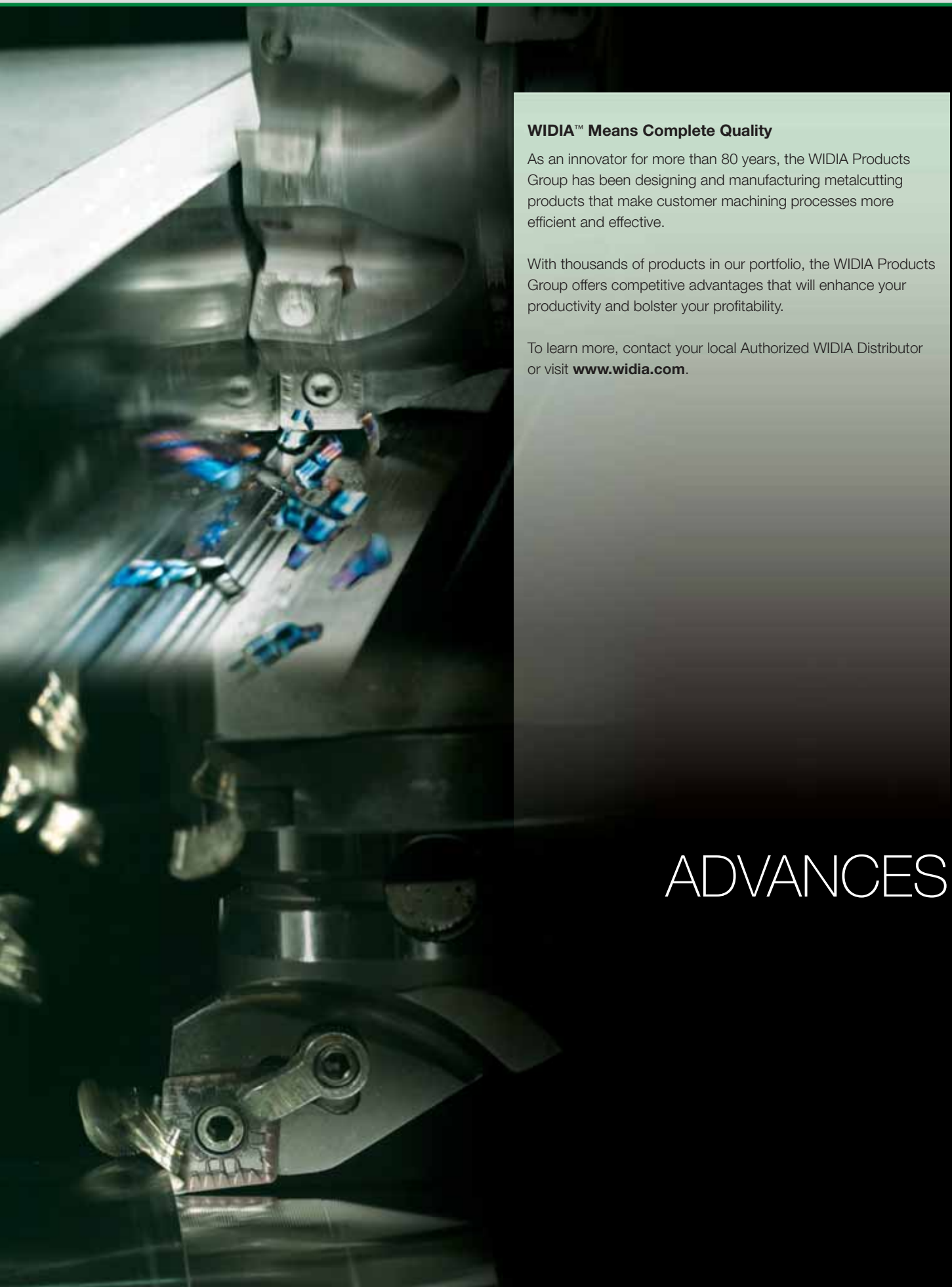
ADVANCES 2014

TURNING | SOLID END MILLING | INDEXABLE MILLING | TOOLING SYSTEMS

INCH

WIDIA™



WIDIA™ Means Complete Quality

As an innovator for more than 80 years, the WIDIA Products Group has been designing and manufacturing metalcutting products that make customer machining processes more efficient and effective.

With thousands of products in our portfolio, the WIDIA Products Group offers competitive advantages that will enhance your productivity and bolster your profitability.

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

ADVANCES

WIDIA Advances

WIDIA™

WIDIA means complete quality

When you buy products from the WIDIA family of brands, you're not just buying speed, power, and precision — you're buying complete quality. The WIDIA Products Group brands offer the most complete portfolio of precision-engineered products and solutions. With thousands of milling, turning, holemaking, and tooling systems products available through a skilled network of Authorized Distributor partners, you'll find everything you need from one single source.

80+ Years of Quality

1925
Application to register "WIDIA" as a trademark

1926
Tungsten carbide production begins

1930
WIDIA wins the Grand Prix at the world exposition EXPO in Liege

1962
First patent granted for coated carbide inserts

1968
Launch of first global coated grade

1987
Launch of the Widaflex™ tooling system for turning, holemaking, and milling

2000
QS 9000 TES and VDA 6.4 certification for the WIDIA operations in Essen and Lichtenau

2006
WIDIA celebrates 80 years

2009
Launch of the TN5100™ and TN7100™ Series grades for turning

2011
Launch KM™ and ERICKSON™ Portfolio

Technical expertise you can count on

WIDIA™ brand cutting tools are available exclusively through a specialised network of Authorized Distributor partners whom you can count on to deliver much more than products.

They will show you how to:

- Significantly reduce cycle time.
- Improve machine tool utilization.
- Achieve measurable productivity improvements.
- Take advantage of proven supply chain solutions.
- Access local inventory and best-in-class technical support.
- Request onsite demonstrations of the latest tooling technology.

The most powerful family of brands in the industry

The WIDIA family of brands is well served by a global network of the finest Authorized Distributors in the industry, selected for their specialized expertise in the areas of:

Turning, Holemaking, Indexable Milling, and Tooling Systems

WIDIA | WIDIA MANCHESTER | WIDIA CLAPPDICO | WIDIA CIRCLE | WIDIA METCUT

Solid Carbide End Milling and Solid Carbide Drilling and Reaming

WIDIA HANITA | WIDIA RÜBIG | WIDIA METAL REMOVAL

Tapping Operations

WIDIA GTD

New Products

Our latest Metalcutting Innovations are designed to deliver higher productivity, longer tool life, and increased application versatility.

For more information about the latest products and services from WIDIA™, please contact your WIDIA Representative or Authorized WIDIA Distributor, or visit www.widia.com.

Turning

- WMT™ Turning, Grooving, Cut-Off, and Profiling
- TopGroove™
- ProGroove™
- Separator™

Solid End Milling

- VariMill I™
- VariMill II™
- VariMill II Long
- VariMill II ER
- Roughing End Mills

Indexable Milling

- M370™ Series High-Feed Double-Sided Platform
- M200™ Series Double-Sided Round Inserts
- M100™ Positive iC 12 Round Inserts

Tooling Systems

- KM™ Quick Change Clamping System
- KM4X™
- High-Performance Solid Carbide End Mills with **SAFE-LOCK**™
- ERICKSON™ HSK Shank Tooling System

ToolBOSS™

Secure point of use solutions — tooling at the right place at the right time.

Combined with our powerful WIDIA™ ToolBOSS Management Software, the 28 LEVEL cabinet provides a versatile, high-capacity solution to meet the unpredictable challenges of logistics and supply chain management.

- Cut tooling inventory.
- 24/7 stock availability.
- Unique reconfiguring.
- Decrease tooling spend.
- Reduce administrative costs.
- Accountability.
- Reduced cost per location.

Drawer Options
19 different drawer sizes available.

Compatibility
Fully compatible with existing ToolBOSS units.

Diagnostics
Built-in tray diagnostic port, facilitating improved remote system support, diagnosis, and repair.

Efficiency
Multiple drawers can be selected in one transaction, minimizing the time required to manage large stock volumes.

Future-Port
USB interface, as well as a DCS expansion port, for use with RFID and other ancillary equipment.

High-Speed Access
Rapid search and selection of an item is enhanced with LED identification system, guiding users to the correct drawer.

Traceability
Software provides a complete audit trail, tracking component usage details.

Expandability
Expandable up to 10 units per system, providing up to 1.121 secure locations.

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

ATMS

Reduce tool spend and productivity costs — quickly and easily.

ATMS is a powerful, cost-effective software solution for tool management. It's an all-inclusive package, providing full tool management with inventory control, purchasing, and full audit trail.

Increase Productivity
- Eliminate downtime from stock-outs.
- Achieve up to 66% setup time reduction.

Improve Your Bottom Line
- Reduce on-hand inventory up to 55% in six months.
- Slash tool consumption up to 30%.
- Reduce acquisition costs up to 90%.

atms
ADVANCED TOOL MANAGEMENT SOFTWARE

Standard and Custom Reporting
An extensive suite of user-friendly standard and customizable reports.

Requesting and Purchasing
The purchasing facility enables internal requisitions to be raised and passed electronically to a business system.

Rework Control
Controls the full rework cycle, including internal and external rework departments.

Inspection Management
Tracks and trends data to identify tool and calibration maintenance needs.

Unlimited Points of Issue
Access to full reporting, ordering, and data management by location and point of issue.

Vending Machine Consolidation and Order Control
Streamlines data entry process consolidation for an unlimited amount of linked vending machines.

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

Recondition

Anyone can regrind your tools — only we truly recondition them.

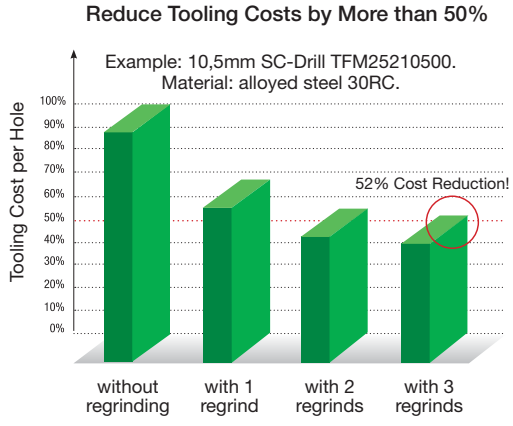
Why recondition?
Our Reconditioning Services help optimise the total value of your metalcutting tools throughout their entire life cycle by giving them “like-new” performance characteristics — with rapid turnaround time — so the tools you need are always on-hand and perform just like new.

By sending your worn drills and end mills for reconditioning, you get:

- Proprietary geometry.
- Certified coatings.
- Superior quality.
- Like-new performance.
- Fast turnaround time.
- Application support throughout the entire tool life cycle.

Most tooling can be reconditioned up to five times.

Our Reconditioning Services deliver considerable savings throughout the life of your cutting tools and can reduce your overall tooling costs by more than 50%.



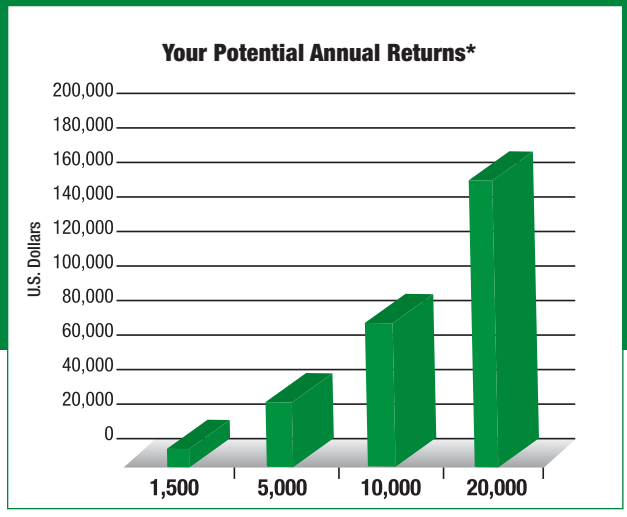
To learn more about our Reconditioning Program, contact your local Authorized Distributor or visit ***www.widia.com****.*

Why Recycle?

It's the right thing to do!
It's easy for your company to be environmentally conscious with our Carbide Recycling Program. By sending us your used carbide tools, you help preserve and protect the environment and ensure that these products are recycled responsibly.

It's profitable!
Not only does WIDIA make it easy for your company to be environmentally conscious, we offer an added incentive — it is profitable. Through our Carbide Recycling Program, get the full value of your investment in metalcutting tools, improve profitability, and reduce your overall tooling spend. When you send us your used carbide, we will reward you with cash.

It's EASY!
Our Carbide Recycling Program is available on the web and is easy to use. You can request a quote, arrange to send us your used carbide, and check the status of your shipment.



**Actual returns may vary based on current market value for carbide recycled materials.*

Green Boxes for green companies
The Green Box™ program is a safe and efficient way for you to package and ship your spent carbide tools to an authorized recycling location.

Qualified used carbide includes mixed coated and uncoated metalcutting tools free of chips, oil, and steel contamination. Material must be free of braze.

To learn more about our Carbide Recycling Program, contact your local Authorized Distributor or visit ***www.widia.com****.*

Sustainable Engineering

Environmental Responsibility
We are deeply committed to designing and manufacturing environmentally responsible products that deliver high performance and proven value. With decades of experience in tooling and manufacturing, and the synergies of superior engineering, leading technology, and customized solutions, we offer some of the most effective opportunities for sustainable manufacturing in the industry. Our comprehensive range of products and excellent customer service make us your complete supplier of sustainable tooling solutions.

Sustainable Engineering
Leading the way with innovation, engineering, and service in standard and custom tooling — a proven methodology and partnership. Through our extensive experience in developing and implementing new project engineering strategies, we have pioneered a proven methodology to help you manufacture new products and bring them to market quickly. We formally evaluate progress and results with you throughout the project through our stage-gate management systems.

We can provide your engineering teams and machine tool builders with process engineering support, advanced metalcutting technologies, and project management expertise to help you achieve your sustainability goals. With our best-in-class process, you will experience accelerated time-to-market, lower overall costs, and reduced risks to implement new technologies.

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

On the Web

Fast, free, and easy registration.

You can easily register with www.widia.com to obtain full access to the features of the site.

Find a Local Authorized WIDIA™ Distributor in Your Area
The WIDIA Products Group offers world-class products and services globally. Our distributors know us, and more importantly, they know you. They know better than anyone in the industry how to put the global power of WIDIA to work for you — in your industry, in your region, and for your business.

Contact Us
Our customers are important to us. We want to provide you the best customer service in the industry. If you have a comment or question, please send it to us. We strive to respond to all inquiries within 24 hours.

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

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

Customer Application Support

Customer Application Support — get fast and reliable answers to your toughest metalcutting problems.



Easy access to proven metalworking expertise!

WIDIA™ Customer Application Engineers assist customers and engineering groups throughout the world with expert tool selection and application recommendations for the entire range of WIDIA tooling.

Service Level Excellence:
- Fast telephone response.
- Quick technical solutions.
- Efficient case management.

Best-in-Class Support Tools and Technology:
- Tooling performance experts.
- Materials database.
- Application calculators.

Services Provided:
- Tooling selection.
- Operating parameters.
- Troubleshooting.
- Process optimization.
- Hardware support.

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

CAS

Our Customer Application Support (CAS) Team is the metalworking industry's leading help desk resource for tooling application solutions and problem resolution!

- Easy access to proven metalworking expertise.
- Service level excellence.
- Best-in-class application support tools and technology.

Convenient Access Options:

Originating Country	Language	Phone	Fax	E-mail
Australia	English	001-724-539-6921*	001-724-539-6830*	ap.techsupport@widia.com
Austria	German	0800 291630	0800 291631	eu.techsupport@widia.com
Belgium	English/French	0800 80410	0800 80411	eu.techsupport@widia.com
China	Chinese	400-889-2237	021-58342200	w-cn.techsupport@widia.com
Denmark	English	808 89295	808 89297	na.techsupport@widia.com
Finland	English	0800 919413	0800 919415	na.techsupport@widia.com
France	Frensh	080 5540 379	080 5540 029	eu.techsupport@widia.com
Germany	German	0800 1015774	0800 0007531	eu.techsupport@widia.com
India	English	001-724539-6921*	001-724-539-6830*	ap.techsupport@widia.com
Israel	English	1809 449907	1809 439845	na.techsupport@widia.com
Italy	Italian	800 916568	800 917749	eu.techsupport@widia.com
Japan	English	001-724539-6921*	001-724-539-6830*	ap.techsupport@widia.com
Korea (South)	English	001-724539-6921*	001-724-539-6830*	ap.techsupport@widia.com
Malaysia	English	001-724539-6921*	001-724-539-6830*	ap.techsupport@widia.com
Netherlands	English	0800 0201131	0800 0201135	na.techsupport@widia.com
New Zealand	English	001-724539-6921*	001-724-539-6830*	ap.techsupport@widia.com
Norway	English	800 10081	800 10001	na.techsupport@widia.com
Poland	Polish	00800 4411943	00800 4411940	eu.techsupport@widia.com
Singapore	English	001-724539-6921*	001-724-539-6830*	ap.techsupport@widia.com
South Africa	English	0800 981644	0800 981645	na.techsupport@widia.com
Sweden	English	020798794	020790477	na.techsupport@widia.com
Taiwan	English	001-724539-6921*	001-724-539-6830*	ap.techsupport@widia.com
Thailand	English	001-724539-6921*	001-724-539-6830*	ap.techsupport@widia.com
United Kingdom	English	0800 028 2996	0800 028 5721	na.techsupport@widia.com
USA	English	888 539 5145	001-724-539-6830*	na.techsupport@widia.com

**Noted phone and fax numbers are not toll free.*

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

WIDIA™ Branded Merchandise

SHOP. BUY. PROMOTE.

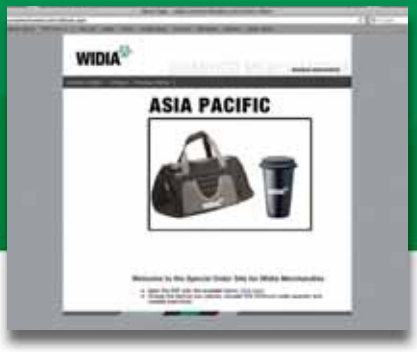
New WIDIA Branded Merchandise Available! Place Your Order Today!

Introducing a new line of WIDIA merchandise. Place an order for any of the following quality products with your Authorized WIDIA Distributor or visit www.widia.corpmerchandise.com.

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

Global Online Ordering Made Simple.

Shopping for Branded Merchandise products online is safe, secure, and easy.
Just follow these simple steps:



- Browse through the Branded Merchandise eStore by clicking on a department and then clicking on the products that interest you.
- Add items to your Cart.
- Register or verify your shopper information.
- Select your payment method and submit your order.
- Print your View Cart page or your Receipt.

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

WIDIA™ Social Media

Join our conversation.

Connect with us to get the latest information on our new products and promotions, read success stories, and view product videos.

https://twitter.com/WIDIAProductGrp

https://www.facebook.com/WIDIAProductGrp

http://www.linkedin.com/company/widia-product-group

http://www.youtube.com/user/WidiaSolutions

WIDIA blogs can be read at http://word.widia.com.

WIDIA™ QR Codes

Use your smartphone or tablet to scan the QR codes throughout this catalog.

Throughout the WIDIA Advances 2014 Catalog, you will find codes like the one shown here that will activate links containing more information about various products and services offered. The QR codes that you will find within this catalog are designed to relate to the products or product families on the page where they are found. These codes will link you to expanded product information, such as application videos, informative drawings and animations, extra product charts and graphs, or simply to an expanded online catalog of products offered by WIDIA for all your drilling, turning, and milling needs.

Helpful Information to Get You Scanning

QR codes are activated when scanned with a dedicated QR scanning application using the onboard camera of your smartphone or tablet. If you currently have a QR scanner on your smartphone or tablet, look for codes to learn more information about our products. Don't have a QR scanner on your device? It's simple to get one. Just go to your device's application store, and search for a "QR code scanner". Follow your application store's directions on downloading an application, and then launch your QR scanner.

- With your scanner, center the QR code in the camera window of your application.
- When the scanner locks onto the image, you will be on your way to the embedded information in the QR code.
- Once the webpage, video, or other information linked to the QR code opens or loads, you can freely interact.

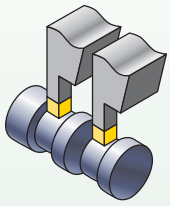
When you need information quickly on a product or an extended product catalog, skip the web search and long website URLs, and scan the provided QR codes in this catalog.

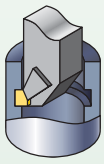
Scan the code at the top of the page to visit our website and online product catalog.

WIDIA

Turning

Grooving





WMT™

- Insert cutting widths: .079–.315" (2–8mm).
- O.D. cutting depths: .65–1" (16,5–25,4mm).
- I.D. boring bar minimum bore diameter: 2.25" (57,15mm).
- Screw-clamping integral shank/cartridge toolholders available.
- Geometry for deep grooving.

Pages: A4–A30

TopGroove™

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

Pages: A32–A73

ProGroove™

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

Pages: A74–A86

S-LOC™

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

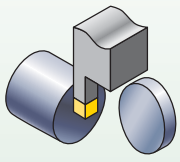
Pages: A118–A123

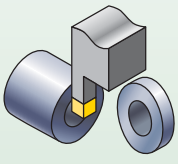
LG

- Insert cutting widths: .315–.630" (8–16mm).
- O.D. cutting depths: .787–1.26" (20–32mm).
- Wedge-clamping integral shank tooling available.

Pages: A74–A86

Cut-Off





WMT™

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

Pages: A4–A30

Separator™

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

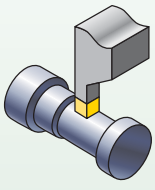
Pages: A88–A109

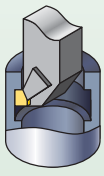
ProGroove™

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

Pages: A74–A86

Plunge and Turn





WMT™

Heavy Stock Removal in Turning Applications

- Double-sided inserts, cutting widths: .079–.315" (2–8mm).
- O.D. cutting depths: .650–1" (16,5–25,4mm).
- I.D. boring bar minimum bore diameter: 2.25" (57,15mm).
- Screw-clamping integral shank/cartridge toolholders available.

Pages: A4–A30

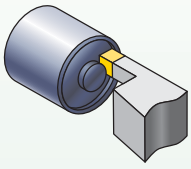
ProGroove™

For Light-Cutting Inserts

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

Pages: A74–A86

Face Grooving



WMT™

- Cutting widths: .118–.250" (3–6,35mm).
- Cutting depths: .5–1" (13–25,4mm).
- Minimum face groove diameter: 1.5–8" (38–205mm).

Pages: A4–A30

Ranger™

- Cutting widths: .126–.25" (3,18–6,35mm).
- Cutting depths: .75–1" (19–25,4mm).
- Minimum face groove O.D. diameter: 2.25–16" (57–400mm).
- Square right-angle shank and round shank toolholders available.
- Screw-clamping, adjustable cartridge toolholders with different widths and spindle rotations.

Pages: A110–A117

S-LOC™

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

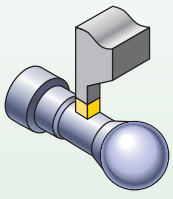
Pages: A118–A123

TopGroove™

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

Pages: A32–A73

Profiling



WMT™

For Heavy Stock Removal

- Full radius insert cutting widths: .118–.315" (3–8mm).
- O.D. cutting depths: .650–1" (16,5–25,4mm).
- Screw-clamping integral shank/cartridge toolholders available.

Pages: A4–A30

TopGroove™

Moderate/Heavy Stock Removal at Shallow Profile Depths

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

Pages: A32–A73

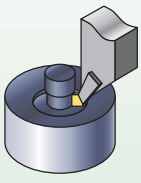
ProGroove™

For Light Cutting

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

Pages: A74–A86

Undercutting



TopGroove™

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

Pages: A32–A73

One System for Grooving, Cut-Off, Turning, and Profiling • **WMT™ System**

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

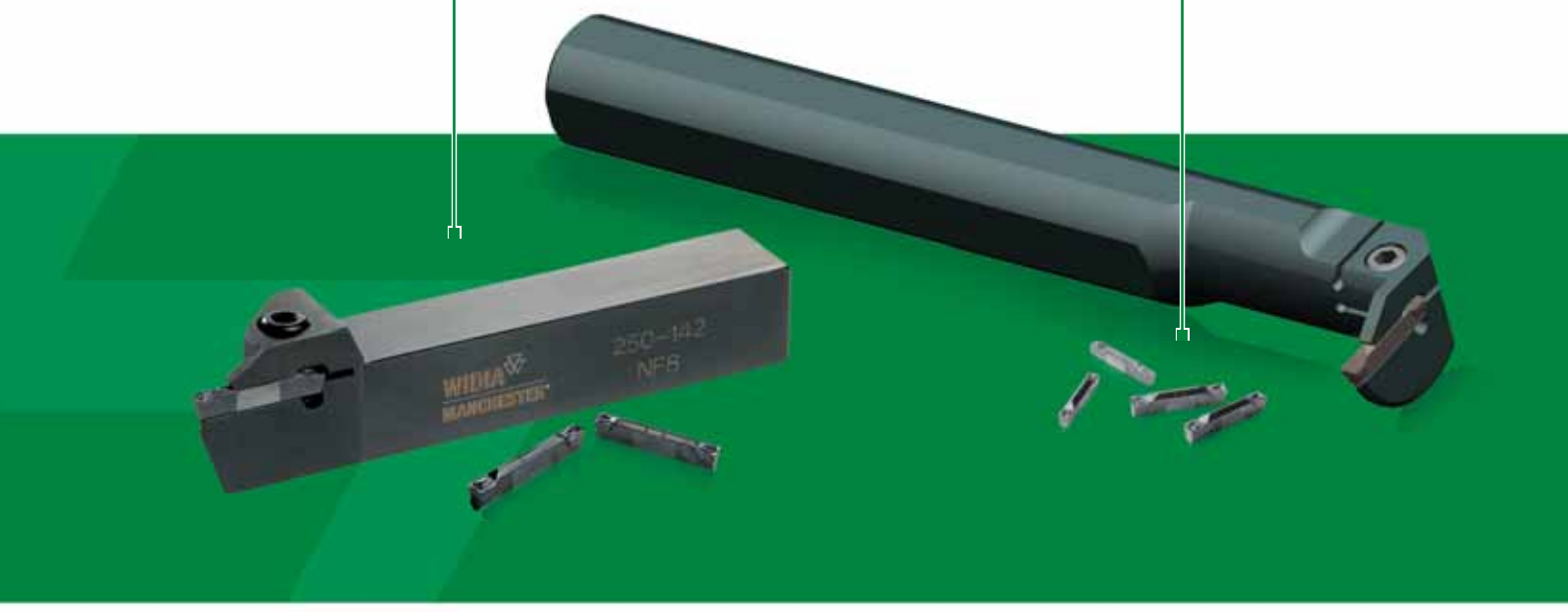
WMT

Versatile and Well Constructed

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

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

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



WMT™ Toolholders

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

The Most Advanced Turning Solutions in the Industry

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

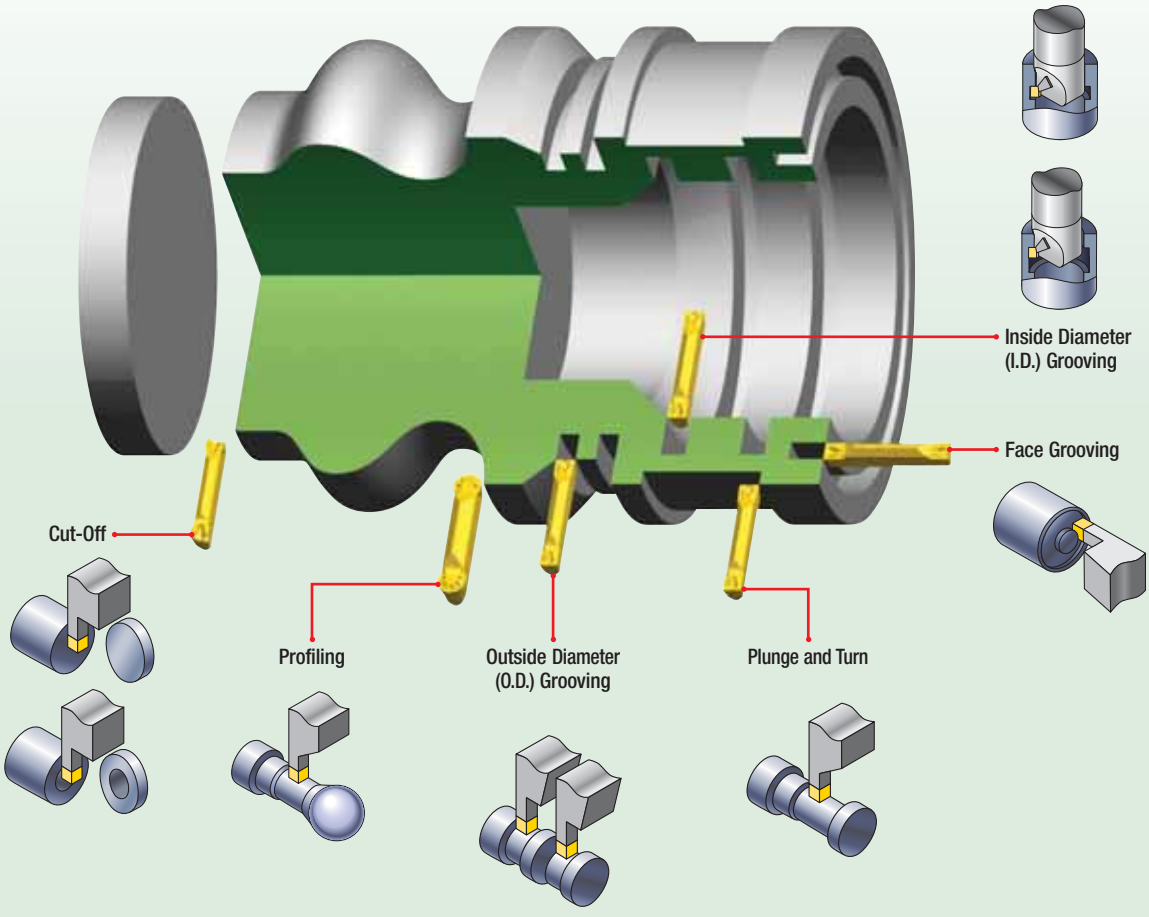
The WMT system, with its extra-long clamping area and precise insert positioning, ensures exceptionally fast and accurate machining, all-in-one tool, for your most demanding grooving, cut-off, turning, and profiling applications.

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

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

1 Choose the application to be performed:

Groove depth, width, and profile.



2 Identify the material to be machined:

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

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

3 **Select your toolholder based on the application:**

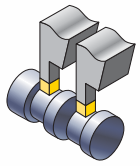
A Choose the appropriate width "W" required for the application.

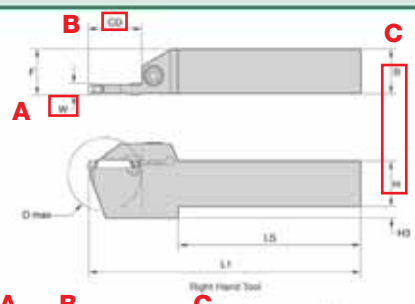
B Choose the shortest cutting depth "CD" dimension for increased tool rigidity.

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

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

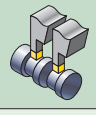
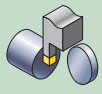
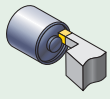
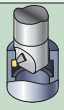
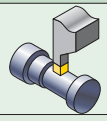
WIDIA





■ O.D. Grooving and Cut-Off

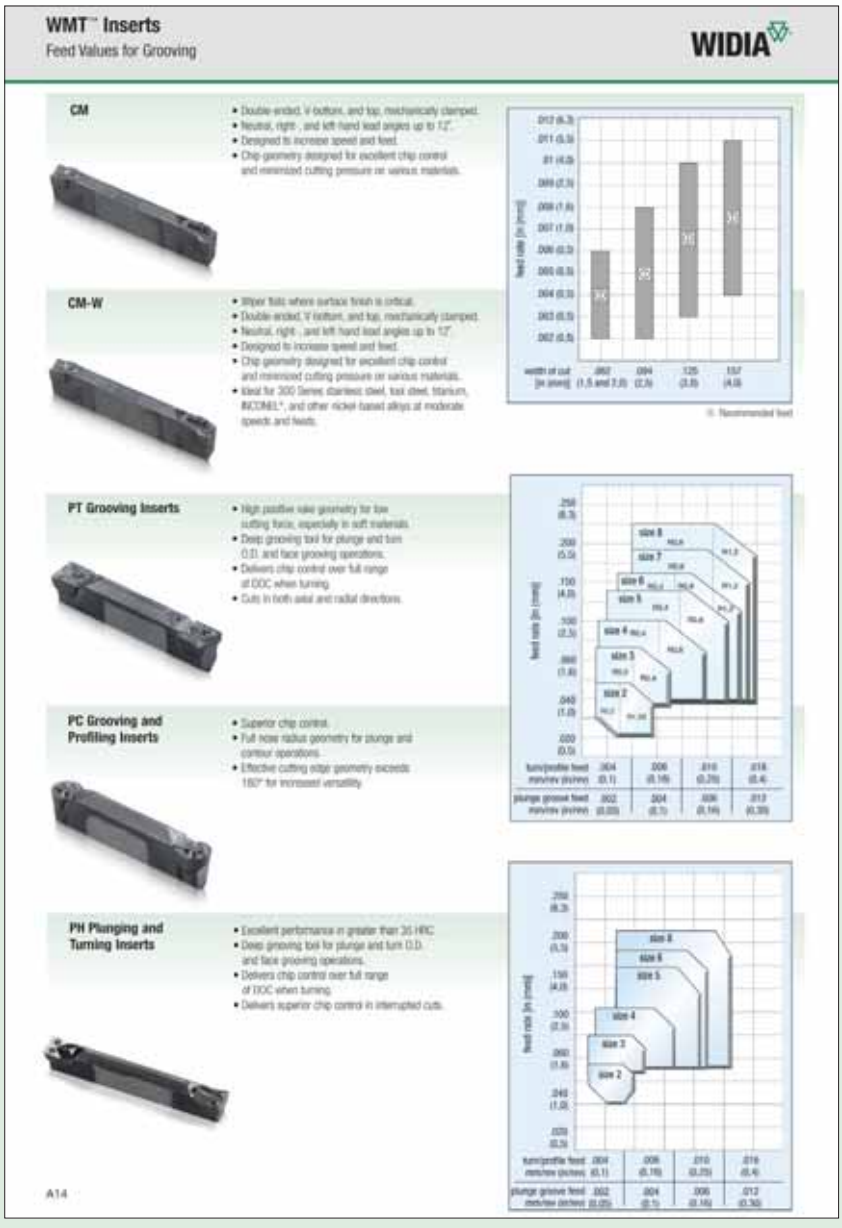
order number	new catalog number	old catalog number right hand	C H	A W	B CD	D max	F	C B	H3	L1	LS	clamp screw
3655938	WMTCR82053	250301	.375	.079	–	1.062	.375	.369	.125	4.500	3.410	606249
3655888	WMTCR82B053	250109	.375	.094	–	1.062	.375	.365	.125	4.500	3.410	606249
3655940	WMTCR83062	250303	.500	.079	–	1.125	.500	.494	.188	4.500	3.410	606249
3655892	WMTCR82B062	250-111	.500	.094	–	1.250	.500	.490	.190	4.500	3.290	606249
3655942	WMTSR102065	250305	.625	.079	.650	–	.625	.603	.250	5.000	3.680	606249
3655894	WMTSR1025075	250-113	.625	.094	.750	–	.625	.603	.250	5.000	3.480	619205
3655898	WMTSR103044	250117	.625	.125	.440	–	.625	.603	–	5.000	3.695	619205
3655900	WMTSR103087	250119	.625	.125	.875	–	.625	.603	.250	5.000	3.305	619205
3655930	WMTSR104044	250181	.625	.156	.440	–	.625	.603	–	5.000	3.695	619205
3655902	WMTSR100056	250123	.625	.188	.560	–	.629	.603	–	5.000	3.562	619168
3655904	WMTSR100100	250125	.625	.188	1.000	–	.629	.603	.250	5.500	3.655	619168
3655944	WMTSR122065	250307	.750	.079	.650	–	.750	.719	–	5.000	3.680	606249
3655896	WMTSR1225075	250-115	.750	.094	.750	–	.750	.719	.250	5.000	3.480	619205
3655934	WMTSR122B042	250189	.750	.094	.420	–	.750	.719	–	5.000	3.695	619205
3655908	WMTSR123087	250129	.750	.125	.875	–	.750	.719	.250	5.000	3.305	619205
3655932	WMTSR124044	250183	.750	.156	.440	–	.750	.719	–	5.000	3.695	619205
3655910	WMTSR125056	250133	.750	.188	.560	–	.750	.719	–	5.000	3.562	619168
3655912	WMTSR125100	250135	.750	.188	1.000	–	.750	.719	.250	5.500	3.655	619168
3655914	WMTSR126056	250137	.750	.250	.560	–	.754	.719	–	5.000	3.562	619168
3656137	WMTSR161065	250319	1.000	.059	.650	–	.991	1.000	–	6.000	4.679	606256
3655946	WMTSR162065	250309	1.000	.079	.650	–	1.000	.969	–	6.000	4.680	606249
3655936	WMTSR1625075	250193	1.000	.094	.750	–	1.000	.969	–	6.000	4.500	619205
3655916	WMTSR163044	250141	1.000	.125	.440	–	1.000	.969	–	6.000	4.695	619205
3655920	WMTSR164087	250145	1.000	.156	.875	–	1.000	.969	–	6.000	4.375	619205
3655922	WMTSR165056	250147	1.000	.188	.560	–	1.000	.969	–	6.000	4.562	619168
3655924	WMTSR165100	250149	1.000	.188	1.000	–	1.000	.969	–	6.000	4.175	619168
3655926	WMTSR166056	250151	1.000	.250	.560	–	1.004	.969	–	6.000	4.562	619168
3655928	WMTSR166100	250153	1.000	.250	1.000	–	1.002	.969	–	6.000	4.174	619168
3539143	WMTSR208056	250175	1.250	.313	.560	–	1.250	1.207	–	6.000	4.553	619168

	application	conventional toolholders	modular blades
 	O.D. Grooving and Cut-Off	pages A22–A24	pages A28–A29
	Face Grooving	pages A25–A26	pages A28–A30
	I.D. Grooving	page A27	—
	Plunge and Turn	pages A22–A24	pages A28–A29

4 Select chipbreaker style for the application:

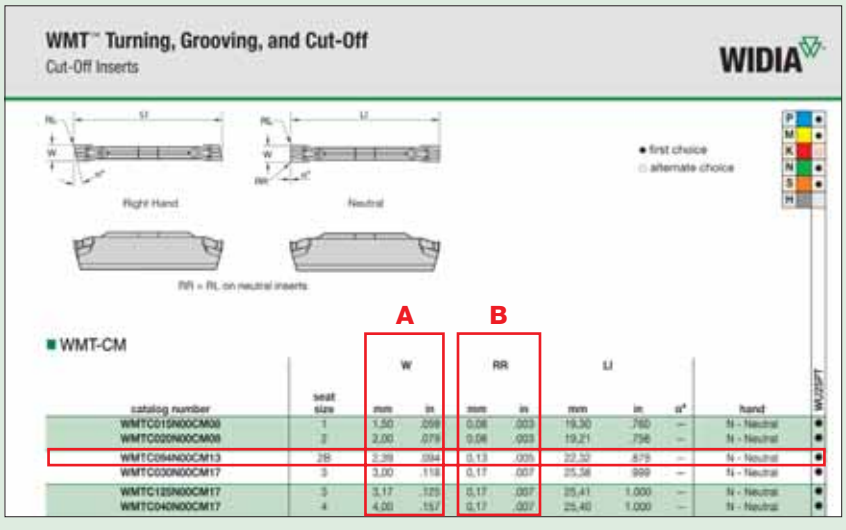
CM	Cut-off
CM-W	Cut-off with wipers
PT	Plunging and turning
PC	Profiling and turning
PH	Plunging and turning

NOTE: Chart shows recommended starting feed rates.



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

B Select the required corner radius value "RR".



5 Select grade:

cutting condition		Recommended Grades: steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys	hardened materials
smooth cut, pre-turned surface		WP10CT	WU10PT	WP10CT	WU10PT	WU10PT	WU10PT
varying depth of cut, casting, or forging skin		WP10CT	WU10PT	WP10CT	WP10CT	WP10CT	WP10CT
lightly interrupted cut		WP25CT	WU25PT	WP25CT	WU25PT	WU25PT	WU25PT
heavily interrupted cut		WU25PT	WU25PT	WP25CT	WU25PT	WU25PT	WU25PT

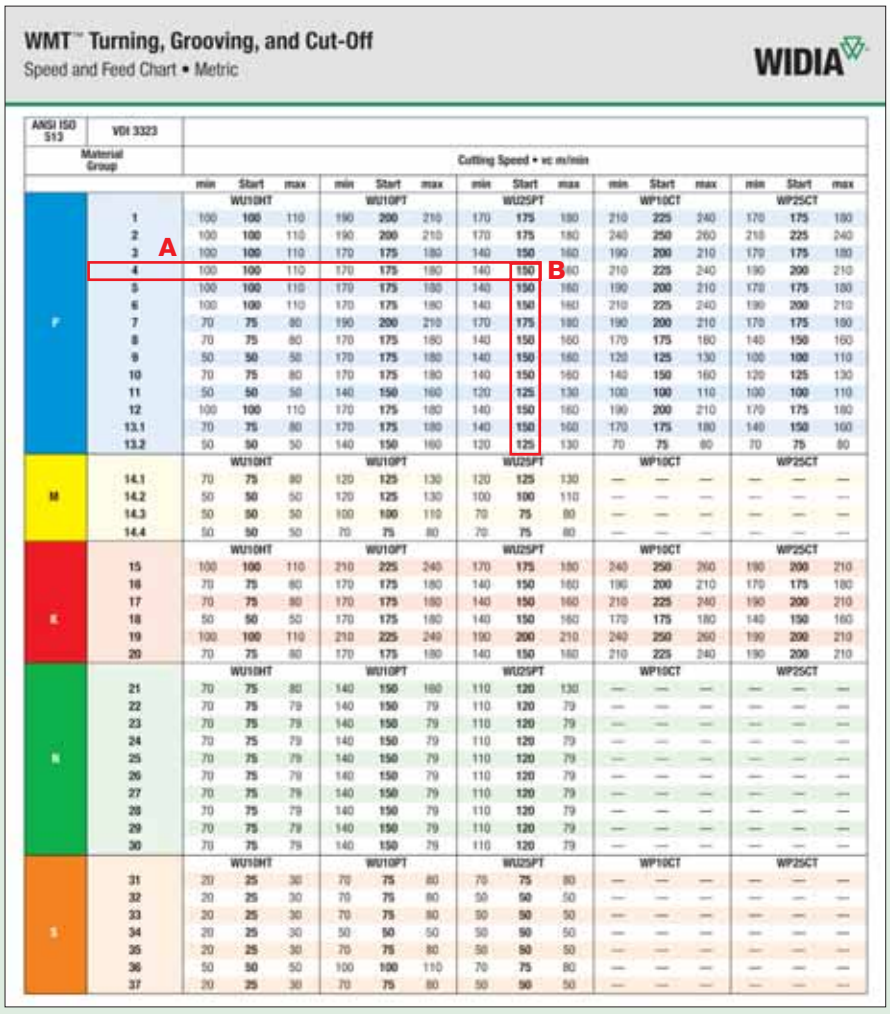
NOTE: See page A10 for Grades and Grade Descriptions.

6 Determine cutting data:

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

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

NOTE: See pages A12–A13 for cutting data.

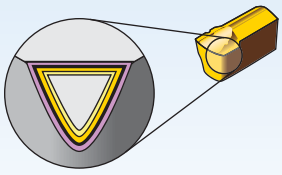


WMT™ Turning, Grooving, and Cut-Off

Speed and Feed Chart • Metric

WIDIA

ANSI ISO 513	VDI 3323	Material Group	Cutting Speed • vc m/min															
			min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
			WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
P	1		100	**100**	110	190	**200**	210	170	**175**	180	210	**225**	240	170	**175**	180
	2		100	**100**	110	190	**200**	210	170	**175**	180	240	**250**	260	210	**225**	240
	3	A	100	**100**	110	170	**175**	180	140	**150**	160	190	**200**	210	170	**175**	180
	4		100	**100**	110	170	**175**	180	140	**150**	B 160	210	**225**	240	190	**200**	210
	5		100	**100**	110	170	**175**	180	140	**150**	160	190	**200**	210	170	**175**	180
	6		100	**100**	110	170	**175**	180	140	**150**	160	210	**225**	240	190	**200**	210
	7		70	**75**	80	190	**200**	210	170	**175**	180	190	**200**	210	170	**175**	180
	8		70	**75**	80	170	**175**	180	140	**150**	160	170	**175**	180	140	**150**	160
	9		50	**50**	50	170	**175**	180	140	**150**	160	120	**125**	130	100	**100**	110
	10		70	**75**	80	170	**175**	180	140	**150**	160	140	**150**	160	120	**125**	130
	11		50	**50**	50	140	**150**	160	120	**125**	130	100	**100**	110	100	**100**	110
	12		100	**100**	110	170	**175**	180	140	**150**	160	190	**200**	210	170	**175**	180
	13.1		70	**75**	80	170	**175**	180	140	**150**	160	170	**175**	180	140	**150**	160
	13.2		50	**50**	50	140	**150**	160	120	**125**	130	70	**75**	80	70	**75**	80
			WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
M	14.1		70	**75**	80	120	**125**	130	120	**125**	130	—	—	—	—	—	—
	14.2		50	**50**	50	120	**125**	130	100	**100**	110	—	—	—	—	—	—
	14.3		50	**50**	50	100	**100**	110	70	**75**	80	—	—	—	—	—	—
	14.4		50	**50**	50	70	**75**	80	70	**75**	80	—	—	—	—	—	—
			WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
K	15		100	**100**	110	210	**225**	240	170	**175**	180	240	**250**	260	190	**200**	210
	16		70	**75**	80	170	**175**	180	140	**150**	160	190	**200**	210	170	**175**	180
	17		70	**75**	80	170	**175**	180	140	**150**	160	210	**225**	240	190	**200**	210
	18		50	**50**	50	170	**175**	180	140	**150**	160	170	**175**	180	140	**150**	160
	19		100	**100**	110	210	**225**	240	190	**200**	210	240	**250**	260	190	**200**	210
	20		70	**75**	80	170	**175**	180	140	**150**	160	210	**225**	240	190	**200**	210
			WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
N	21		70	**75**	80	140	**150**	160	110	**120**	130	—	—	—	—	—	—
	22		70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
	23		70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
	24		70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
	25		70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
	26		70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
	27		70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
	28		70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
	29		70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
	30		70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
			WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
S	31		20	**25**	30	70	**75**	80	70	**75**	80	—	—	—	—	—	—
	32		20	**25**	30	70	**75**	80	50	**50**	50	—	—	—	—	—	—
	33		20	**25**	30	70	**75**	80	50	**50**	50	—	—	—	—	—	—
	34		20	**25**	30	50	**50**	50	50	**50**	50	—	—	—	—	—	—
	35		20	**25**	30	70	**75**	80	50	**50**	50	—	—	—	—	—	—
	36		50	**50**	50	100	**100**	110	70	**75**	80	—	—	—	—	—	—
	37		20	**25**	30	70	**75**	80	50	**50**	50	—	—	—	—	—	—



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

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

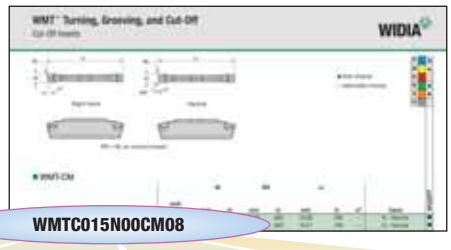
wear resistance ⟷ toughness

Grade

Coating		Grade Description	05	10	15	20	25	30	35	40	45
WU10PT	HC-P15	An advanced PVD-TiAlN coating over a very deformation-resistant unalloyed carbide substrate. The WU10PT grade's new and improved coating enables speeds to be increased by 50–100%. The WU10PT grade is ideal for finishing to general machining of most workpiece materials at higher speeds. Excellent for machining most steels, stainless steels, cast irons, non-ferrous materials, and super alloys under stable conditions. It also performs well machining hardened and short chipping materials.			P M K N S H						
WU25PT	HC-P30	An advanced PVD-TiAlN-coated grade with a tough, ultra-fine-grain, unalloyed substrate. For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium, irons, and non-ferrous materials. Speeds may vary from low to medium and will handle interruptions and high feed rates.				P M K N S					
WU10HT	HW-K15	A hard, low binder content, unalloyed WC/Co fine-grained grade. Exceptional edge wear resistance combined with very high strength for machining titanium, cast irons, austenitic stainless steels, non-ferrous metals, non-metals, and most high-temperature alloys. Superior thermal deformation and depth of cut notch resistance. The grain structure is well controlled for minimal pits and flaws, which contributes to long, reliable service.				M K N S					
WP10CT	HC-P10	A specially engineered, proprietary, cobalt-enriched carbide grade with thick K-MTCVD-TiCN coating layer, an Al_2O_3 layer of controlled grain size, and outer layers of TiCN and TiN for maximum wear resistance. An excellent finishing to medium machining grade for a variety of workpiece materials including most steels, ferritic and martensitic stainless steels, and cast irons. The specially engineered, cobalt-enriched substrate offers a balanced combination of deformation resistance and edge toughness, while the thick coating layers offer outstanding abrasion resistance and crater wear resistance for high-speed machining. The smooth coating provides good resistance to edge build-up and microchipping and produces excellent surface finishes. For rougher cutting, use the WP10CT grade.			P K						
WP25CT	HC-P25	A tough cobalt-enriched carbide grade with a newly designed multilayer K-MTCVD TiCN-Al_2O_3-TiCN-TiN coating with superior interlayer adhesion. This is the industry's best general-purpose turning grade for most steels and ferritic and martensitic stainless steels. The substrate design, with cobalt-enrichment, ensures adequate deformation resistance along with excellent bulk toughness and insert edge strength. The coating layers offer good wear resistance over a wide range of machining conditions. The smoothness of the coating leads to reduced frictional heat, minimizes microchipping, and improves workpiece surface finishes. The WP25CT grade performs well in moderately heavy roughing to semi-finishing cuts. Use the WP25CT grade for finishing cuts.				P K					

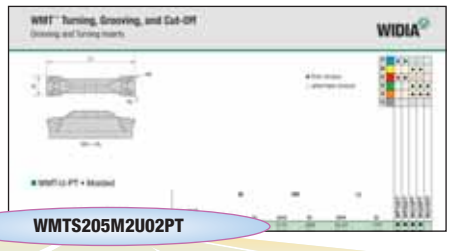
WMT Identification System

Cut-Off



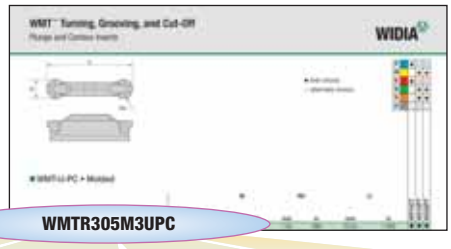
WMT	C	015	N	00	CM	08
Tooling System	Cut-Off	W in mm*10 inch*1000	Hand of Insert	Main Cutting Edge Lead Angle	Chipbreaker Geometry CM = Cut-Off CM-W = Cut-Off with Wiper	Corner Radius in mm* 10

Grooving



WMT	S	205	M	2	U	02	PT
Tooling System	Square	mm*10 inch*1000	Unit of Measurement for Width **m** = mm **i** = inch	Seat Size	**U** = Molded or **P** = Ground	Corner Radius in mm*10	Chipbreaker Geometry

Plunge • Contour



WMT	R	305	M	3	U	PC
Tooling System	Full Radius	mm*10 inch*1000	Unit of Measurement for Width **m** = mm **i** = inch	Seat Size	**U** = Molded or **P** = Ground	Chipbreaker Geometry

ANSI ISO 513	VDI 3323	Cutting Speed • vc m/min														
Material Group		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
		WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
P	1	100	**100**	110	190	**200**	210	170	**175**	180	210	**225**	240	170	**175**	180
	2	100	**100**	110	190	**200**	210	170	**175**	180	240	**250**	260	210	**225**	240
	3	100	**100**	110	170	**175**	180	140	**150**	160	190	**200**	210	170	**175**	180
	4	100	**100**	110	170	**175**	180	140	**150**	160	210	**225**	240	190	**200**	210
	5	100	**100**	110	170	**175**	180	140	**150**	160	190	**200**	210	170	**175**	180
	6	100	**100**	110	170	**175**	180	140	**150**	160	210	**225**	240	190	**200**	210
	7	70	**75**	80	190	**200**	210	170	**175**	180	190	**200**	210	170	**175**	180
	8	70	**75**	80	170	**175**	180	140	**150**	160	170	**175**	180	140	**150**	160
	9	50	**50**	50	170	**175**	180	140	**150**	160	120	**125**	130	100	**100**	110
	10	70	**75**	80	170	**175**	180	140	**150**	160	140	**150**	160	120	**125**	130
	11	50	**50**	50	140	**150**	160	120	**125**	130	100	**100**	110	100	**100**	110
	12	100	**100**	110	170	**175**	180	140	**150**	160	190	**200**	210	170	**175**	180
	13.1	70	**75**	80	170	**175**	180	140	**150**	160	170	**175**	180	140	**150**	160
	13.2	50	**50**	50	140	**150**	160	120	**125**	130	70	**75**	80	70	**75**	80
		WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
M	14.1	70	**75**	80	120	**125**	130	120	**125**	130	—	—	—	—	—	—
	14.2	50	**50**	50	120	**125**	130	100	**100**	110	—	—	—	—	—	—
	14.3	50	**50**	50	100	**100**	110	70	**75**	80	—	—	—	—	—	—
	14.4	50	**50**	50	70	**75**	80	70	**75**	80	—	—	—	—	—	—
		WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
K	15	100	**100**	110	210	**225**	240	170	**175**	180	240	**250**	260	190	**200**	210
	16	70	**75**	80	170	**175**	180	140	**150**	160	190	**200**	210	170	**175**	180
	17	70	**75**	80	170	**175**	180	140	**150**	160	210	**225**	240	190	**200**	210
	18	50	**50**	50	170	**175**	180	140	**150**	160	170	**175**	180	140	**150**	160
	19	100	**100**	110	210	**225**	240	190	**200**	210	240	**250**	260	190	**200**	210
	20	70	**75**	80	170	**175**	180	140	**150**	160	210	**225**	240	190	**200**	210
		WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
N	21	70	**75**	80	140	**150**	160	110	**120**	130	—	—	—	—	—	—
	22	70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
	23	70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
	24	70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
	25	70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
	26	70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
	27	70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
	28	70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
	29	70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
	30	70	**75**	79	140	**150**	79	110	**120**	79	—	—	—	—	—	—
		WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
S	31	20	**25**	30	70	**75**	80	70	**75**	80	—	—	—	—	—	—
	32	20	**25**	30	70	**75**	80	50	**50**	50	—	—	—	—	—	—
	33	20	**25**	30	70	**75**	80	50	**50**	50	—	—	—	—	—	—
	34	20	**25**	30	50	**50**	50	50	**50**	50	—	—	—	—	—	—
	35	20	**25**	30	70	**75**	80	50	**50**	50	—	—	—	—	—	—
	36	50	**50**	50	100	**100**	110	70	**75**	80	—	—	—	—	—	—
	37	20	**25**	30	70	**75**	80	50	**50**	50	—	—	—	—	—	—

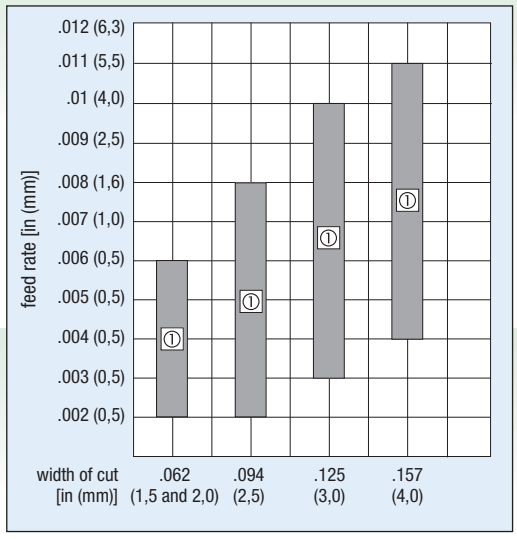
ANSI ISO 513	VDI 3323	Cutting Speed • vc SFM														
Material Group		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
		WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
P	1	290	**300**	320	620	**650**	680	520	**550**	580	670	**700**	740	590	**625**	660
	2	330	**350**	370	620	**650**	680	570	**600**	630	760	**800**	840	670	**700**	740
	3	290	**300**	320	520	**550**	580	480	**500**	530	640	**675**	710	550	**575**	600
	4	330	**350**	370	570	**600**	630	520	**550**	580	710	**750**	790	620	**650**	680
	5	290	**300**	320	520	**550**	580	480	**500**	530	590	**625**	660	520	**550**	580
	6	330	**350**	370	520	**550**	580	480	**500**	530	710	**750**	790	620	**650**	680
	7	260	**275**	290	620	**650**	680	550	**575**	600	590	**625**	660	520	**550**	580
	8	240	**250**	260	520	**550**	580	480	**500**	530	520	**550**	580	450	**475**	500
	9	140	**150**	160	520	**550**	580	480	**500**	530	380	**400**	420	330	**350**	370
	10	210	**225**	240	550	**575**	600	500	**525**	550	480	**500**	530	400	**425**	450
	11	140	**150**	160	480	**500**	530	430	**450**	470	330	**350**	370	290	**300**	320
	12	290	**300**	320	520	**550**	580	480	**500**	530	640	**675**	710	570	**600**	630
	13.1	240	**250**	260	520	**550**	580	480	**500**	530	520	**550**	580	450	**475**	500
	13.2	120	**125**	130	480	**500**	530	430	**450**	470	260	**275**	290	240	**250**	260
		WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
M	14.1	240	**250**	260	430	**450**	470	400	**425**	450	—	—	—	—	—	—
	14.2	190	**200**	210	360	**375**	390	330	**350**	370	—	—	—	—	—	—
	14.3	140	**150**	160	310	**325**	340	290	**300**	320	—	—	—	—	—	—
	14.4	120	**125**	130	260	**275**	290	240	**250**	260	—	—	—	—	—	—
		WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
K	15	290	**300**	320	670	**700**	740	620	**650**	680	760	**800**	840	640	**675**	710
	16	190	**200**	210	520	**550**	580	480	**500**	530	620	**650**	680	550	**575**	600
	17	210	**225**	240	570	**600**	630	520	**550**	580	710	**750**	790	620	**650**	680
	18	170	**175**	180	550	**575**	600	500	**525**	550	520	**550**	580	450	**475**	500
	19	290	**300**	320	710	**750**	790	640	**675**	710	760	**800**	840	640	**675**	710
	20	240	**250**	260	520	**550**	580	480	**500**	530	710	**750**	790	620	**650**	680
		WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
N	21	240	**250**	260	480	**500**	530	380	**400**	420	—	—	—	—	—	—
	22	240	**250**	260	480	**500**	530	380	**400**	420	—	—	—	—	—	—
	23	240	**250**	260	480	**500**	530	380	**400**	420	—	—	—	—	—	—
	24	240	**250**	260	480	**500**	530	380	**400**	420	—	—	—	—	—	—
	25	240	**250**	260	480	**500**	530	380	**400**	420	—	—	—	—	—	—
	26	240	**250**	260	480	**500**	530	380	**400**	420	—	—	—	—	—	—
	27	240	**250**	260	480	**500**	530	380	**400**	420	—	—	—	—	—	—
	28	240	**250**	260	480	**500**	530	380	**400**	420	—	—	—	—	—	—
	29	240	**250**	260	480	**500**	530	380	**400**	420	—	—	—	—	—	—
	30	240	**250**	260	480	**500**	530	380	**400**	420	—	—	—	—	—	—
		WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
S	31	120	**125**	130	260	**275**	290	240	**250**	260	—	—	—	—	—	—
	32	100	**100**	110	210	**225**	240	190	**200**	210	—	—	—	—	—	—
	33	70	**75**	80	210	**225**	240	210	**225**	240	—	—	—	—	—	—
	34	50	**50**	50	190	**200**	210	190	**200**	210	—	—	—	—	—	—
	35	50	**50**	50	190	**200**	210	190	**200**	210	—	—	—	—	—	—
	36	190	**200**	210	310	**325**	340	290	**300**	320	—	—	—	—	—	—
	37	100	**100**	110	210	**225**	240	210	**225**	240	—	—	—	—	—	—

CM

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

CM-W

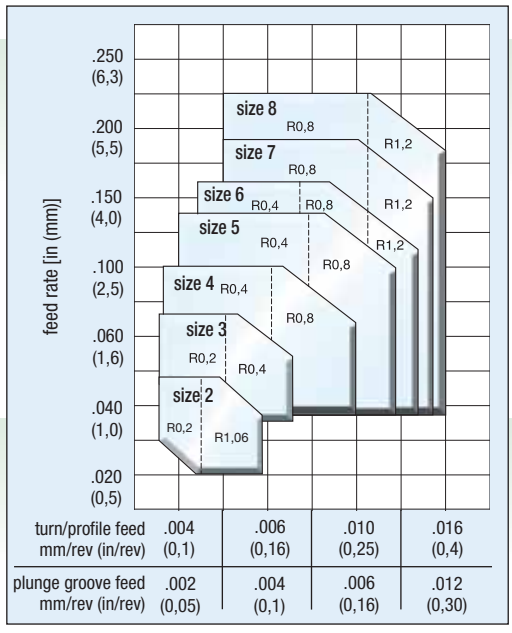
- Wiper flats where surface finish is critical.
- Double-ended, V-bottom, and top, mechanically clamped.
- Neutral, right-, and left-hand lead angles up to 12°.
- Designed to increase speed and feed.
- Chip geometry designed for excellent chip control and minimized cutting pressure on various materials.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



① Recommended feed

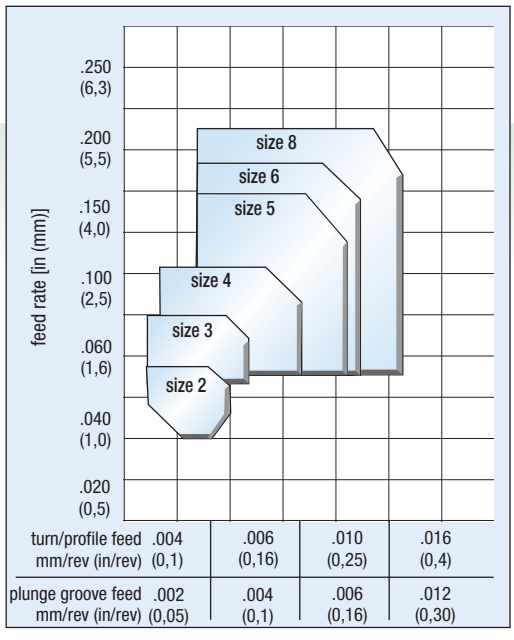
PT Grooving Inserts

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



PC Grooving and Profiling Inserts

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



PH Plunging and Turning Inserts

- Excellent performance in greater than 35 HRC.
- Deep grooving tool for plunge and turn O.D. and face grooving operations.
- Delivers chip control over full range of DOC when turning.
- Delivers superior chip control in interrupted cuts.

WIN WITH WIDIA™

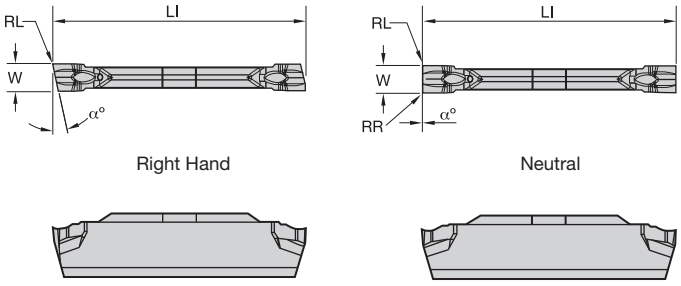
WMT™ System

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

WMT Toolholders

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

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



RR = RL on neutral inserts

● first choice
○ alternate choice

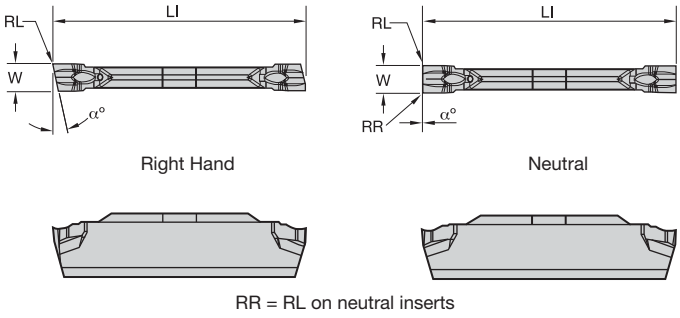
P	●
M	●
K	○
N	●
S	●
H	

WMT-CM

catalog number	seat size	W mm	W in	RR mm	RR in	LI mm	LI in	α°	hand	WU25PT
WMTC015N00CM08	1	1,50	.059	0,08	.003	19,30	.760	—	N - Neutral	●
WMTC020N00CM08	2	2,00	.079	0,08	.003	19,21	.756	—	N - Neutral	●
WMTC094N00CM13	2B	2,39	.094	0,13	.005	22,32	.879	—	N - Neutral	●
WMTC030N00CM17	3	3,00	.118	0,17	.007	25,38	.999	—	N - Neutral	●
WMTC125N00CM17	3	3,17	.125	0,17	.007	25,41	1.000	—	N - Neutral	●
WMTC040N00CM17	4	4,00	.157	0,17	.007	25,40	1.000	—	N - Neutral	●

catalog number	seat size	W mm	W in	RR mm	RR in	LI mm	LI in	α°	hand
WMTC015L05CM08	1	1,50	.059	0,08	.003	19,31	.760	5	L - Left
WMTC020L05CM08	2	1,99	.079	0,08	.003	19,21	.756	5	L - Left
WMTC020L12CM08	2	2,00	.079	0,08	.003	19,25	.758	12	L - Left
WMTC030L05CM17	3	3,00	.118	0,17	.007	25,34	.998	5	L - Left
WMTC030L12CM17	3	3,00	.118	0,17	.007	25,40	1.000	12	L - Left
WMTC040L12CM17	4	4,00	.157	0,17	.007	25,40	1.000	12	L - Left
WMTC040L05CM17	4	4,00	.157	0,17	.007	25,40	1.000	5	L - Left

catalog number	seat size	W mm	W in	RL mm	RL in	LI mm	LI in	α°	hand
WMTC015R12CM08	1	1,50	.059	0,08	.003	19,28	.759	12	R - Right
WMTC015R05CM08	1	1,50	.059	0,08	.003	19,31	.760	5	R - Right
WMTC020R05CM08	2	2,00	.079	0,08	.003	19,26	.758	5	R - Right
WMTC020R12CM08	2	2,00	.079	0,08	.003	19,26	.758	12	R - Right
WMTC094R12CM13	2B	2,39	.094	0,13	.005	22,28	.877	12	R - Right
WMTC094R05CM13	2B	2,39	.094	0,13	.005	22,32	.879	5	R - Right
WMTC030R05CM17	3	3,00	.118	0,17	.007	25,34	.998	5	R - Right
WMTC030R12CM17	3	3,00	.118	0,17	.007	25,40	1.000	12	R - Right
WMTC125R05CM17	3	3,17	.125	0,17	.007	25,40	1.000	5	R - Right
WMTC125R12CM17	3	3,18	.125	0,17	.007	25,40	1.000	12	R - Right
WMTC040R05CM17	4	4,00	.157	0,17	.007	25,40	1.000	5	R - Right
WMTC040R12CM17	4	4,00	.157	0,17	.007	25,40	1.000	12	R - Right



RR = RL on neutral inserts

● first choice
○ alternate choice

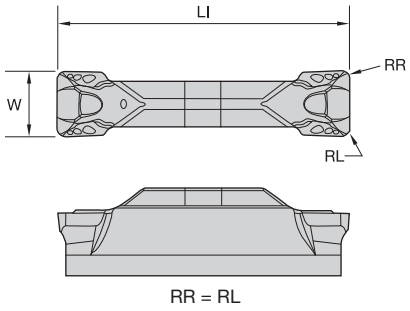
P	●
M	●
K	○
N	●
S	●
H	

■ WMT-CM-W

catalog number	seat size	W mm	W in	RR mm	RR in	LI mm	LI in	α°	hand	WU25PT
WMTC015N00CMW08	1	1,50	.059	0,08	.003	19,30	.760	—	N - Neutral	●
WMTC020N00CMW08	2	2,00	.079	0,08	.003	19,21	.756	—	N - Neutral	●
WMTC094N00CMW13	2B	2,39	.094	0,13	.005	22,32	.879	—	N - Neutral	●
WMTC030N00CMW17	3	3,00	.118	0,17	.007	25,38	.999	—	N - Neutral	●
WMTC125N00CMW17	3	3,18	.125	0,17	.007	25,41	1.000	—	N - Neutral	●
WMTC040N00CMW17	4	4,00	.157	0,17	.007	25,40	1.000	—	N - Neutral	●

catalog number	seat size	W mm	W in	RR mm	RR in	LI mm	LI in	α°	hand	
WMTC020L12CMW08	2	2,00	.079	0,08	.003	19,27	.758	12	L - Left	●
WMTC030L05CMW17	3	3,00	.118	0,17	.007	25,35	.998	5	L - Left	●
WMTC030L12CMW17	3	3,00	.118	0,17	.007	25,40	1.000	12	L - Left	●

catalog number	seat size	W mm	W in	RL mm	RL in	LI mm	LI in	α°	hand	
WMTC020R05CMW08	2	2,00	.079	0,08	.003	19,20	.756	5	R - Right	●
WMTC020R12CMW08	2	2,00	.079	0,08	.003	19,27	.758	12	R - Right	●
WMTC094R12CMW13	2B	2,39	.094	0,13	.005	22,29	.877	12	R - Right	●
WMTC094R05CMW13	2B	2,39	.094	0,13	.005	22,32	.879	5	R - Right	●
WMTC030R05CMW17	3	2,00	.118	0,17	.007	25,35	.998	5	R - Right	●
WMTC030R12CMW17	3	2,00	.118	0,17	.007	25,40	1.000	12	R - Right	●
WMTC125R05CMW17	3	3,17	.125	0,17	.007	25,41	1.000	5	R - Right	●
WMTC125R12CMW17	3	3,17	.125	0,17	.007	25,41	1.000	12	R - Right	●



RR = RL

● first choice
○ alternate choice

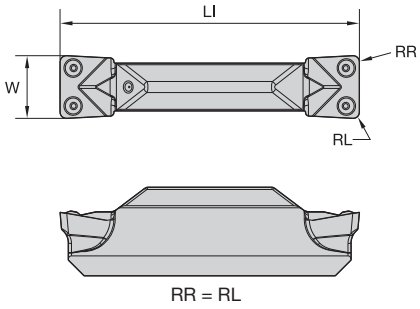
		WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
P		●	●	○	○	
M				●	●	○
K		●	●	○	○	
N				●	●	●
S				●	●	●
H				○		

WMT-U-PT • Molded

catalog number	seat size	W mm	W in	RR mm	RR in	LI mm	LI in	WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
WMTS205M2U02PT	2	2,05	.081	0,15	.006	19,23	.757	●	●	●	●	
WMTS305M3U03PT	3	3,05	.120	0,31	.012	25,81	1.016	●	●	●	●	
WMTS305M3U06PT	3	3,05	.120	0,61	.024	25,78	1.015	●	●	●	●	
WMTS405M4U03PT	4	4,05	.159	0,31	.012	25,53	1.005	●	●	●	●	
WMTS405M4U06PT	4	4,05	.159	0,61	.024	25,53	1.005	●	●	●	●	
WMTS505M5U03PT	5	5,05	.199	0,30	.012	28,76	1.320	●	●	●	●	
WMTS505M5U06PT	5	5,05	.199	0,61	.024	28,76	1.320	●	●	●	●	
WMTS605M6U03PT	6	6,05	.238	0,30	.012	28,76	1.320	●	●	●	●	
WMTS605M6U06PT	6	6,05	.238	0,59	.023	28,76	1.320	●	●	●	●	
WMTS805M8U06PT	8	8,05	.317	0,61	.024	28,70	1.130	●	●	●	●	
WMTS805M8U15PT	8	8,05	.317	1,50	.059	28,71	1.130	●	●	●	●	

WMT-P-PT • Precision

catalog number	seat size	W mm	W in	RR mm	RR in	LI mm	LI in	WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
WMTS200M2P02PT	2	2,00	.079	0,15	.006	19,10	.752			●	●	
WMTS094I2BP02PT	2B	2,38	.094	0,15	.006	22,15	.872			●	●	
WMTS094I2BP04PT	2B	2,38	.094	0,38	.015	22,14	.872			●	●	
WMTS300M3P03PT	3	3,00	.118	0,31	.012	25,65	1.010			●	●	●
WMTS300M3P06PT	3	3,00	.118	0,61	.024	25,65	1.010			●	●	
WMTS125I3P03PT	3	3,17	.125	0,23	.009	25,40	1.000			●	●	
WMTS125I3P08PT	3	3,17	.125	0,76	.030	25,40	1.000			●	●	
WMTS400M4P03PT	4	4,00	.157	0,31	.012	25,40	1.000			●	●	●
WMTS400M4P06PT	4	4,00	.157	0,60	.024	25,40	1.000			●	●	
WMTS188I5P03PT	5	4,76	.188	0,26	.010	28,63	1.127			●	●	
WMTS188I5P08PT	5	4,77	.188	0,76	.030	28,63	1.127			●	●	
WMTS500M5P03PT	5	5,00	.197	0,30	.012	28,63	1.127			●	●	●
WMTS500M5P06PT	5	5,00	.197	0,61	.024	28,63	1.127			●	●	
WMTS600M6P03PT	6	6,00	.236	0,30	.012	28,63	1.127			●	●	
WMTS600M6P06PT	6	6,00	.236	0,58	.022	28,63	1.127			●	●	
WMTS250I6P08PT	6	6,34	.250	0,76	.030	28,63	1.127			●	●	
WMTS250I6P03PT	6	6,35	.250	0,25	.010	28,63	1.127			●	●	
WMTS800M8P06PT	8	8,00	.315	0,61	.024	28,57	1.125			●	●	
WMTS800M8P15PT	8	8,00	.315	1,50	.059	28,57	1.125			●	●	



● first choice
○ alternate choice

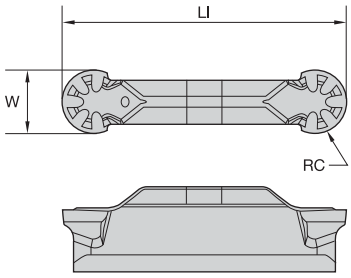
		WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
P		●	●	○	○	
M				●	●	○
K		●	●	○	○	
N				●	●	●
S				●	●	●
H				○		

■ WMT-U-PH • Molded

catalog number	seat size	W mm	W in	RR mm	RR in	L1 mm	L1 in	WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
WMTS305M3U03PH	3	3,05	.120	0,30	.012	25,81	1.016			●	●	
WMTS305M3U06PH	3	3,05	.120	0,60	.024	25,81	1.016			●	●	
WMTS405M4U03PH	4	4,05	.159	0,30	.012	25,53	1.005			●	●	
WMTS405M4U06PH	4	4,05	.159	0,60	.024	25,53	1.005			●	●	
WMTS505M5U03PH	5	5,05	.199	0,30	.012	28,76	1.320			●	●	
WMTS505M5U06PH	5	5,05	.199	0,60	.024	28,76	1.320			●	●	
WMTS605M6U03PH	6	6,05	.238	0,30	.012	28,76	1.320			●	●	
WMTS605M6U06PH	6	6,05	.238	0,60	.024	28,76	1.320			●	●	
WMTS805M8U03PH	8	8,05	.317	0,30	.012	28,70	1.130			●	●	
WMTS805M8U06PH	8	8,05	.317	0,60	.024	28,70	1.130			●	●	

■ WMT-P-PH • Precision

catalog number	seat size	W mm	W in	RR mm	RR in	L1 mm	L1 in	WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
WMTS300M3P03PH	3	3,00	.118	0,30	.012	25,65	1.010			●	●	●
WMTS300M3P06PH	3	3,00	.118	0,60	.024	25,65	1.010			●	●	●
WMTS125I3P03PH	3	3,18	.125	0,25	.010	25,40	1.000			●	●	
WMTS125I3P08PH	3	3,18	.125	0,75	.030	25,40	1.000			●	●	
WMTS156I4P03PH	4	3,95	.156	0,30	.012	25,40	1.000			●	●	
WMTS156I4P08PH	4	3,96	.156	0,75	.030	25,40	1.000			●	●	
WMTS400M4P03PH	4	4,00	.157	0,30	.012	25,40	1.000			●	●	●
WMTS400M4P06PH	4	4,00	.157	0,60	.024	25,40	1.000			●	●	●
WMTS188I5P03PH	5	4,77	.188	0,25	.010	28,63	1.127			●	●	
WMTS188I5P08PH	5	4,77	.188	0,75	.030	28,63	1.127			●	●	
WMTS500M5P03PH	5	5,00	.197	0,30	.012	28,63	1.127			●	●	●
WMTS500M5P06PH	5	5,00	.197	0,60	.024	28,63	1.127			●	●	●
WMTS600M6P03PH	6	6,00	.236	0,30	.012	28,63	1.127			●	●	
WMTS600M6P06PH	6	6,00	.236	0,60	.024	28,63	1.127			●	●	
WMTS250I6P08PH	6	6,32	.249	0,75	.030	28,63	1.127			●	●	
WMTS250I6P03PH	6	6,35	.250	0,25	.010	28,63	1.127			●	●	
WMTS312I8P03PH	8	7,92	.312	0,25	.010	28,57	1.125			●	●	
WMTS312I8P08PH	8	7,92	.312	0,75	.030	28,57	1.125			●	●	
WMTS800M8P03PH	8	8,00	.315	0,30	.012	28,57	1.125			●	●	
WMTS800M8P06PH	8	8,00	.315	0,60	.024	28,57	1.125			●	●	



● first choice
○ alternate choice

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

WMT-U-PC • Molded

catalog number	seat size	W mm	W in	RC mm	RC in	LI mm	LI in	WP10CT	WU10PT	WU25PT
WMTR305M3UPC	3	3,05	.120	1,53	.060	25,53	1.005	●	●	●
WMTR405M4UPC	4	4,05	.163	2,03	.080	25,58	1.007	●	●	●
WMTR505M5UPC	5	5,05	.202	2,53	.099	29,01	1.142	●	●	●
WMTR605M6UPC	6	6,05	.238	3,03	.119	28,77	1.133	●	●	●
WMTR805M8UPC	8	8,05	.317	4,03	.159	29,22	1.150	●	●	●

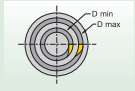
WMT-P-PC • Precision

catalog number	seat size	W mm	W in	RC mm	RC in	L1 mm	L1 in			
WMTR300M3PPC	3	3,00	.118	1,50	.059	25,40	1.000		●	●
WMTR400M4PPC	4	4,00	.158	2,00	.079	25,45	1.002		●	●
WMTR188I5PPC	5	4,78	.188	2,39	.094	28,65	1.128		●	●
WMTR500M5PPC	5	5,00	.197	2,50	.098	28,88	1.137		●	●
WMTR600M6PPC	6	6,00	.236	3,00	.118	28,65	1.128		●	●
WMTR250I6PPC	6	6,36	.250	3,18	.125	29,01	1.142		●	●
WMTR312I8PPC	8	7,94	.312	3,96	.156	29,00	1.142		●	●
WMTR800M8PPC	8	8,00	.315	4,00	.158	29,08	1.145		●	●

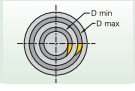
WMT™ System

Our WMT toolholders now have a smart new naming system. Here are some examples of the improved nomenclature for our WMT Toolholders.

Integral Toolholders

WMT	A	R	16	6	075	–	275-400
Tooling System WMT = Groove and Turn (WMT Insert)	Tool Style S = Straight C = Straight with circular support E = End mount A = Straight, face grooving inboard sweep B = Straight, face grooving outboard sweep	Hand R = Right hand L = Left hand	Shank Size For square shanks, the number indicates the height and width in 1/16" increments. For rectangular shanks, the first digit indicates the number of eighths of width "B" and the second digit indicates the number of quarters of height "H".	Seat Size 1 2 2B 3 4 5 6 8	Max Grooving Depth CD_{max} in 1/100" Note: Values <1.00" use a preceeding zero e.g., 075 = .75" max groove depth		Face Grooving Diameter diameters are min and max for outer face groove diameter 999 = unlimited D max D min – D max in 1/100" e.g., 275–400 = 2.75" D min 4.00" D max 

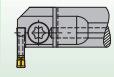
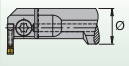
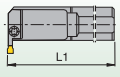
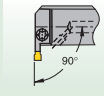
Modular Blades

WMT	WGM	R	6	19	B	070-100
Tooling System	Connection Type	Hand R = Right hand L = Left hand	Seat Size	Max Grooving Depth	Tool Style	Face Grooving Diameter 

Modular Toolholders

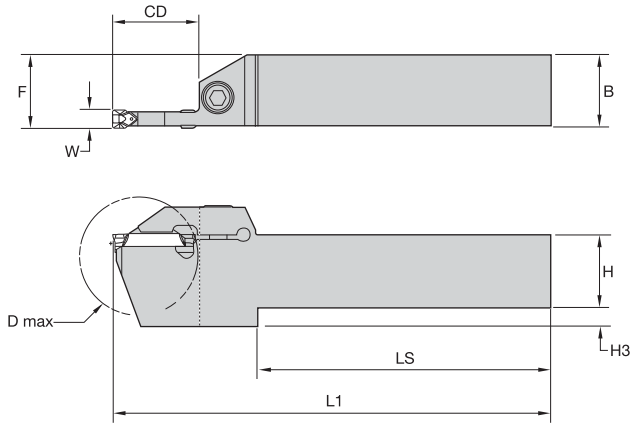
WGM	S	R	16
Tooling System MDG = Modular Deep Grooving WGM = Modular Serrated Locking System	Tool Style S = Straight E = End mount	Hand R = Right hand L = Left hand	Shank Size For square shanks, the number indicates the height and width in 1/16" increments. For rectangular shanks, the first digit indicates the number of eighths of width "B" and the second digit indicates the number of quarters of height "H".

Integral Boring Bars

A	16	R	WMT	E	R	6	12	M
Bar Type 	Bar Diameter 	Bar Length 	Tooling System	Tool Style 	Hand R = Right hand L = Left hand	Seat Size	Max Grooving Depth	Tool Units

For more detailed information about our new nomenclature system, visit us at **www.widia.com.**

WIDIA VICTORY



Right Hand Tool

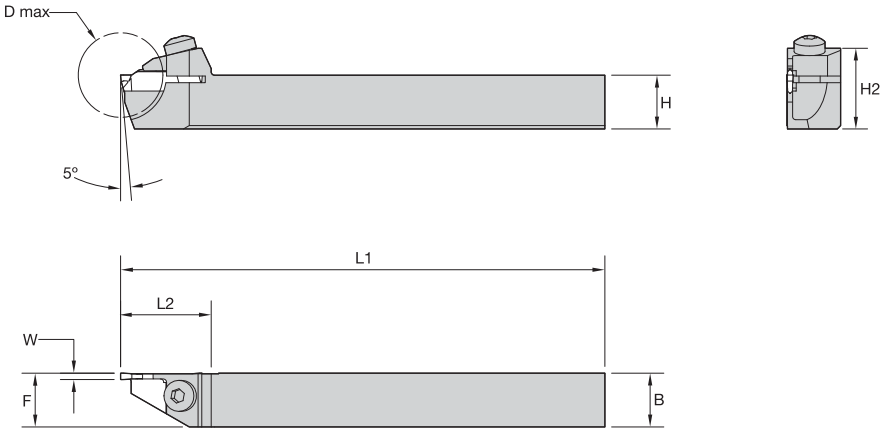
O.D. Grooving and Cut-Off

order number	new catalog number	old catalog number	H	W	CD	D max	F	B	H3	L1	LS	clamp screw
		right hand										
3655938	WMTCR62053	250301	.375	.079	—	1.062	.375	.369	.125	4.500	3.410	606249
3655888	WMTCR62B053	250109	.375	.094	—	1.062	.375	.365	.125	4.500	3.410	606249
3655940	WMTCR82062	250303	.500	.079	—	1.125	.500	.494	.188	4.500	3.410	606249
3655892	WMTCR82B062	250-111	.500	.094	—	1.250	.500	.490	.190	4.500	3.290	606249
3655942	WMTSR102065	250305	.625	.079	.650	—	.625	.603	.250	5.000	3.680	606249
3655894	WMTSR102B075	250-113	.625	.094	.750	—	.625	.603	.250	5.000	3.480	619205
3655898	WMTSR103044	250117	.625	.125	.440	—	.625	.603	—	5.000	3.695	619205
3655900	WMTSR103087	250119	.625	.125	.875	—	.625	.603	.250	5.000	3.355	619205
3655930	WMTSR104044	250181	.625	.156	.440	—	.625	.603	—	5.000	3.695	619205
3655902	WMTSR105056	250123	.625	.188	.560	—	.629	.603	—	5.000	3.562	619168
3655904	WMTSR105100	250125	.625	.188	1.000	—	.629	.603	.250	5.500	3.655	619168
3655944	WMTSR122065	250307	.750	.079	.650	—	.750	.719	—	5.000	3.680	606249
3655896	WMTSR122B075	250-115	.750	.094	.750	—	.750	.719	.250	5.000	3.480	619205
3655934	WMTSR122B042	250189	.750	.094	.420	—	.750	.719	—	5.000	3.695	619205
3655908	WMTSR123087	250129	.750	.125	.875	—	.750	.719	.250	5.000	3.355	619205
3655932	WMTSR124044	250183	.750	.156	.440	—	.750	.719	—	5.000	3.695	619205
3655910	WMTSR125056	250133	.750	.188	.560	—	.750	.719	—	5.000	3.562	619168
3655912	WMTSR125100	250135	.750	.188	1.000	—	.750	.719	.250	5.500	3.655	619168
3655914	WMTSR126056	250137	.750	.250	.560	—	.754	.719	—	5.000	3.562	619168
3656137	WMTSR161065	250319	1.000	.059	.650	—	.991	1.000	—	6.000	4.679	606266
3655946	WMTSR162065	250309	1.000	.079	.650	—	1.000	.969	—	6.000	4.680	606249
3655936	WMTSR162B075	250193	1.000	.094	.750	—	1.000	.969	—	6.000	4.500	619205
3655916	WMTSR163044	250141	1.000	.125	.440	—	1.000	.969	—	6.000	4.695	619205
3655920	WMTSR164087	250145	1.000	.156	.875	—	1.000	.969	—	6.000	4.375	619205
3655922	WMTSR165056	250147	1.000	.188	.560	—	1.000	.969	—	6.000	4.562	619168
3655924	WMTSR165100	250149	1.000	.188	1.000	—	1.000	.969	—	6.000	4.175	619168
3655926	WMTSR166056	250151	1.000	.250	.560	—	1.004	.969	—	6.000	4.562	619168
3655928	WMTSR166100	250153	1.000	.250	1.000	—	1.002	.969	—	6.000	4.174	619168
3539143	WMTSR208056	250175	1.250	.312	.560	—	1.250	1.207	—	6.000	4.553	619168
3539145	WMTSR208100	250177	1.250	.312	1.000	—	—	1.207	—	6.000	4.174	619168

(continued)

(O.D. Grooving and Cut-Off continued)

order number	new catalog number	old catalog number	H	W	CD	D max	F	B	H3	L1	LS	clamp screw
		left hand										
3655939	WMTCL62053	250302	.375	.079	—	1.062	.375	.369	.125	4.500	3.410	606249
3655889	WMTCL62B053	250110	.375	.094	—	1.062	.375	.365	.125	4.500	3.410	606249
3655941	WMTCL82062	250304	.500	.079	—	1.125	.500	.494	.188	4.500	3.410	606249
3655893	WMTCL82B062	250112	.500	.094	—	1.250	.500	.490	.190	4.500	3.290	606249
3655943	WMTSL102065	250306	.625	.079	.650	—	.625	.603	.250	5.000	3.680	606249
3655895	WMTSL102B075	250-114	.625	.094	.750	—	.625	.603	.250	5.000	3.480	619205
3655899	WMTSL103044	250118	.625	.125	.440	—	.625	.603	—	5.000	3.695	619205
3655901	WMTSL103087	250120	.625	.125	.875	—	.625	.603	.250	5.000	3.355	619205
3655931	WMTSL104044	250182	.625	.156	.440	—	.625	.603	—	5.000	3.695	619205
3655903	WMTSL105056	250124	.625	.188	.560	—	.629	.603	—	5.000	3.562	619168
3655905	WMTSL105100	250126	.625	.188	1.000	—	.629	.603	.250	5.500	3.655	619168
3655945	WMTSL122065	250308	.750	.079	.650	—	.750	.719	—	5.000	3.680	606249
3655897	WMTSL122B075	250-116	.750	.094	.750	—	.750	.719	.250	5.000	3.480	619205
3655935	WMTSL122B042	250190	.750	.094	.420	—	.750	.719	—	5.000	3.695	619205
3655907	WMTSL123044	250128	.750	.125	.440	—	.750	.719	—	5.000	3.695	619205
3655909	WMTSL123087	250130	.750	.125	.875	—	.750	.719	.250	5.000	3.355	619205
3655933	WMTSL124044	250184	.750	.156	.440	—	.750	.719	—	5.000	3.697	619205
3655911	WMTSL125056	250134	.750	.188	.560	—	.750	.719	—	5.000	3.562	619168
3655913	WMTSL125100	250136	.750	.188	1.000	—	.750	.719	.250	5.500	3.655	619168
3655915	WMTSL126056	250138	.750	.250	.560	—	.754	.719	—	5.000	3.562	619168
3656138	WMTSL161065	250320	1.000	.059	.650	—	.991	1.000	—	6.000	4.679	606249
3655947	WMTSL162065	250310	1.000	.079	.650	—	1.000	.969	—	6.000	4.680	606249
3655937	WMTSL162B075	250194	1.000	.094	.750	—	1.000	.969	—	6.000	4.500	619205
3655917	WMTSL163044	250142	1.000	.125	.440	—	1.000	.969	—	6.000	4.695	619205
3655919	WMTSL163087	250144	1.000	.125	.875	—	1.000	.969	—	6.000	4.375	619205
3655921	WMTSL164087	250146	1.000	.156	.875	—	1.000	.969	—	6.000	4.375	619205
3655923	WMTSL165056	250148	1.000	.188	.560	—	1.000	.969	—	6.000	4.562	619168
3655925	WMTSL165100	250150	1.000	.188	1.000	—	1.000	.969	—	6.000	4.175	619168
3655927	WMTSL166056	250152	1.000	.250	.560	—	1.004	.969	—	6.000	4.562	619168
3655929	WMTSL166100	250154	1.000	.250	1.000	—	1.004	.969	—	6.000	4.174	619168
3539144	WMTSL208056	250176	1.250	.312	.560	—	1.250	1.207	—	6.000	4.553	619168

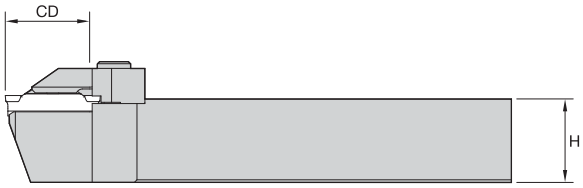


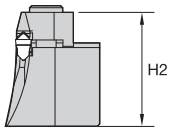
Left Hand Tool

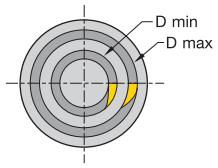
Swiss Grooving and Cut-Off

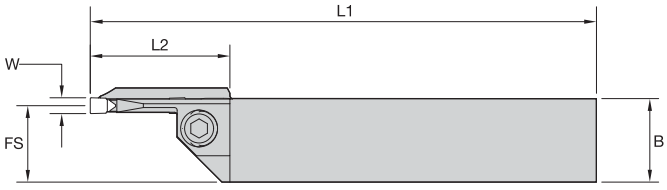
order number	new catalog number	old catalog number	W	D max	B	H	H2	F	L1	L2	clamp screw
		right hand									
3655948	WMTCR061039	250311	.059	.787	.375	.375	.625	.375	4.500	.842	606249
3655949	WMTCR081039	250313	.059	.787	.500	.500	.750	.500	4.500	.842	606249
3656133	WMTCR101051	250315	.059	1.024	.625	.625	.925	.626	5.000	.952	606266
3656135	WMTCR121051	250317	.059	1.024	.750	.750	1.050	.750	5.000	.952	606266
3656139	WMTCR062039	250321	.079	.787	.375	.375	.625	.375	4.500	.843	606249
3656141	WMTCR082039	250323	.079	.787	.500	.500	.750	.500	4.500	.843	606249
3656143	WMTCR102051	250325	.079	1.024	.625	.625	.925	.625	5.000	.953	606266
3656145	WMTCR122051	250327	.079	1.024	.750	.750	1.050	.750	5.000	.953	606266
		left hand									
3656186	WMTCL061039	250312	.059	.787	.375	.375	.625	.375	4.500	.842	606249
3656101	WMTCL081039	250314	.059	.787	.500	.500	.750	.500	4.500	.842	606249
3656134	WMTCL101051	250316	.059	1.024	.625	.625	.925	.626	5.000	.952	606266
3656136	WMTCL121051	250318	.059	1.024	.750	.750	1.050	.750	5.000	.952	606266
3656140	WMTCL062039	250322	.079	.787	.375	.375	.625	.375	4.500	.843	606249
3656142	WMTCL082039	250324	.079	.787	.500	.500	.750	.500	4.500	.843	606249
3656144	WMTCL102051	250326	.079	1.024	.625	.625	.925	.625	5.000	.953	606266
3656146	WMTCL122051	250328	.079	1.024	.750	.750	1.050	.750	5.000	.953	606266

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

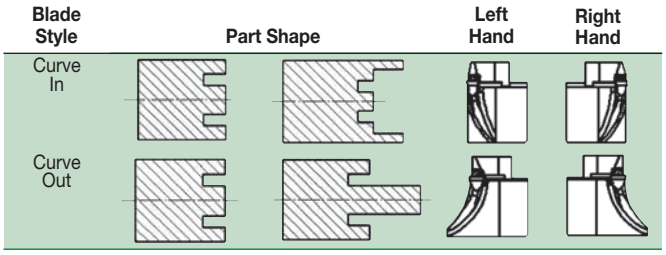








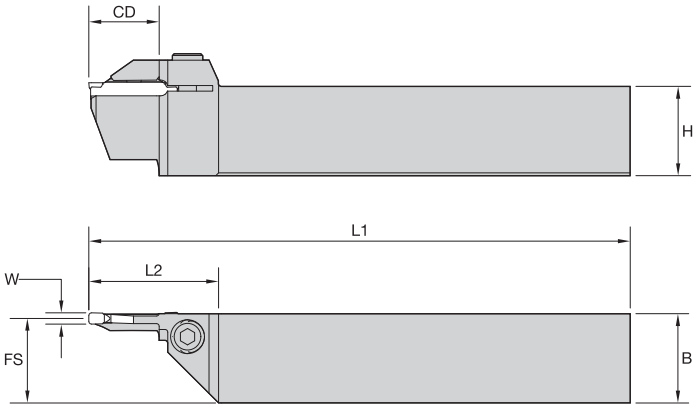
Left Hand Tool



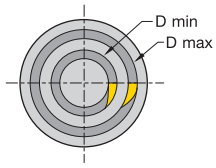
Curve Out

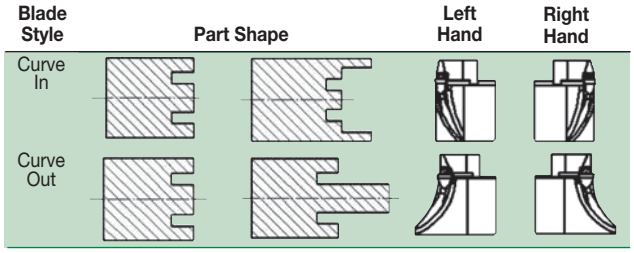
order number	new catalog number	old catalog number	W	CD	D max	D min	FS	H2	H	B	L1	L2	clamp	clamp screw
		right hand												
3656147	WMTBR163050-150-200	251117	.125	.500	2.000	1.500	.937	1.280	.990	.990	6.000	1.343	–	619205
3656151	WMTBR163063-275-400	251121	.125	.625	4.000	2.750	.937	1.280	.990	.990	6.000	1.343	–	619205
3656149	WMTBR163063-200-275	251119	.125	.625	2.750	2.000	.937	1.280	.990	.990	6.000	1.343	–	619205
3656153	WMTBR163075-400-800	251123	.125	.750	8.000	4.000	.937	1.280	.990	.990	6.000	1.438	–	619205
3656155	WMTBR165063-150-200	251133	.188	.625	2.000	1.500	.906	1.355	.990	.990	6.000	1.500	446102	619168
3656157	WMTBR165075-200-275	251135	.188	.750	2.750	2.000	.906	1.352	.990	.990	6.000	1.500	446102	619168
3656159	WMTBR165075-275-400	251137	.188	.750	4.000	2.750	.906	1.352	.990	.990	6.000	1.655	446104	619168
3656165	WMTBR166075-200-275	251151	.250	.750	2.750	2.000	.875	1.372	.990	.990	6.000	1.500	446102	619168
3656168	WMTBR166100-400-800	251155	.250	1.000	8.000	4.000	.875	1.372	.990	.990	6.000	1.655	446104	619168
3656187	WMTBR166075-275-400	251153	.251	.750	4.000	2.750	.875	1.372	.990	.990	6.000	1.655	446104	619168
		left hand												
3656152	WMTBL163063-275-400	251122	.125	.625	4.000	2.750	.937	1.280	.990	.990	6.000	1.343	–	619205
3656154	WMTBL163075-400-800	251124	.125	.750	8.000	4.000	.937	1.280	.990	.990	6.000	1.438	–	619205
3656156	WMTBL165063-150-200	251134	.188	.625	2.000	1.500	.906	1.355	.990	.990	6.000	1.500	446101	619168
3656158	WMTBL165075-200-275	251136	.188	.750	2.750	2.000	.906	1.352	.990	.990	6.000	1.500	446101	619168
3656164	WMTBL166063-150-200	251150	.250	.625	2.000	1.500	.875	1.377	.990	.990	6.000	1.500	446101	619168
3656166	WMTBL166075-200-275	251152	.250	.750	2.750	2.000	.875	1.372	.990	.990	6.000	1.500	446101	619168
3656167	WMTBL166075-275-400	251154	.250	.750	4.000	2.750	.875	1.372	.990	.990	6.000	1.655	446103	619168
3656169	WMTBL166100-400-800	251156	.250	1.000	8.000	4.000	.875	1.372	.990	.990	6.000	1.655	446103	619168

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



Left Hand Tool

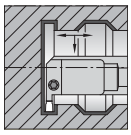




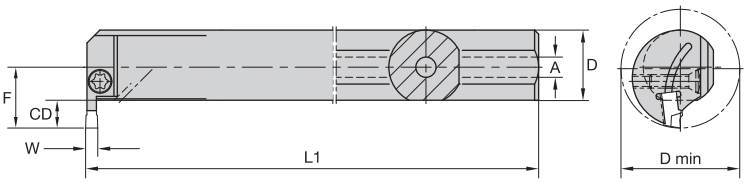
Curve In

order number	new catalog number	old catalog number	W	CD	D max	D min	B	H	H2	FS	L1	L2	clamp	clamp screw
		right hand												
3539323	**WMTAR163075-400-800**	**252111**	.125	.750	8.000	4.000	.990	.990	1.280	.937	6.000	1.438	**—**	**MS326**
3539325	**WMTAR165075-275-400**	**252117**	.187	.750	4.000	2.750	.990	.990	1.336	.906	6.000	1.655	**446104**	**619168**
3539327	**WMTAR165100-400-800**	**252119**	.187	1.000	8.000	4.000	.990	.990	1.336	.906	6.000	1.655	**446104**	**619168**
		left hand												
3539324	**WMTAL163075-400-800**	**252112**	.125	.750	8.000	4.000	.990	.990	1.280	.937	6.000	1.438	**—**	**MS326**
3539328	**WMTAL165100-400-800**	**252120**	.187	1.000	8.000	4.000	.990	.990	1.336	.906	6.000	1.655	**446103**	**619168**
3539332	**WMTAL166100-400-800**	**252128**	.250	1.000	8.000	4.000	.990	.990	1.336	.875	6.000	1.655	**446103**	**619168**

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



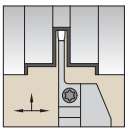
Steel shank with through coolant.

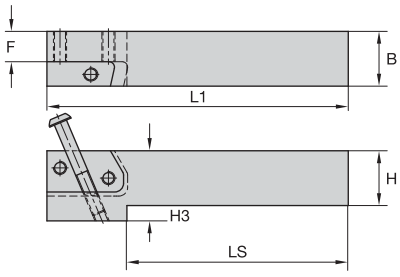


Right Hand Tool

I.D. Boring Bars

order number	catalog number	seat size	CD	W	D min	D	L1	F	A	insert screw	hex (inch)
	right hand										
5423448	**A16RWMTER0316N**	3	.63	.13	1.59	1.00	8.00	1.02	.25	**619168**	5 mm
5423449	**A20SWMTER0319N**	3	.75	.13	1.85	1.25	10.00	1.14	.25	**619168**	5 mm
5423840	**A16RWMTER0416N**	4	.63	.16	1.59	1.00	8.00	1.02	.25	**619168**	5 mm
5423841	**A20SWMTER0419N**	4	.75	.16	1.85	1.25	10.00	1.14	.25	**619168**	5 mm
5423842	**A20SWMTER0519N**	5	.75	.19	1.85	1.25	10.00	1.14	.25	**619168**	5 mm
5423843	**A24TWMTER0522N**	5	.87	.19	2.13	1.50	12.00	1.26	.25	**619168**	5 mm
5423844	**A20SWMTER0619N**	6	.75	.25	1.85	1.25	10.00	1.14	.25	**619168**	5 mm
5423845	**A24TWMTER0622N**	6	.87	.25	2.13	1.50	12.00	1.26	.25	**619168**	5 mm
	left hand										
5423846	**A16RWMTEL0316N**	3	.63	.13	1.59	1.00	8.00	1.02	.25	**619168**	5 mm
5423847	**A20SWMTEL0319N**	3	.75	.13	1.85	1.25	10.00	1.14	.25	**619168**	5 mm
5423848	**A16RWMTEL0416N**	4	.63	.16	1.59	1.00	8.00	1.02	.25	**619168**	5 mm
5423849	**A20SWMTEL0419N**	4	.75	.16	1.85	1.25	10.00	1.14	.25	**619168**	5 mm
5423870	**A20SWMTEL0519N**	5	.75	.19	1.85	1.25	10.00	1.14	.25	**619168**	5 mm
5423871	**A24TWMTEL0522N**	5	.87	.19	2.13	1.50	12.00	1.26	.25	**619168**	5 mm
5423872	**A20SWMTEL0619N**	6	.75	.25	1.85	1.25	10.00	1.14	.25	**619168**	5 mm
5423873	**A24TWMTEL0622N**	6	.87	.25	2.13	1.50	12.00	1.26	.25	**619168**	5 mm



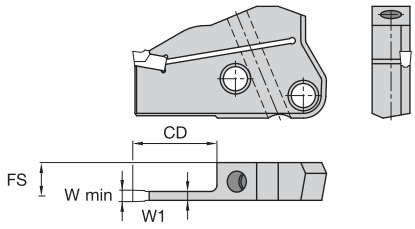


M50
2 blade screws required
Right Hand Tool

Grooving, Cut-Off, and Face Grooving

order number	catalog number	H	B	L1	LS	F	H3	blade screw	clamp screw
	right hand								
5349621	**WGMSR12**	.75	.75	4.30	2.75	.31	.49	**MS2002**	**MS1162**
5349622	**WGMSR16**	1.00	1.00	5.05	3.76	.56	.24	**MS2002**	**MS1162**
5349624	**WGMSR20**	1.25	1.25	5.05	—	.81	—	**MS2002**	**MS1162**
	left hand								
5349609	**WGMSL12**	.75	.75	4.30	2.75	.31	.49	**MS2002**	**MS1162**
5349620	**WGMSL16**	1.00	1.00	5.05	3.76	.56	.24	**MS2002**	**MS1162**
5349623	**WGMSL20**	1.25	1.25	5.05	—	.81	—	**MS2002**	**MS1162**

NOTE: Seat size 4 inserts can be used in seat size 3 and 4 toolholders, within cutting width range.
Seat size 6 inserts can be used in seat size 5 and 6 toolholders, within cutting width range.
Use the larger seat size toolholder for optimal performance.

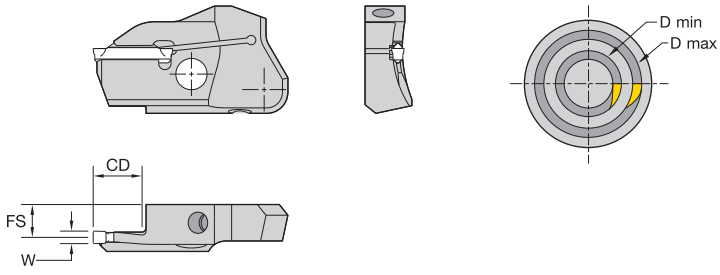


Right Hand Tool

Grooving and Cut-Off

order number	catalog number	seat size	CD	W	FS	W1
	right hand					
5359127	**WMTWGMR114S**	1	.5512	.059	.435	.048
5359128	**WMTWGMR213S**	2	.5118	.079	.426	.066
5359129	**WMTWGMR2B16S**	2B	.6496	.094	.422	.074
5359130	**WMTWGMR319S**	3	.7480	.118	.409	.100
5359131	**WMTWGMR419S**	4	.7480	.157	.394	.130
5359132	**WMTWGMR522S**	5	.8661	.197	.387	.144
5359133	**WMTWGMR622S**	6	.8661	.236	.365	.188
	left hand					
5359120	**WMTWGML114S**	1	.5512	.059	.435	.048
5359121	**WMTWGML213S**	2	.5118	.079	.426	.066
5359122	**WMTWGML2B16S**	2B	.6496	.094	.422	.074
5359123	**WMTWGML319S**	3	.7480	.118	.409	.100
5359124	**WMTWGML419S**	4	.7480	.157	.394	.130
5359125	**WMTWGML522S**	5	.8661	.197	.387	.144
5359126	**WMTWGML622S**	6	.8661	.236	.365	.188

NOTE: Right-hand holder uses right-hand blades.
Right-hand holder uses left-hand blades.
Blade and clamp screw torque equals 71–88 in. lbs. (8–10 Nm).



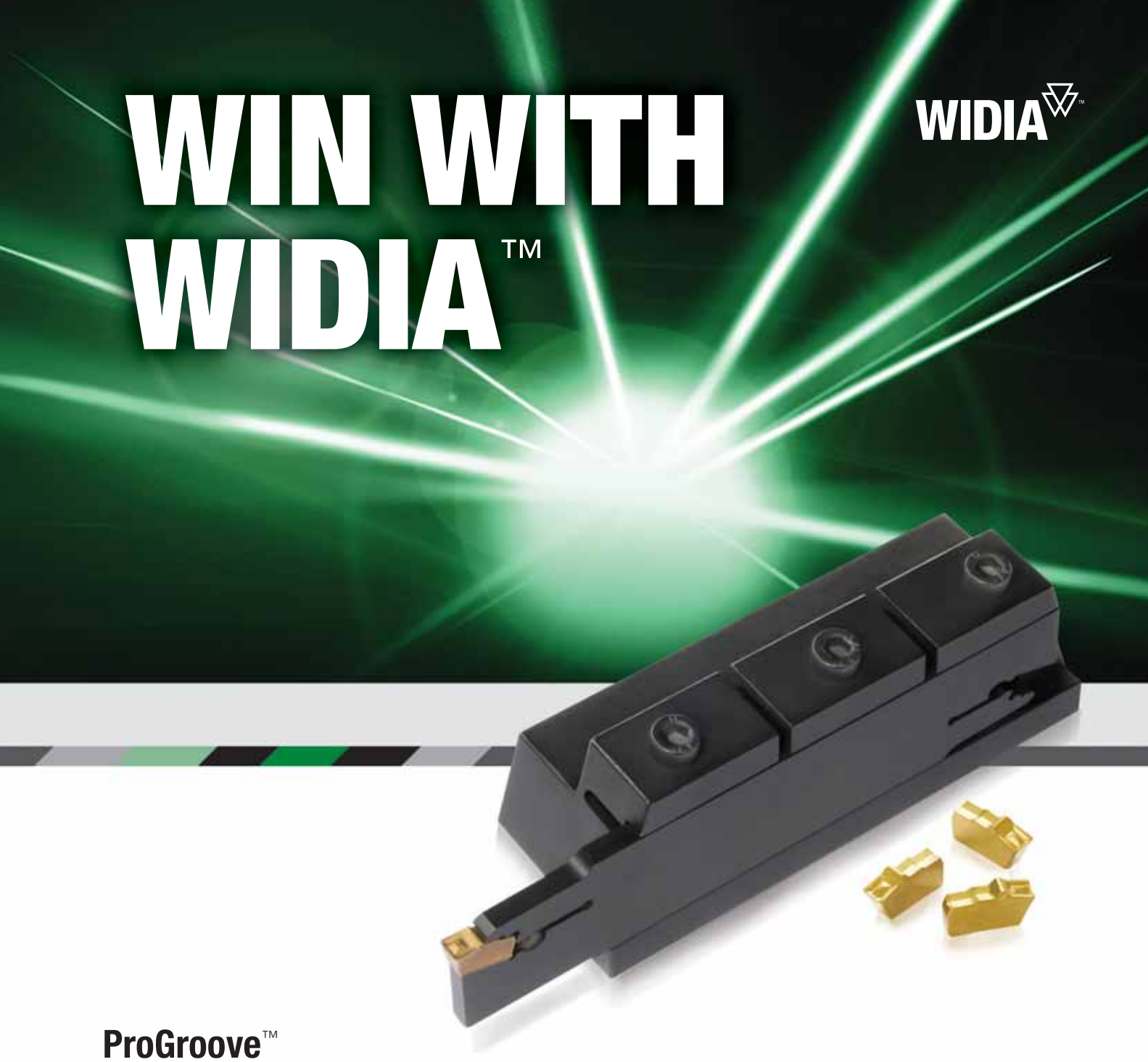
Right Hand Tool

Face Grooving

order number	catalog number	seat size	CD	W	FS
	right hand				
5359150	**WMTWGMR313B038-052**	3	.500	.118	.433
5359151	**WMTWGMR316B052-070**	3	.625	.118	.433
5359152	**WMTWGMR316B070-100**	3	.625	.118	.433
5359153	**WMTWGMR319B100-205**	3	.750	.118	.433
5359154	**WMTWGMR416B052-070**	4	.625	.157	.413
5359155	**WMTWGMR416B070-100**	4	.625	.157	.413
5359156	**WMTWGMR419B100-205**	4	.750	.157	.413
5359157	**WMTWGMR522B100-205**	5	.8661	.197	.394
5359158	**WMTWGMR622B100-205**	6	.8661	.236	.394
	left hand				
5359134	**WMTWGML313B038-052**	3	.500	.118	.433
5359135	**WMTWGML316B052-070**	3	.625	.118	.433
5359136	**WMTWGML316B070-100**	3	.625	.118	.433
5359137	**WMTWGML319100-205**	3	.750	.118	.433
5359138	**WMTWGML413B038-052**	4	.500	.157	.413
5359139	**WMTWGML416B052-070**	4	.625	.157	.413
5359140	**WMTWGML416B070-100**	4	.625	.157	.413
5359141	**WMTWGML419B100-205**	4	.750	.157	.413
5359142	**WMTWGML516B038-052**	5	.625	.197	.394
5359143	**WMTWGML519B052-070**	5	.750	.197	.394
5359144	**WMTWGML519B070-100**	5	.750	.197	.394
5359145	**WMTWGML522B100-205**	5	.8661	.197	.394
5359146	**WMTWGML616B038-052**	6	.625	.236	.394
5359147	**WMTWGML619B052-070**	6	.750	.236	.394
5359148	**WMTWGML619B070-100**	6	.750	.236	.394
5359149	**WMTWGML622B100-205**	6	.8661	.236	.394

NOTE: Right-hand holder uses right-hand blades.
Left-hand holder uses left-hand blades.
Blade and clamp screw torque equals 71–88 in. lbs. (8–10 Nm).

WIN WITH WIDIA™



ProGroove™

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

ProGroove Grooving and Cut-Off

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

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

WIDIA™ TopGroove™

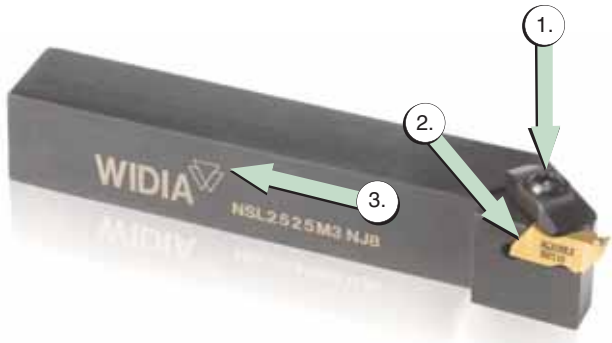
WIDIA has set the industry standard for threading and grooving productivity with the TopGroove clamping design. The TopGroove design provides consistent tool performance, accurate indexing, and superior clamping to provide excellent surface finish and outstanding tool life.

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

TopGroove

Rigidity, Versatility, and Chip Control

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



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

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

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

Carbide Grades and Proven Solutions for High Productivity

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

The Most Advanced Turning Solutions in the Industry

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

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

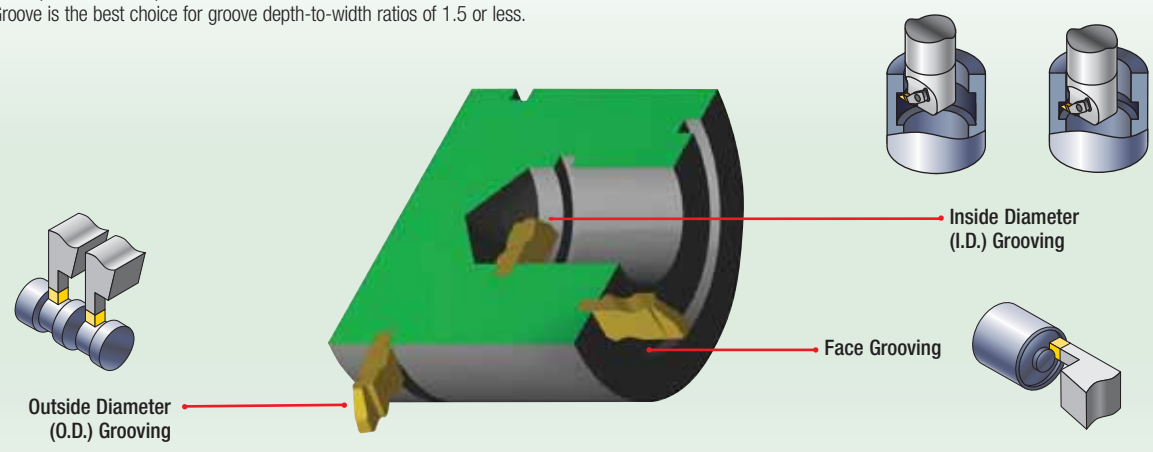
Utilize this comprehensive, easy-to-use guide for the information necessary to identify, choose, and select the appropriate cutting tools for your specific needs.

What you need to know:

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

1 Choose the application to be performed:

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



For deep grooving, use WMT™ on page A4

TopGroove™ for Internal, External, and Face Grooving Applications

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

2 Identify the material to be machined:

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

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

3 Select your toolholder based on the application:

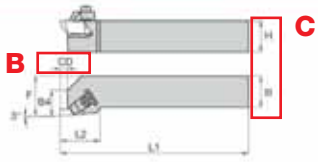
A Choose the appropriate gage insert (width) required for the application.

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

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

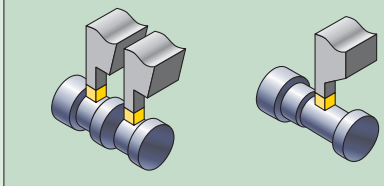
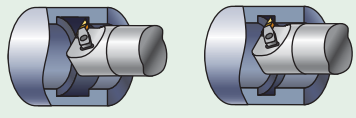
TopGroove™
Toolholders

WIDIA



■ NS

		C						B	A				
order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	clamp screw	hex/ Torx Plus
	right hand												
3632147	NSR062	.375	.375	.562	2.50	.75	.35	.138	N.2R	CM74	S310	–	7/64
3639035	NSR062V	.500	.500	.750	3.50	.75	.35	.138	N.2R	CM74	S310	–	7/64
3639044	NSR102B	.625	.625	.875	4.50	.75	.35	.138	N.2R	CM74	S310	–	7/64
3639026	NSR122B	.750	.750	1.000	4.50	.75	.35	.138	N.2R	CM74	S310	–	7/64
3639025	NSR162C	1.000	1.000	1.250	5.00	.75	.35	.138	N.2R	CM74	S310	–	7/64
3639027	NSR123A	.750	.750	1.000	4.00	1.25	.50	.210	N.3R	CM72LP	–	S2112	25 IP
3639023	NSR123B	.750	.750	1.000	4.50	1.25	.50	.210	N.3R	CM72LP	–	S2112	25 IP
3638592	NSR163C	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3R	CM72LP	–	S2112	25 IP
3638591	NSR163D	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3R	CM72LP	–	S2112	25 IP
3639028	NSR203D	1.250	1.250	1.500	6.00	1.25	.50	.210	N.3R	CM72LP	–	S2112	25 IP
3637506	NSR243D	1.500	1.500	2.000	6.00	1.38	.50	.210	N.3R	CM72LP	–	S2112	25 IP
3637535	NSR243E	1.500	1.500	2.000	7.00	1.38	.50	.210	N.3R	CM72LP	–	S2112	25 IP
3637496	NSR853D	1.250	1.000	1.250	6.00	1.25	.50	.210	N.3R	CM72LP	–	S2112	25 IP
3637509	NSR205D	1.250	1.250	1.500	6.00	2.00	.61	.413	N.5R	CM80	S352	–	1/4
3637540	NSR245D	1.500	1.500	2.000	6.00	2.00	.61	.415	N.5R	CM80	S352	–	1/4
	left hand												
3632161	NSL062	.375	.375	.562	2.50	.75	.35	.138	N.2L	CM75	S310	–	7/64
3637485	NSL062V	.500	.500	.750	3.50	.75	.35	.138	N.2L	CM75	S310	–	7/64
3637510	NSL102B	.625	.625	.875	4.50	.75	.35	.138	N.2L	CM75	S310	–	7/64
3632145	NSL122B	.750	.750	1.000	4.50	.75	.35	.138	N.2L	CM75	S310	–	7/64
3632138	NSL162C	1.000	1.000	1.250	5.00	.75	.35	.138	N.2L	CM75	S310	–	7/64
3632152	NSL123A	.750	.750	1.000	4.00	1.25	.50	.210	N.3L	CM73LP	–	S2112	25 IP
3639032	NSL123B	.750	.750	1.000	4.50	1.25	.50	.210	N.3L	CM73LP	–	S2112	25 IP
3639029	NSL163C	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3L	CM73LP	–	S2112	25 IP
3639024	NSL163D	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3L	CM73LP	–	S2112	25 IP

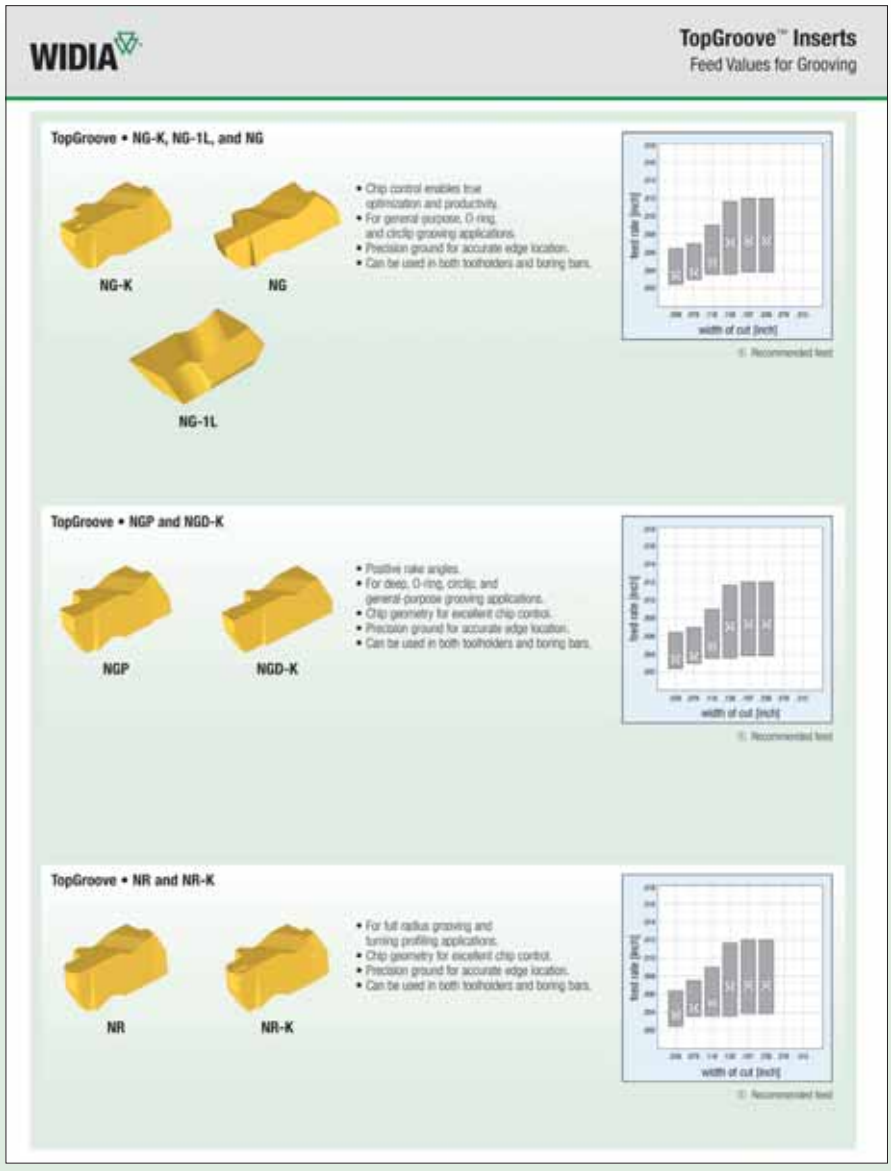
	application	conventional toolholders	modular blades
	O.D. Grooving and Plunge and Turn	pages A40–A43	—
	I.D. Grooving	pages A44–A45	—

4 Select chipbreaker style for the application:

See application guide on page A46 for a complete list of insert styles.

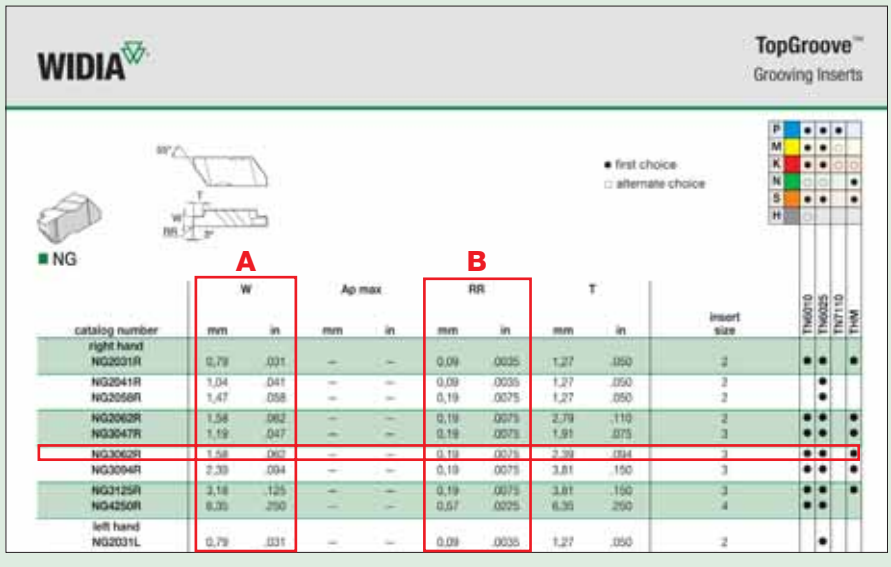
NOTE: Chart shows recommended starting feed rates.

See page A47.



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

B Select the required corner radius value "RR".



5 Select grade:

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

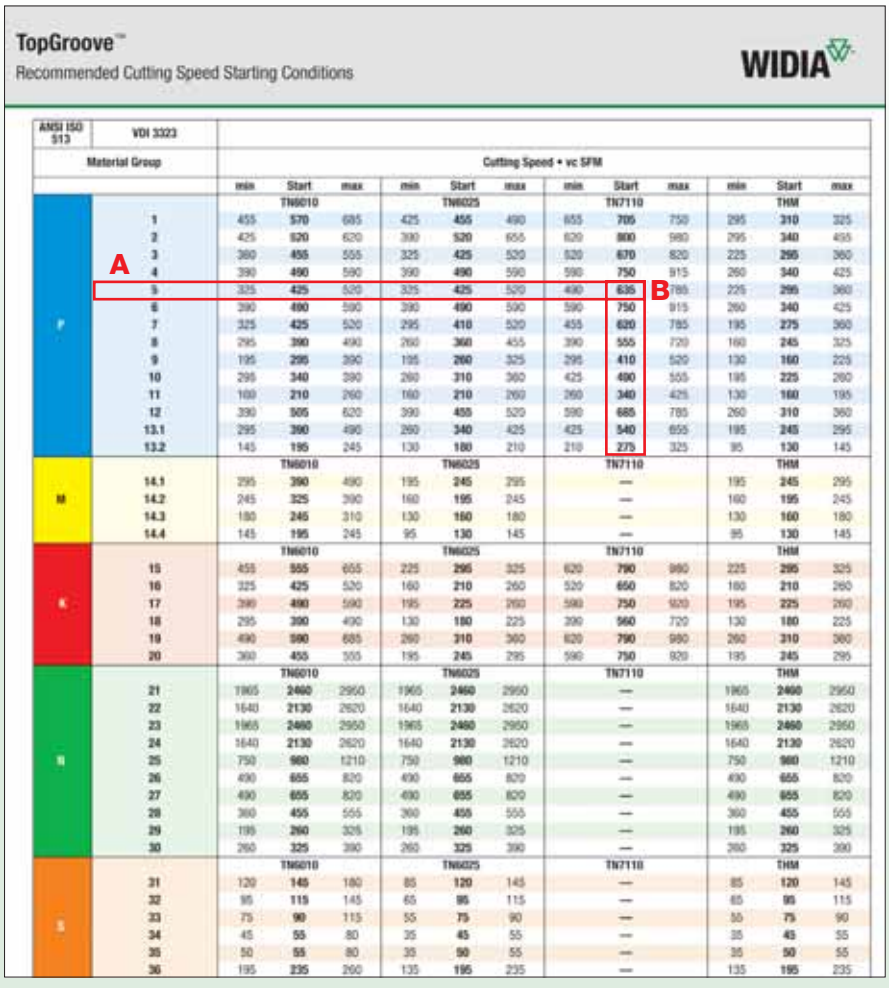
See page A48 for Grades and Grade Descriptions.

6 Determine cutting data:

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

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

See page A50 for cutting data.

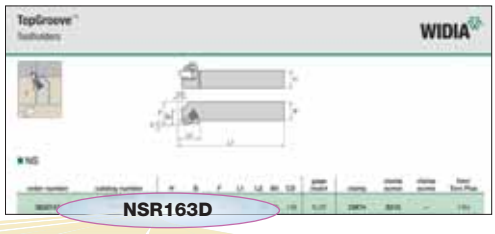


TopGroove™
Recommended Cutting Speed Starting Conditions
WIDIA

ANSI ISO 513	VDI 3323	Material Group	Cutting Speed • vc SFM											
			min	Start	max	min	Start	max	min	Start	max	min	Start	max
				TN6010			TN6025			TN7110			THM	
P		1	455	**570**	685	425	**455**	490	655	**705**	750	295	**310**	325
		2	425	**520**	620	390	**520**	655	620	**800**	980	295	**340**	455
		3	390	**455**	555	325	**425**	520	520	**670**	820	225	**295**	360
		4	390	**490**	590	390	**490**	590	590	**750**	915	260	**340**	425
		5	325	**425**	520	325	**425**	520	490	**635**	780	225	**295**	360
		6	390	**490**	590	390	**490**	590	590	**750**	915	260	**340**	425
		7	325	**425**	520	295	**410**	520	455	**620**	785	195	**275**	360
		8	295	**390**	490	260	**360**	455	390	**555**	720	160	**245**	325
		9	195	**295**	390	195	**260**	325	295	**410**	520	130	**160**	225
		10	295	**340**	390	260	**310**	360	425	**490**	555	195	**225**	260
		11	160	**210**	260	160	**210**	260	260	**340**	425	130	**160**	195
		12	390	**505**	620	390	**455**	520	590	**685**	785	260	**310**	360
		13.1	295	**390**	490	260	**340**	425	425	**540**	655	195	**245**	295
		13.2	145	**195**	245	130	**180**	210	210	**275**	325	95	**130**	145
				TN6010			TN6025			TN7110			THM	
M		14.1	295	**390**	490	195	**245**	295		—		195	**245**	295
		14.2	245	**325**	390	160	**195**	245		—		160	**195**	245
		14.3	180	**245**	310	130	**160**	180		—		130	**160**	180
		14.4	145	**195**	245	95	**130**	145		—		95	**130**	145
				TN6010			TN6025			TN7110			THM	
K		15	455	**555**	655	225	**295**	325	620	**790**	980	225	**295**	325
		16	325	**425**	520	160	**210**	260	520	**650**	820	160	**210**	260
		17	390	**490**	590	195	**225**	260	590	**750**	920	195	**225**	260
		18	295	**390**	490	130	**180**	225	390	**560**	720	130	**180**	225
		19	490	**590**	685	260	**310**	360	820	**790**	980	260	**310**	360
		20	360	**455**	555	195	**245**	295	590	**750**	920	195	**245**	295
				TN6010			TN6025			TN7110			THM	
N		21	1965	**2460**	2950	1965	**2460**	2950		—		1965	**2460**	2950
		22	1640	**2130**	2620	1640	**2130**	2620		—		1640	**2130**	2620
		23	1965	**2460**	2950	1965	**2460**	2950		—		1965	**2460**	2950
		24	1640	**2130**	2620	1640	**2130**	2620		—		1640	**2130**	2620
		25	750	**980**	1210	750	**980**	1210		—		750	**980**	1210
		26	490	**655**	820	490	**655**	820		—		490	**655**	820
		27	490	**655**	820	490	**655**	820		—		490	**655**	820
		28	360	**455**	555	360	**455**	555		—		360	**455**	555
		29	195	**260**	325	195	**260**	325		—		195	**260**	325
		30	260	**325**	390	260	**325**	390		—		260	**325**	390
				TN6010			TN6025			TN7110			THM	
S		31	120	**145**	180	85	**120**	145		—		85	**120**	145
		32	95	**115**	145	65	**95**	115		—		65	**90**	115
		33	75	**90**	115	55	**75**	90		—		55	**75**	90
		34	45	**55**	80	35	**45**	55		—		35	**45**	55
		35	50	**55**	80	35	**90**	55		—		35	**90**	55
		36	195	**235**	260	135	**195**	235		—		135	**195**	235

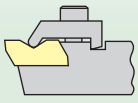
Turning

TopGroove Holder Identification System



N — Insert Holding Method

N — TopGroove*

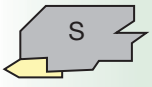


*Proprietary standard only.

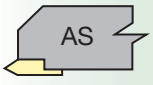
S — Insert Mounting Location

End mount

Side mount Offset



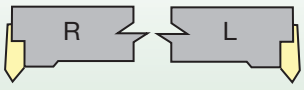
Side mount No offset for swiss machining



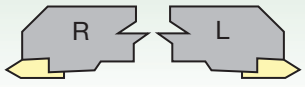
NRR undercut

R — Hand of Tool

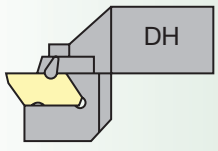
End mount



Side mount



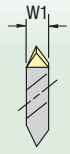
Drop Head



16 — Shank Size

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

3 — Insert Size



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

D — Qualified Surface and Length

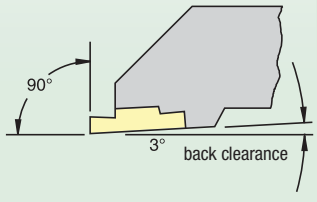
A – qualified back and end, 4" long

B – qualified back and end, 4.5" long

C – qualified back and end, 5" long

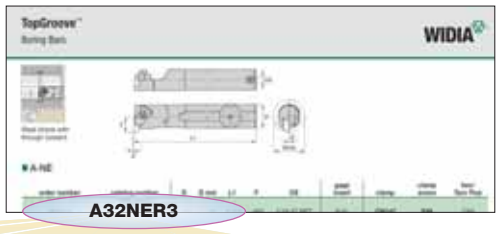
D – qualified back and end, 6" long

E – qualified back and end, 7" long



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

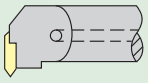
TopGroove
Boring Bar Identification System



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

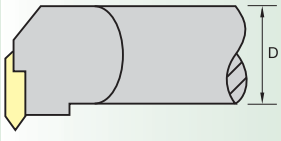
A — Bar Type

Steel with coolant



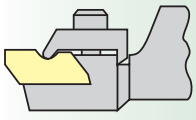
32 — Bar Diameter

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



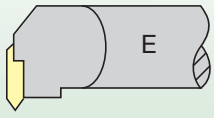
N — Insert Holding Method

N — TopGroove

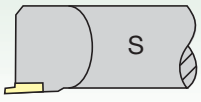


E — Insert Location

End mount

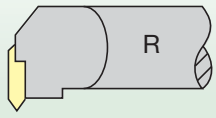


Side mount

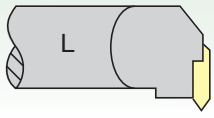


R — Hand of Tool

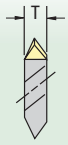
Right hand



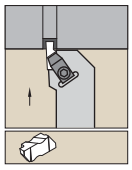
Left hand

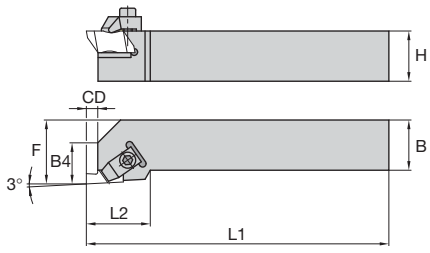


3 — Insert Size



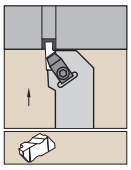
insert size	T
1	.100"
2	.150"
3	.195"
4	.255"
5	.380"
6	.383"
8	.438"

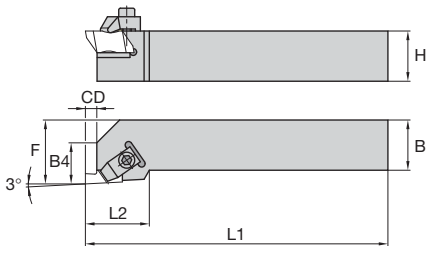




NS

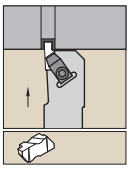
order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus
	right hand											
3632147	**NSR062**	.375	.375	.562	2.50	.75	.35	.138	N.2R	**CM74**	**S310**	7/64
3639035	**NSR082V**	.500	.500	.750	3.50	.75	.35	.138	N.2R	**CM74**	**S310**	7/64
3639044	**NSR102B**	.625	.625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

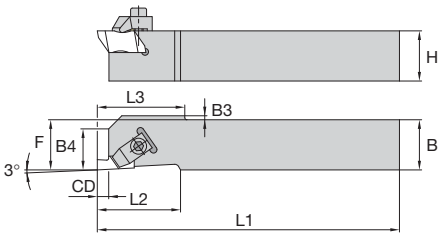




NS (with Shim)

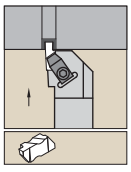
order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus	shim	shim screw	shim screw I.D. drive size
	right hand														
3639031	NSR164C	1.000	1.000	1.250	5.00	1.38	.54	.294	N.4R	CM72LP	S2112	25 IP	SM420	SL344	–
3639033	NSR164D	1.000	1.000	1.250	6.00	1.38	.54	.294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

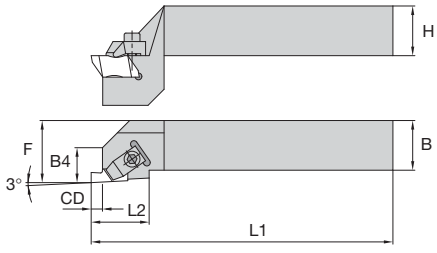




NAS (for Swiss Machines)

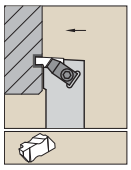
order number	catalog number	H	B	F	L1	L2	B4	CD	B3	L3	gage insert	clamp	clamp screw	hex/ Torx Plus
	right hand													
3632140	NASR062D	.375	.375	.375	6.00	.75	.35	.138	.07	.88	N.2R	CM182	S310	7/64
3636529	NASR082D	.500	.500	.500	6.00	.75	.35	.138	—	—	N.2R	CM182	S310	7/64
3639039	NASR102B	.625	.625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

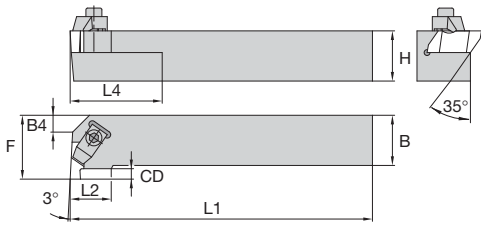




NS-DH

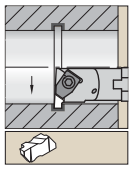
order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/ Torx plus	jack screw	wrench size jack screw
	right hand													
3637547	NSRDH122B	.750	.750	1.000	4.50	.75	.40	.138	N.2R	CM74	S310	7/64	—	—
3637528	NSRDH163D	1.000	1.000	1.250	6.00	1.25	.58	.210	N.3R	CM72LP	S2112	25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



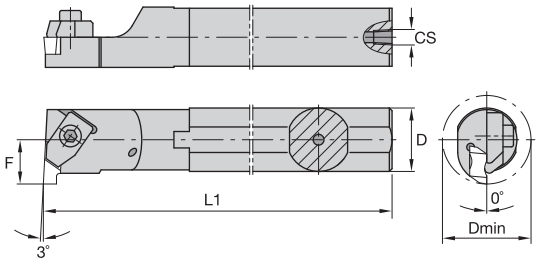


NE

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



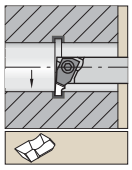
Steel shank with through coolant.



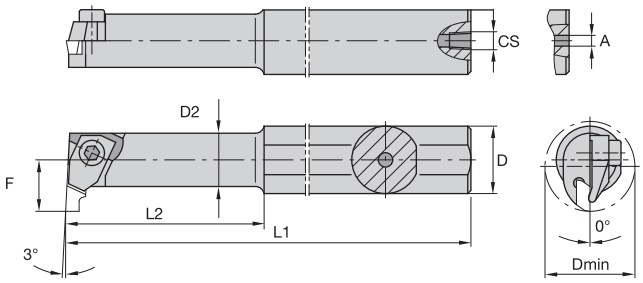
A-NE

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

NOTE: Minimum bore capability varies with depth of groove. See pages A68–A69 for details.



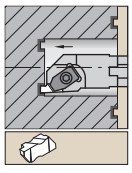
Necked steel shank
with through coolant.



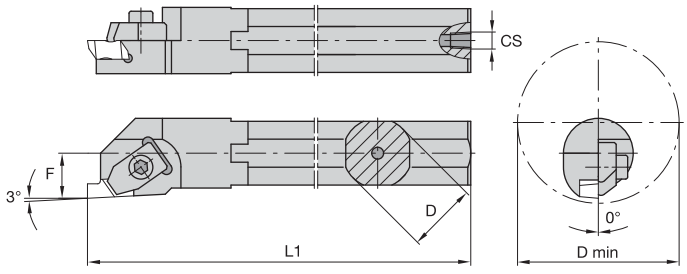
A-NE-1

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

NOTE: Minimum bore capability varies with depth of groove. See pages A68–A69 for details.



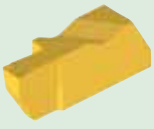
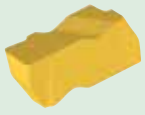
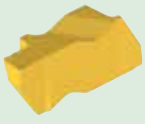
Steel shank with
through coolant.

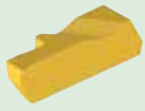
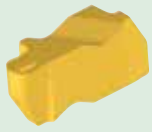
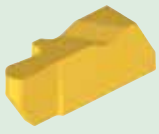
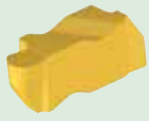
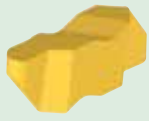


A-NS

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

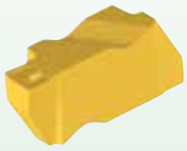
NOTE: Minimum bore capability varies with depth of groove. See pages A68–A69 for details.

insert style	application	rake angle	page(s)
NG 	• General-purpose grooving. • O-ring grooving. • Circlip grooving.	neutral	**A51**
NG-K 	• Chip control geometry. • General-purpose grooving. • O-ring grooving. • Circlip grooving. • Light turning.	10° positive	**A52**
NGC-K* 	• Combined groove and chamfered edge break in one positive plunge with chip control. • Designed for DIN 471/472 standard circlip grooves.	10° positive	**—**
NGD* 	• Deep grooving.	neutral	**—**
NGD-K 	• Chip control geometry. • Deep grooving. • Light turning.	10° positive	**A55**
NGP 	• General-purpose grooving. • O-ring grooving. • Circlip grooving.	5° positive	**A56**
NF* 	• Face grooving. • Additional side clearance.	neutral	**—**
NF-K 	• Face grooving with chip control. • Additional side clearance.	10° positive	**A57**
NFD-K 	• Deep face grooving with chip control. • Additional side clearance.	10° positive	**A57**

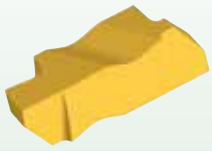
insert style	application	rake angle	page(s)
NFD-KI* 	• Internal deep face grooving with chip control. • For use in boring bars for internal face grooves.	10° positive	**—**
NP-K 	• Turning. • Back turning positive. • Profiling with chip control.	10° positive	**A58**
NR 	• Full radius grooving. • Turning and profiling.	neutral	**A58**
NR-K 	• Chip control geometry. • Full radius grooving, turning, and profiling.	10° positive	**A60**
NRD 	• Deep grooving. • Full radius end-form.	neutral	**A60**
NRP* 	• Full radius grooving. • Light-turning profiling.	5° positive	**—**
NU* 	• Undercutting.	neutral	**—**
NV* 	• Poly-Vee grooving.	neutral	**—**
NB/NBD 	• Blanks. • Blanks for deep grooving. • Available in uncoated grades only.	—	**A61**

*Inserts are available as custom solutions.

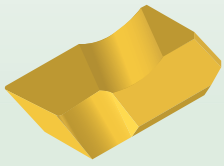
TopGroove • NG-K, NG-1L, and NG



NG-K

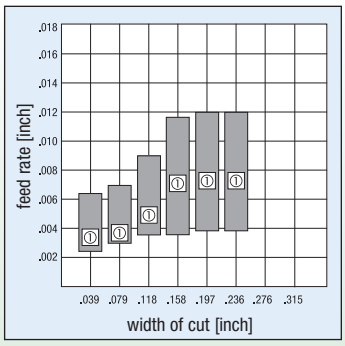


NG

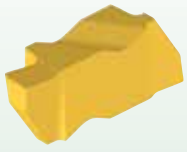


NG-1L

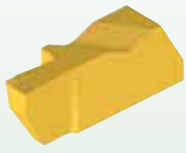
- Chip control enables true optimization and productivity.
- For general-purpose, O-ring, and circlip grooving applications.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.



TopGroove • NGP and NGD-K

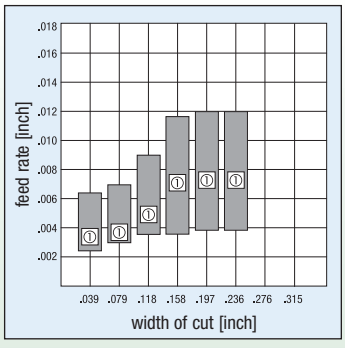


NGP

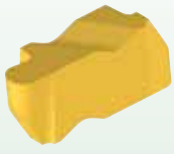


NGD-K

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



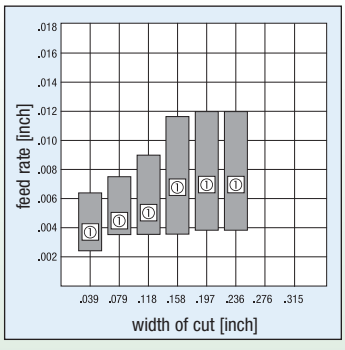
TopGroove • NR and NR-K

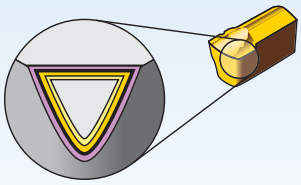


NR

NR-K

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





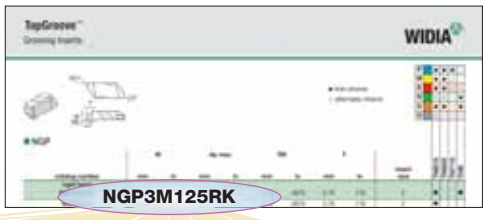
Coatings provide high-speed capability and are engineered for finishing to light roughing.

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

Grade

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

TopGroove
Insert Identification System



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

N — Top-Groove

B — Blank (for special forms)

F — Face grooving

G — Grooving

P — Back turning

R — Full radius

U — Undercutting (or relieving)

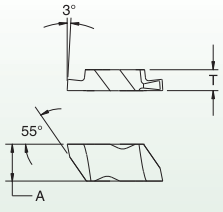
V — Poly-Vee

D — Deep grooving

P — Positive

C — Groove and chamfer

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



M — Metric insert groove width

C — Circlip groove insert width is nominal circlip size

Blank — indicates inch width insert

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

inch example
1/32 = .031"

Width Tolerance: ±.001" unless otherwise specified

**Omit position for TopGroove NB-style blanks.

L — Left hand

R — Right hand

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

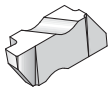
K — Standard chip control

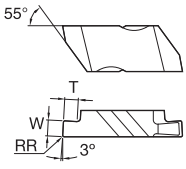
E — Hone only

Groove size

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

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





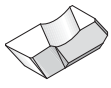
● first choice
○ alternate choice

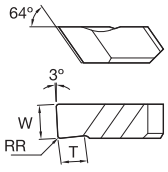
P	●	●	●	
M	●	●	○	
K	●	●	○	○
N	○	○		●
S	●	●		●
H	○			

■ NG

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

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

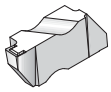


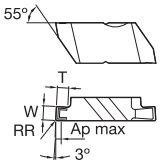


■ NG-1L

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

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





■ NG-K

● first choice
○ alternate choice

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

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

(continued)

(NG-K continued)

● first choice
○ alternate choice

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

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

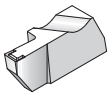
(continued)

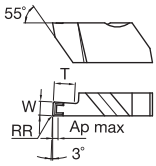
(NG-K continued)

● first choice
○ alternate choice

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

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





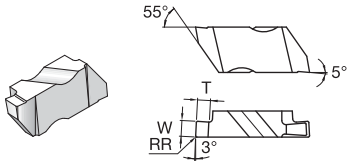
● first choice
○ alternate choice

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

■ NGD-K

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

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



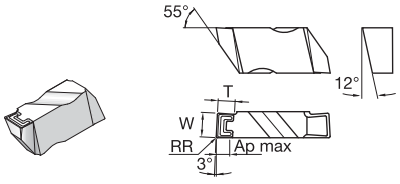
● first choice
○ alternate choice

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

■ NGP

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

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



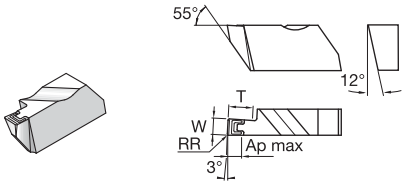
● first choice
○ alternate choice

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

■ NF-K

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

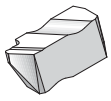
NOTE: Right-hand insert shown; left-hand insert is mirror image.

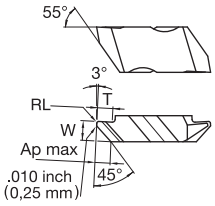


■ NFD-K

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

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





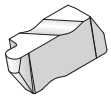
● first choice
○ alternate choice

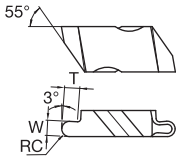
P	●	●	●	
M	●	●	○	
K	●	●	○	○
N	○	○		●
S	●	●		●
H	○			

NP-K

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

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





NR

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

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

(continued)

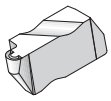
(NR continued)

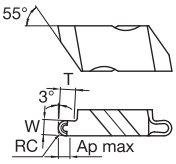
● first choice
○ alternate choice

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

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

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





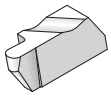
● first choice
○ alternate choice

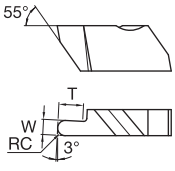
		TN6010	TN6025	TN7110	THM
P		●	●	●	
M		●	●	○	
K		●	●	○	○
N		○	○		●
S		●	●		●
H		○			

NR-K

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

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

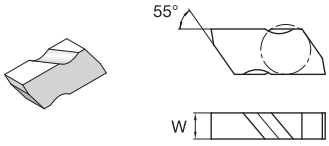




NRD

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

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



● first choice
○ alternate choice

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

■ NB

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

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

TopGroove Inserts: The Best Platform for Customization

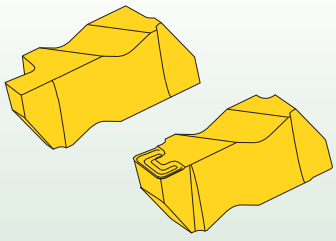
All TopGroove custom order inserts benefit from the superior rigidity of our TopGroove toolholder and clamping system. For added productivity, most custom orders can be incorporated into the double-ended inserts.

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

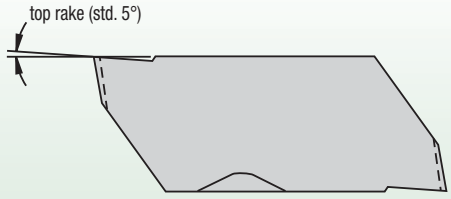
State-of-the-art CAD enables rapid development of your custom insert design. For convenience, a concept drawing is always available to facilitate engineering development of an insert.

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

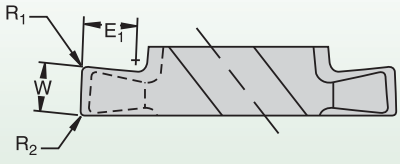
Whatever your special grooving requirements may be, WIDIA can provide an effective solution. We have the technical expertise, resources, and commitment to help you develop insert designs that satisfy your metalcutting application demands.



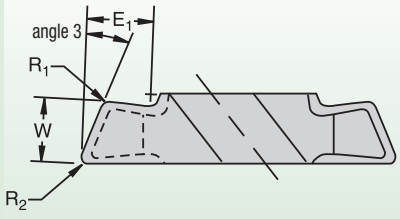
top rake



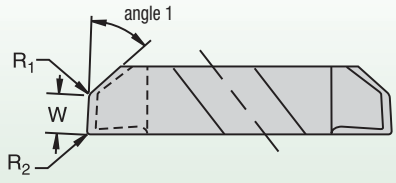
style A



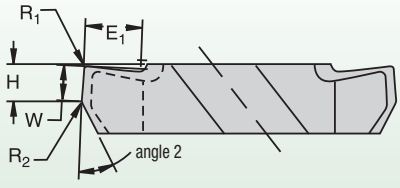
style B1



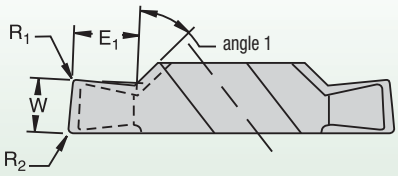
style B2



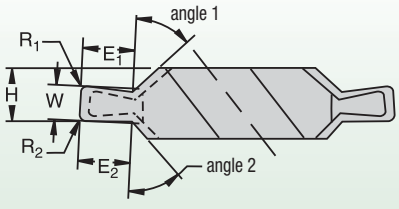
style B3



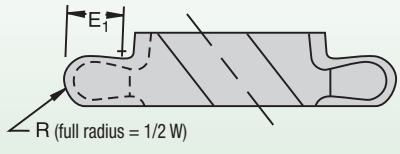
style B4



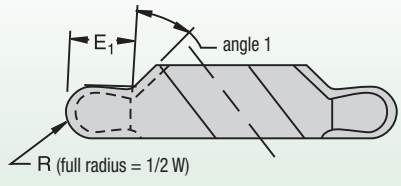
style C1



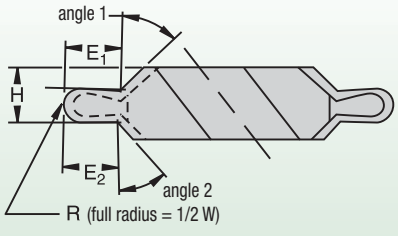
style D



style F



style G



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

TopGroove™ Grooving Systems

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

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

Date / /

Customer-Specified Dimensions

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

Orientation (circle one) left hand right hand

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

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

Closest Catalog Standard

Customer

Distributor

Shipping Requirements

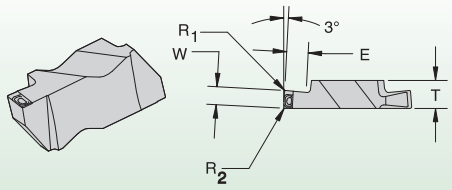
Attention Distributors: Use this worksheet to collect information for your customer.

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

A-SK Specials

10° positive cutting action

- Grooving
- Face grooving



insert catalog number		width range W	corner radii range R_1 and R_2	E	T	grades
right hand	left hand					
NG2-R-SK or NF2-R-SK	**NG2-L-SK or NF2-L-SK**	.026–.056 .057–.135	.000–.007 .003–.013	.050 .110	.150	Carbide grades quoted upon request. **See page A48.**
NG3-R-SK or NF3-R-SK	**NG3-L-SK or NF3-L-SK**	.042–.067 .068–.076 .077–.094 .095–.105 .106–.125 .126–.134 .135–.156 .157–.174 .184–.196	.003–.013 .005–.020 .005–.030 .005–.020 .005–.030 .005–.020 .005–.030 .008–.018 .018–.028	.094 .094 .150 .150 .150 .150 .150 .150 .150	.195	
NG4-R-SK or NF4-R-SK	**NG4-L-SK or NF4-L-SK**	.100–.110 .111–.125 .126–.131 .132–.156 .157–.162 .163–.189 .190–.191 .192–.204 .245–.257	.005–.020 .005–.030 .005–.020 .005–.030 .005–.020 .005–.030 .018–.028 .008–.018 .018–.025	.150 .150 .150 .150 .150 .250 .250 .250 .250	.255	

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

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

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

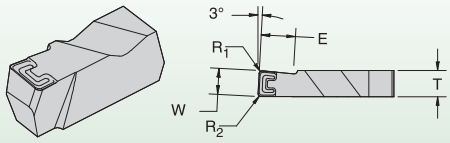
If deeper cutting depth (E) is required, please specify. Refer to the application drawing and charts for maximum face groove depths and minimum face groove diameters.

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

A-SK Specials

10˚ positive cutting action

- Deep grooving
- Deep face grooving



insert catalog number		width range W	corner radii range R_1 and R_2	E	T	grades
right hand	left hand					
NGD3-R-SK or NFD3-R-SK	**NGD3-L-SK or NFD3-L-SK**	.057–.069 .089–.101* .120–.132* .184–.196*	.003–.013 .003–.013 .003–.013 .018–.028	.125 .250 .250 .250	.195	Carbide grades quoted upon request. **See page A48.**
NGD4-R-SK or NFD4-R-SK	**NG4-L-SK or NF4-L-SK**	.120–.132* .180–.196* .245–.257*	.003–.013 .018–.028 .018–.028	.250 .375 .500	.255	

**One cutting edge.*

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

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

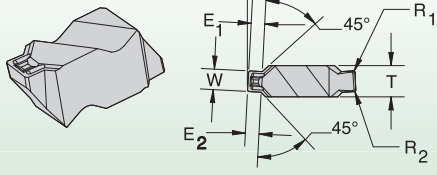
Unless otherwise specified, a standard tolerance of ±.001" on width (W) will be applied, and a standard tolerance of ±.0025" on radii (R_1 and R_2) will be applied.

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

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

C1-SK Specials

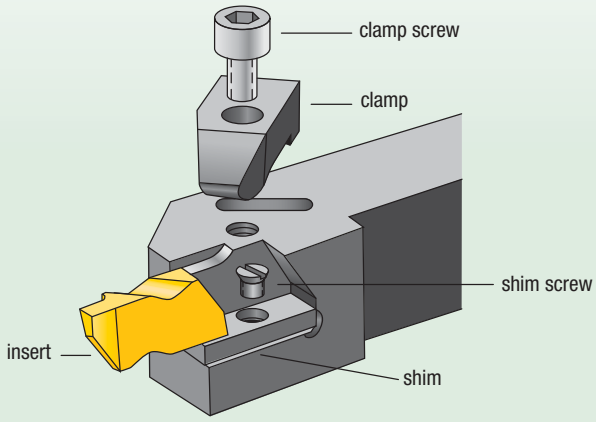
- Groove and chamfer



insert catalog number		width range W	corner radii range R_1 and R_2	E	T	grades
right hand	left hand					
NB2-R-K	**NB2-L-K**	.047–.125	.005–.015	.100	.150	Carbide grades quoted upon request. **See page A48.**
NB3-R-K	**NB3-L-K**	.094–.170	.005–.025	.150	.195	

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

TopGroove Toolholders and Boring Bars



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

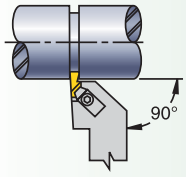
**1" diameter boring head.*

***Boring head.*

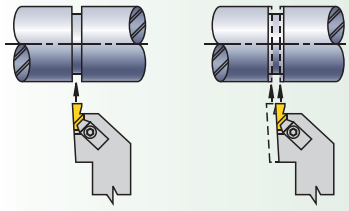
Grooving Tool Failure and Solution Guide

Practical Solutions to Common Grooving Problems

Holder Position for Grooving Operation

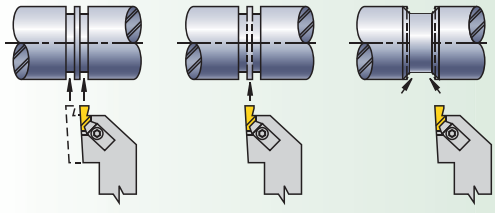


How to Cut a Groove Slightly Wider than the Groove Tool



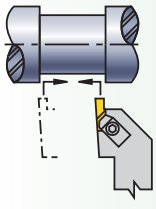
1. Plunge the center of the groove.
2. Plunge each side of the groove to get the specified width. Use a slower feed rate when cutting groove sides.

How to Cut Wider Grooves



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

Finish Turning the Groove



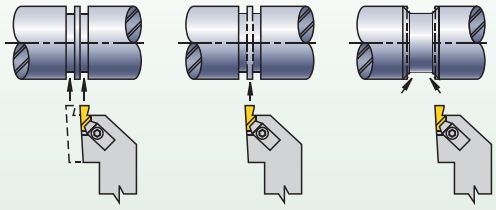
1. Follow recommendations explained above.
2. To avoid insert chipping and to achieve groove wall perpendicularity, follow the tool path outlined here.
3. Use the lightest depth of cut that still enables good chip surface finishing.

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

Machining Guidelines for Chip Control • Grooving

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

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



Machining Guidelines for Chip Control • Turning/Profiling

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

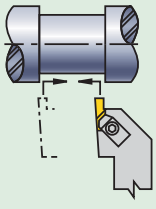
- .031–.062" (0,79–1,6mm) wide insert can cut up to .025" (0,6mm) deep.
- .067–.128" (1,7–3,3mm) wide insert can cut up to .040" (1mm) deep.
- .138–.189" (3,5–4,8mm) wide insert can cut up to .080" (2mm) deep.
- .197–.250" (5–6,35mm) wide insert can cut up to .120" (3mm) deep.

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

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

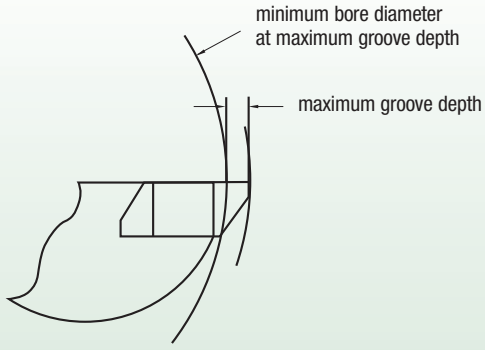
The same internal grooving depth limits are a function of bar clearance versus bore diameters.

Finish Turning the Groove



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

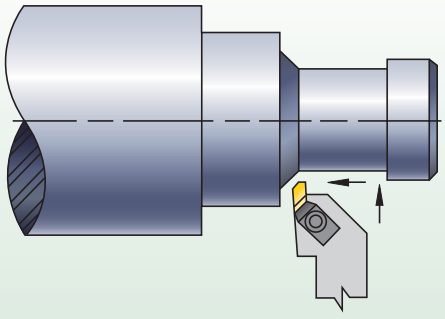
Internal Groove Depth versus Bar Interference



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

Machining Guidelines for Back Turning/Turning/Profiling

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



Machining Guidelines for Using TopGroove Deep Grooving Inserts (NGD)

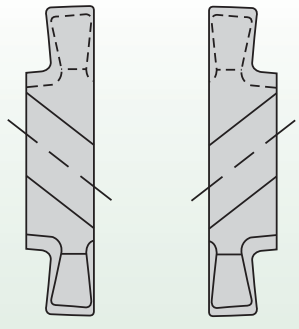
Typically, those NGD- and NRD-style inserts with two cutting edges require no machine offset changes. However, those inserts with only one cutting edge do require offset changes. Refer to the chart here to ensure proper offset adjustments.

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

TopGroove Insert Selection Guide

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

See page A48 for carbide grade selection and more technical information.

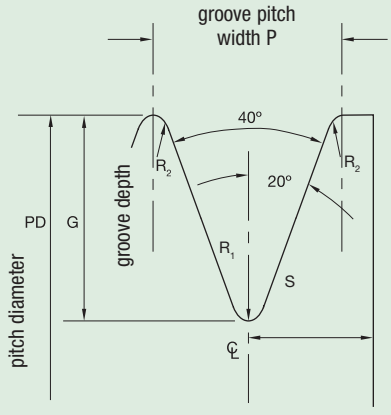


left-hand insert right-hand insert

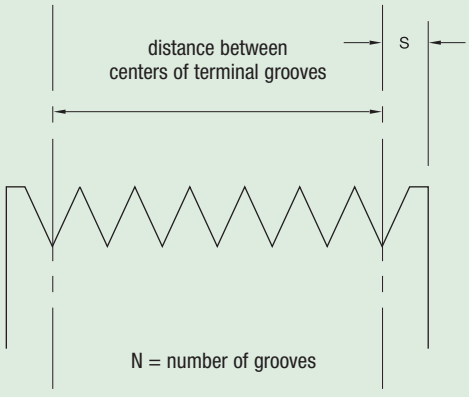
Machining Guidelines for Poly-Vee Grooving with Custom Solution and TopGroove NV Inserts (NV3-J and NV4-L)

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

Section J



Section L

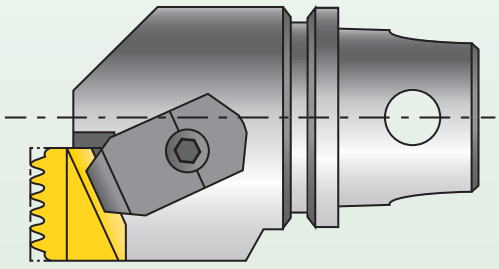


Groove Dimensions and Tolerances for Sheaves

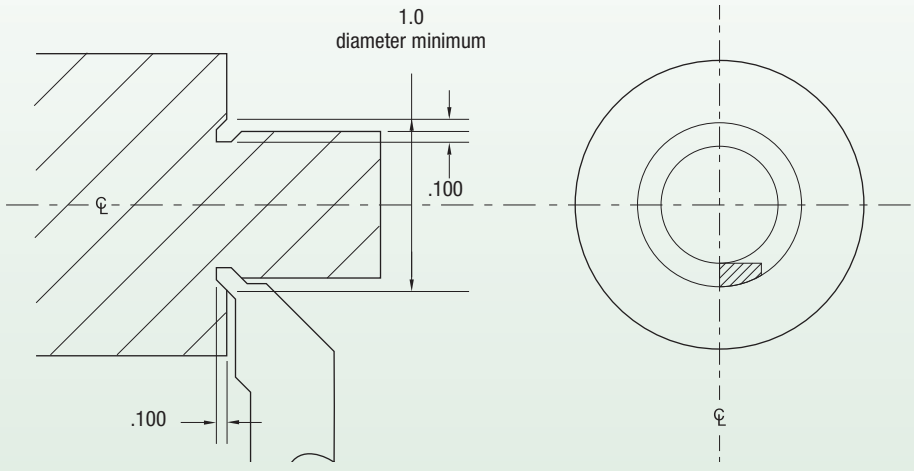
groove cross section	pitch width (P)	groove depth (G)	minimum radius (R2)	radius (R1)	terminal distance	distance between centers of terminal grooves and maximum accumulated tolerance
J	.092 ±.001	.087 ±.005	.008	.0125 ±.0025	1/8	(N-1).092 ±.010
L	.185 ±.002	.201 ±.005	.015	.0125 ±.0025	3/8	(N-1).185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

Multiple Tooth Poly–Vee Grooving

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



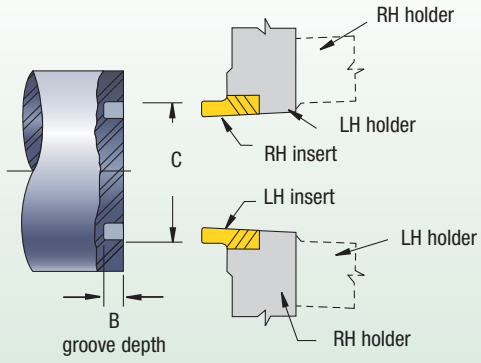
Machining Guidelines for Undercutting Operations Performed with Custom Solution and TopGroove NU Inserts (NU3094, NU3125, and NU3156)



NOTE: Items shown are non-standard items.

Machining Guidelines for Face Grooving Operations • External

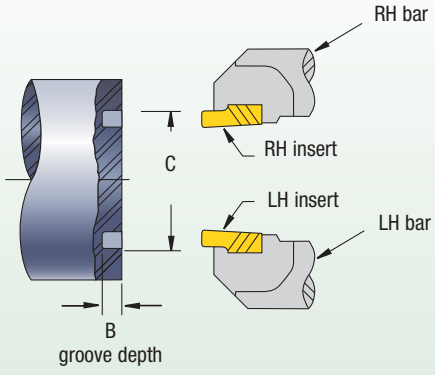
Toolholders



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

Machining Guidelines for Face Grooving Operations • External

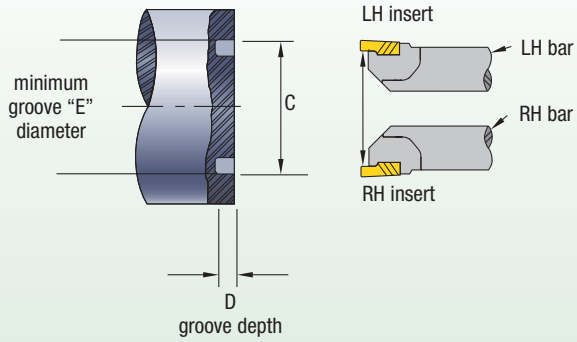
Boring Bars



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

Machining Guidelines for Face Grooving Operations • Internal

Boring Bars



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

NOTE: Also check minimum bore diameter of boring bar. See page A44.

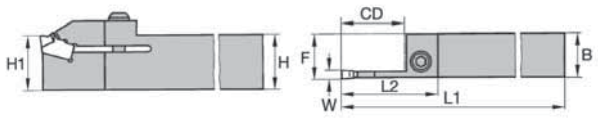
ProGroove™

ProGroove™ Grooving and Cut-Off

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

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

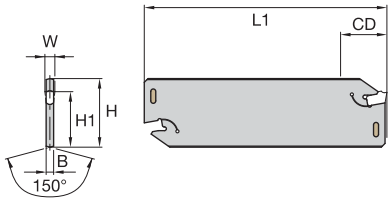
ProGroove



Right Hand Tool

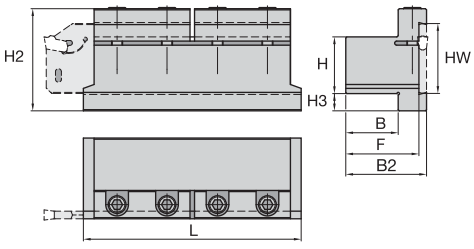
Grooving and Cut-Off

order number	catalog number	W	CD	H	B	F	L1	L2	H1	cap screw	wrench
	right hand										
2962743	**12250023000**	.122	.787	.750	.750	.764	5.000	1.260	.750	**12148596200**	**12148041200**
2962745	**12250023200**	.122	.984	1.000	1.000	1.012	6.000	1.575	1.000	**12148596200**	**12148041200**
2962751	**12250025200**	.201	1.260	1.000	1.000	1.016	6.000	2.087	1.000	**12148596200**	**12148041200**
	left hand										
2962744	**12250023100**	.122	.787	.750	.750	.764	5.000	1.260	.750	**12148596200**	**12148041200**



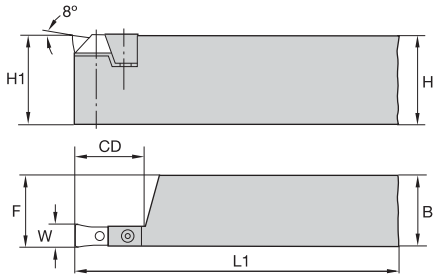
Cut-Off Blades

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



Cut-Off Blade Holders

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

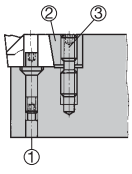


Grooving

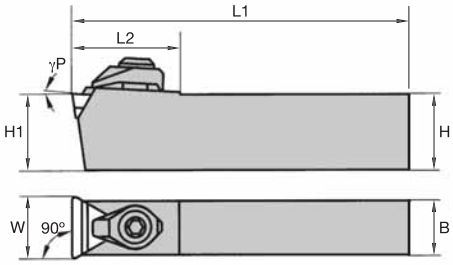
order number	catalog number	W	CD	H	H1	B	L1	F
	right hand							
2983280	32250110100	.321	.866	1.250	1.250	1.000	6.020	1.021
2983282	32250110500	.480	1.181	1.500	1.500	1.250	7.020	1.272
2983973	32250110700	.559	1.181	1.500	1.500	1.250	7.020	1.272
	left hand							
2983975	32250110200	.321	.866	1.250	1.250	1.000	6.020	1.021
2983977	32250110600	.480	1.181	1.500	1.500	1.250	7.020	1.272
2983978	32250110800	.559	1.181	1.500	1.500	1.250	7.020	1.272
2983979	32250111000	.638	1.339	1.500	1.500	1.250	7.020	1.272

Spare Parts

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



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



Grooving

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

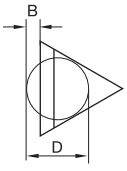
NOTE: KS holders are supplied without chipbreaker. For chipbreaker order numbers, see below.

For Grooving without Chipbreaker

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

For Grooving with Chipbreaker (Order Additional Clamp and Chipbreaker)

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



WIN WITH WIDIA™

ProGroove™

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

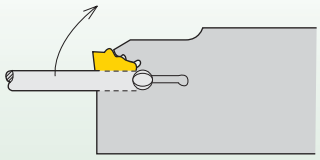
ProGroove Grooving and Cut-Off

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

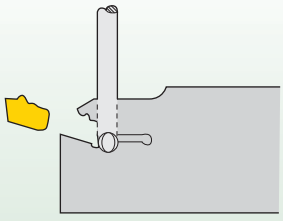
To learn more, contact your local Authorized Distributor or visit **www.widia.com**.

WIDIA™

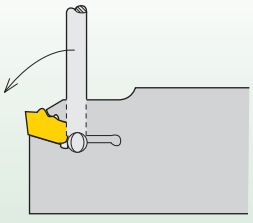
ProGroove System



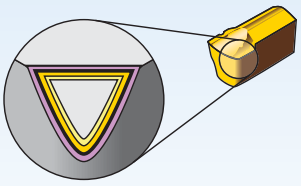
To change the cutting insert, place the wrench into the blade recess.
The blade mouth is opened by turning through 90°.



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



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



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

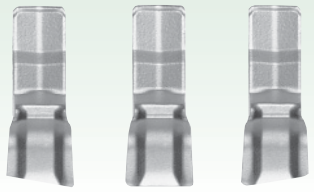
- Reduce cycle times — high speed and feed capability.
- Longer tool life — new multilayer coating provides better wear resistance.

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

Grade

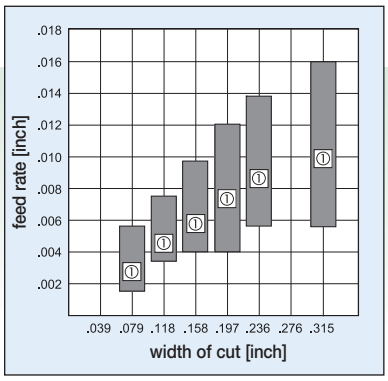
Coating		Grade Description	ISO	05	10	15	20	25	30	35	40	45
TN6030	HC-P30	PVD-TiAlN Nano-layer coated carbide. Medium and heavy machining for steels and nodular cast irons. Recommended at medium cutting speeds when good toughness properties are required.	P					■	■	■		
			M					■	■	■		
			K					■	■	■		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

ProGroove • U



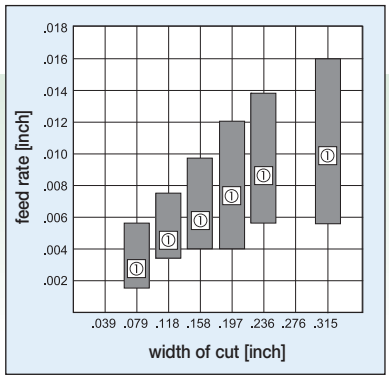
left-hand neutral right-hand

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



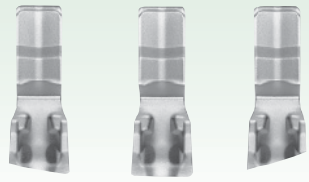
ProGroove • M

neutral



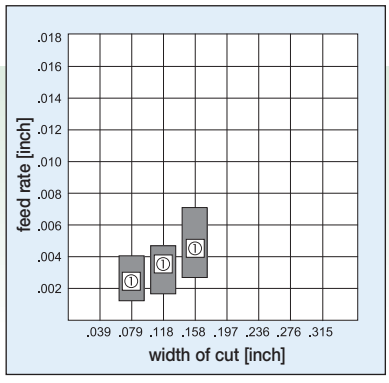
For grooving and parting, also capable of copy and straight turning as well as chamfering. With additional chip forming element for good chip control with varying depths of cut.

ProGroove • S

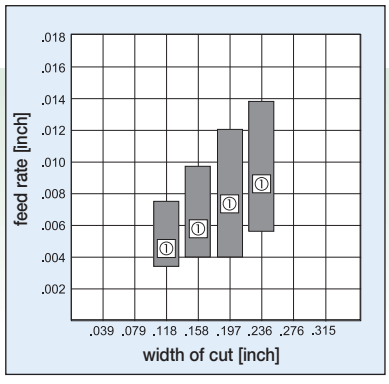


left-hand neutral right-hand

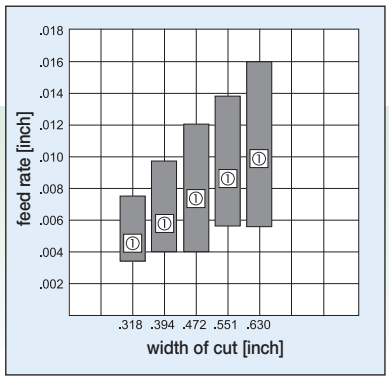
For low-burr parting with straight flanks and smooth surface finishes. All inserts are recommended for parting and grooving slender workpieces, part diameter <1.25", and thin-wall tubes.



ProGroove • R



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



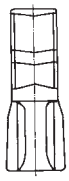
LG System • 0 and 1

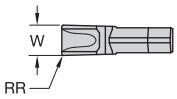
0 1

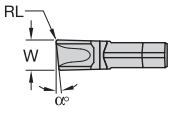
…0
Inserts with wide range of applications in grooving and deep grooving. With additional chip control element for good chip control, even with varying widths of cut.

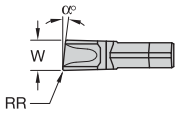
…1
Inserts with wide range of uses in grooving and deep grooving of short chipping materials.

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









● first choice
○ alternate choice

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

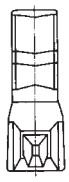
■ PGU

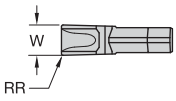
catalog number	W mm	W in	RR mm	RR in	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567320	2,10	.083	0,20	.008	—	N - Neutral	●	●	●	●	●	
123567330	3,10	.122	0,30	.012	—	N - Neutral	●	●	●	●	●	
123567340	4,10	.161	0,30	.012	—	N - Neutral	●	●	●		●	
123567350	5,10	.201	0,30	.012	—	N - Neutral	●	●	●	●	●	
123567360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

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

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

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

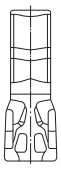


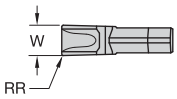


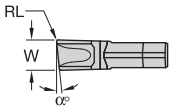
■ PGM

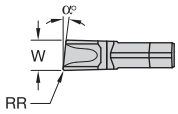
catalog number	W mm	W in	RR mm	RR in	α°	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567420	2,10	.083	0,20	.008	—	●	●	●			
123567430	3,10	.122	0,30	.012	—	●	●	●			
123567440	4,10	.161	0,30	.012	—	●	●	●			
123567450	5,10	.201	0,30	.012	—	●	●	●			
123567460	6,10	.240	0,40	.016	—	●	●	●			
123567480	8,15	.321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

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









● first choice
○ alternate choice

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

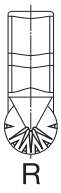
■ PGS

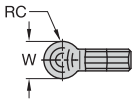
	W		RR									
catalog number	mm	in	mm	in	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567702	2,25	.089	0,20	.008	–	N - Neutral			●	●		
123567703	3,25	.128	0,20	.008	–	N - Neutral			●			
123567704	4,25	.167	0,20	.008	–	N - Neutral			●	●		

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

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

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

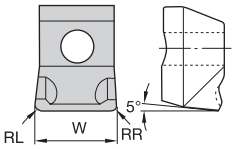




■ PGR

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

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



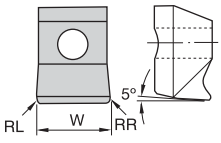
● first choice
○ alternate choice

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

LGN0

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

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



LGN1

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

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

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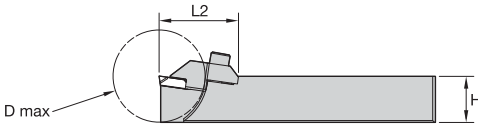
Separator

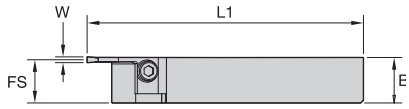
Features

- Insert widths .063–.157" (2–4mm).
- Toolholder shank sizes .375–1.250" (10–31,75mm).
- Cut-off up 3" (76mm) bar capacity.

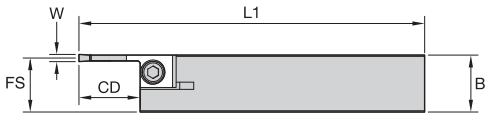
Benefits

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





Left Hand Tool



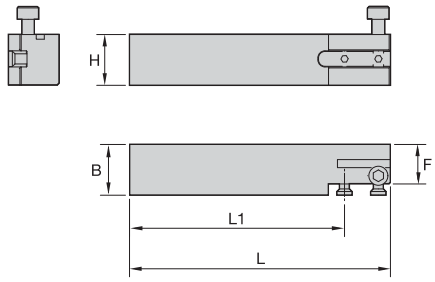
Left Hand Tool

Right Hand Tool

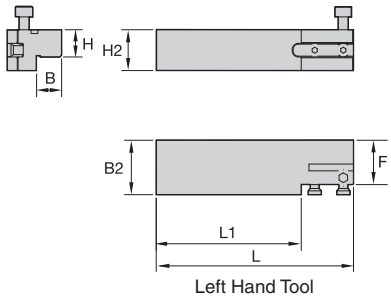
Square Shank

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

NOTE: Above toolholders are supplied with clamp.



Left Hand Tool



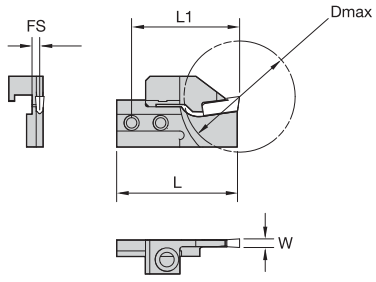
Left Hand Tool


Right Hand Tool

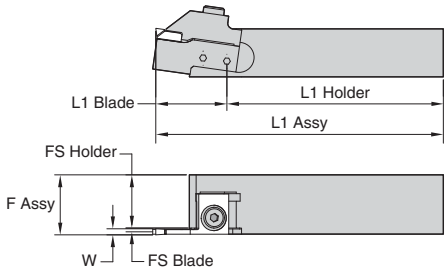
1/2" and 3/4" Shank Toolholders

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

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



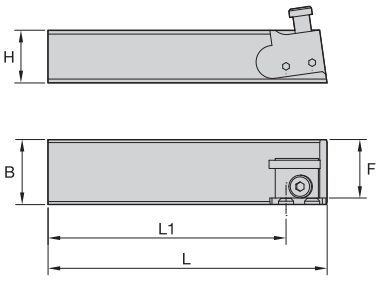
Right Hand Tool



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

1/2" and 3/4" Shank Blades

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

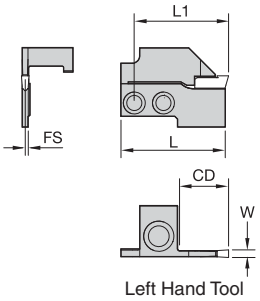


Left Hand Tool

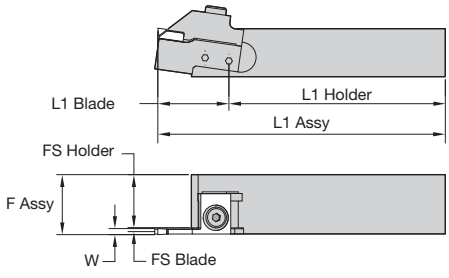

Right Hand Tool

1" and 1-1/4" Shank Toolholders

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



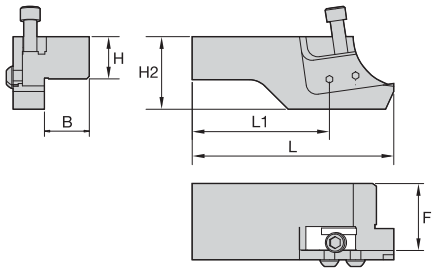
Left Hand Tool



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

1" and 1-1/4" Shank Blades

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



Left Hand Tool


Right Hand Tool

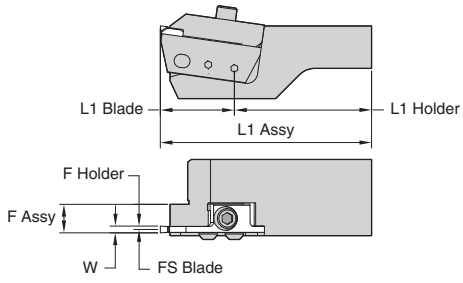
Universal Style 2-1/4" Bar Capacity

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

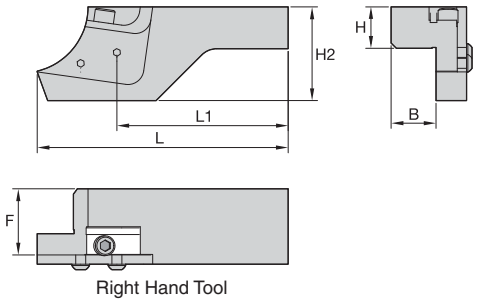
NOTE: .750" shank holders 206118 and 206128 use different clamps.

Components

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



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



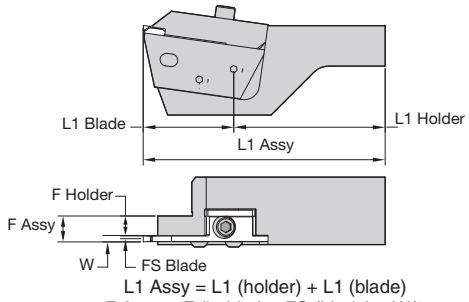
Right Hand Tool

Universal Style 3" Bar Capacity

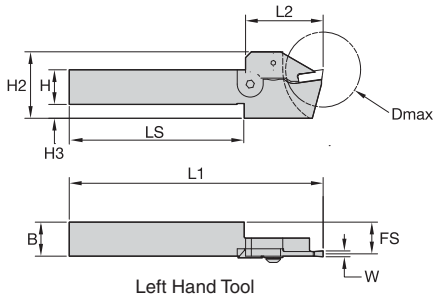
order number	catalog number	B	H	H2	F	L1	L	support blade screw	clamp screw
	right hand								
3538660	206115	.964	1.000	2.219	1.454	3.754	5.640	606171	S352
3538661	206116	1.064	1.000	2.219	1.554	3.754	5.640	606171	619112
3587587	206121	1.194	1.250	2.219	1.684	4.004	5.890	606171	619112
	left hand				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

Components

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



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



Left Hand Tool

Sub-Spindle

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

WIN WITH WIDIA™

Separator™

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

Separator Toolholders and Inserts

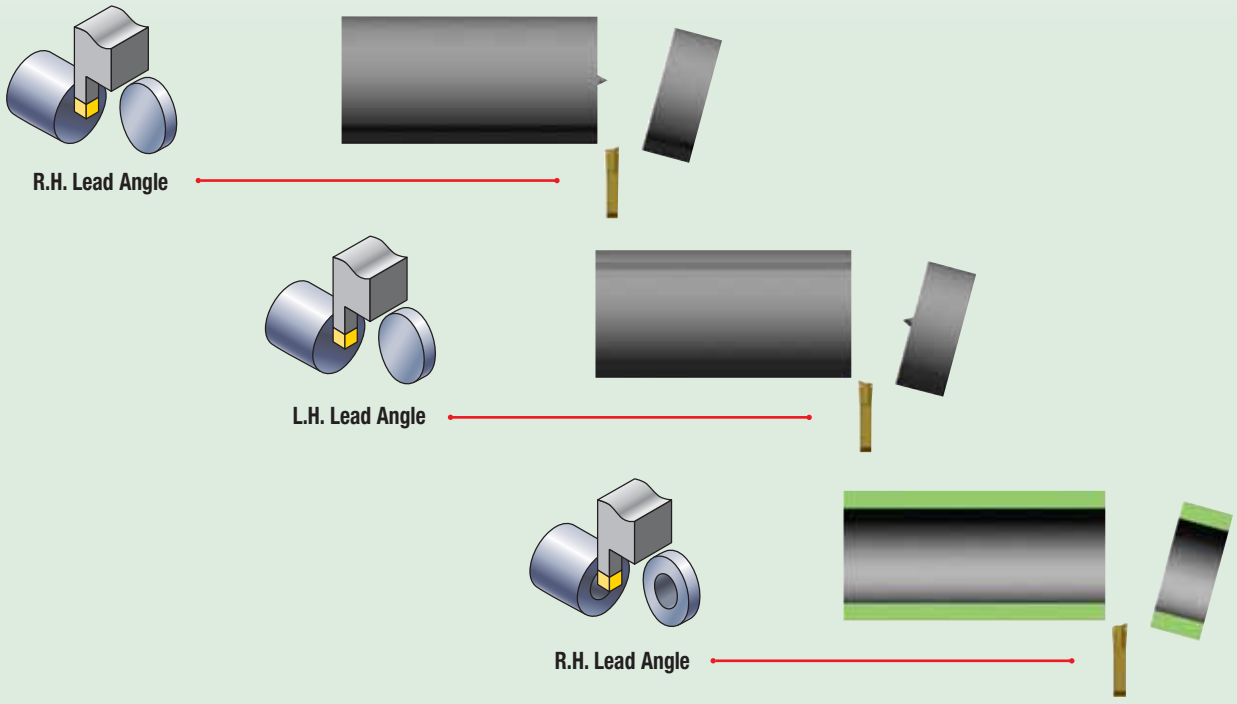
- Insert widths .079–.157" (2–4mm).
- Toolholder shank sizes .394–1.25" (10–31,75mm).
- Cut-off up to 2.99" (76mm) bar capacity.
- Quick, reliable insert indexing.
- Positive mechanical clamping.
- CNC square shank, screw machine, and PL blade-style toolholders.

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

WIDIA™

1 Choose the application to be performed:

Choose lead angle of insert for application.



2 Identify the material to be machined:

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

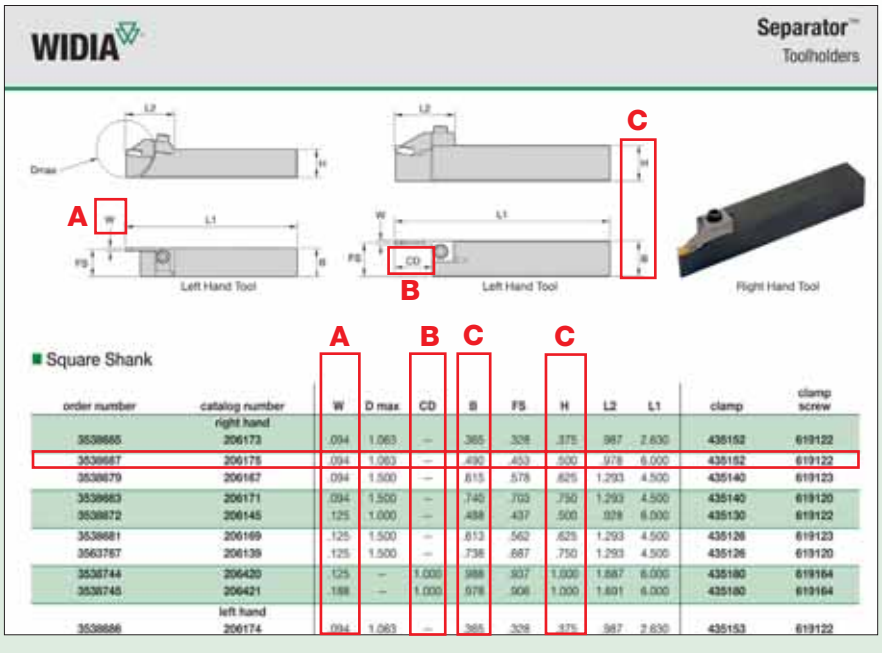
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

3 Select your toolholder based on the application:

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

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

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



■ Square Shank

order number	catalog number	W	D max	CD	B	FS	H	L2	L1	clamp	clamp screw
	right hand										
3538665	206173	.094	1.063	–	.365	.328	.375	.987	2.630	435152	619122
3538667	206175	.094	1.063	–	.490	.453	.500	.978	6.000	435152	619122
3538679	206167	.094	1.500	–	.615	.578	.625	1.293	4.500	435140	619123
3538683	206171	.094	1.500	–	.740	.703	.750	1.293	4.500	435140	619120
3538872	206145	.125	1.000	–	.488	.437	.500	.928	6.000	435130	619122
3538681	206169	.125	1.500	–	.613	.562	.625	1.293	4.500	435126	619123
3563767	206139	.125	1.500	–	.738	.687	.750	1.293	4.500	435126	619120
3538744	206420	.125	–	1.000	.988	.937	1.000	1.887	6.000	435180	619164
3538745	206421	.188	–	1.000	.978	.906	1.000	1.801	6.000	435180	619164
	left hand										
3538686	206174	.094	1.063	–	.365	.328	.375	.987	2.630	435153	619122

4 Select chipbreaker style for the application:

See the application guide on page A99 for a complete list of insert styles.

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

5 Select grade:

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

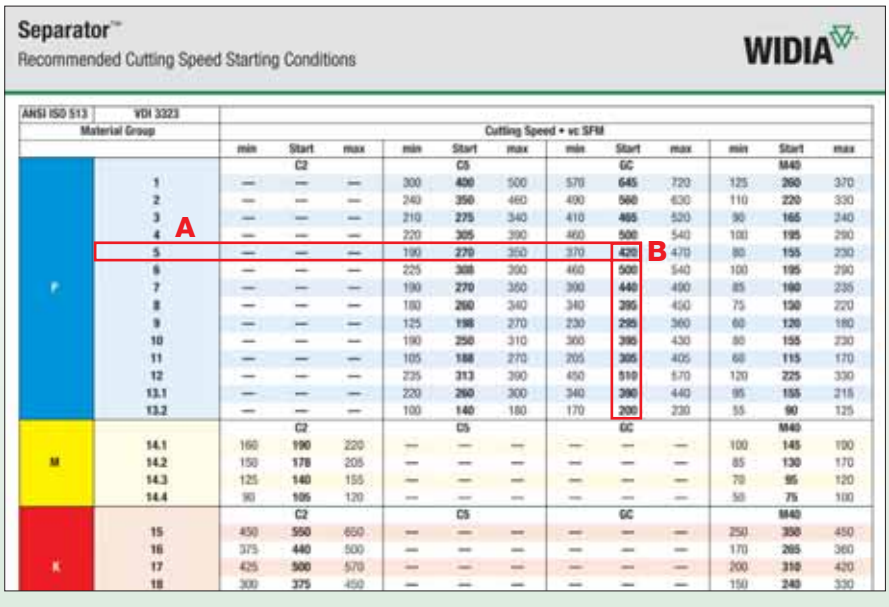
See page A98 for Grades and Grade Descriptions.

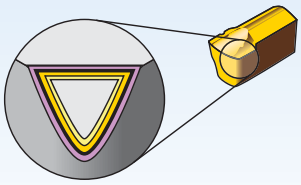
6 Determine cutting data:

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

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

See page A100–A101 for cutting data.





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

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

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

Grade

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

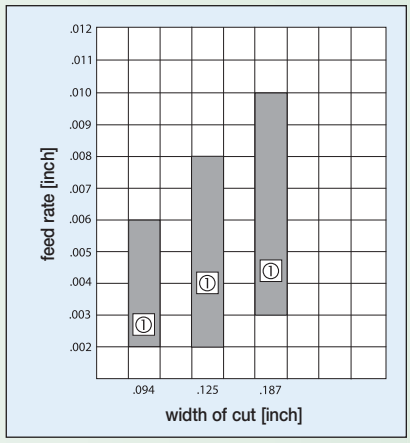
Separator • X² and X²-Ultra

X²

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

X²-Ultra

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



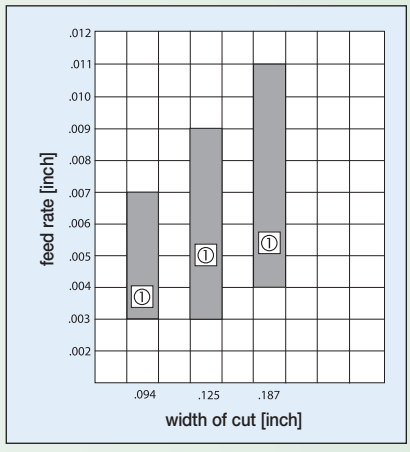
Separator • S² and S²-Ultra

S²

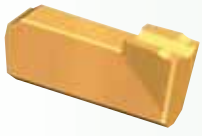
High positive rake with a more open chipbreaker enables increased speeds and feeds for moderate- to high-speed applications. The geometry includes wipers and a corner radius that provides superior flatness and finish. This insert is also available with sharp corners. Its greatest strengths can be seen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

S²-Ultra

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

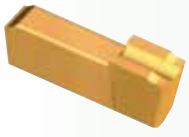


Separator • Classic and F²



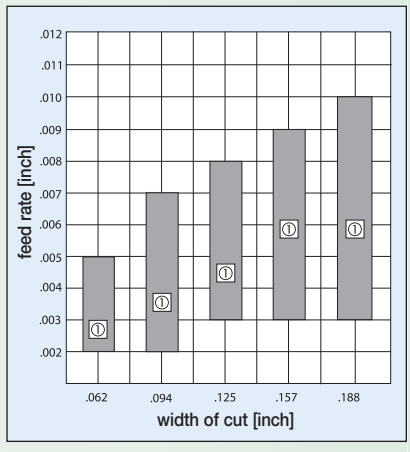
Classic

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



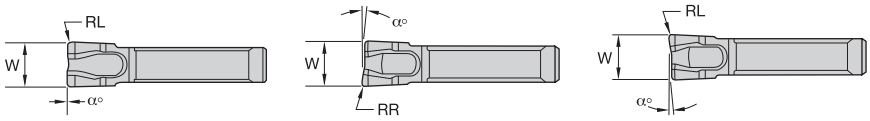
F²

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



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

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



● first choice
○ alternate choice

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

X²

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

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

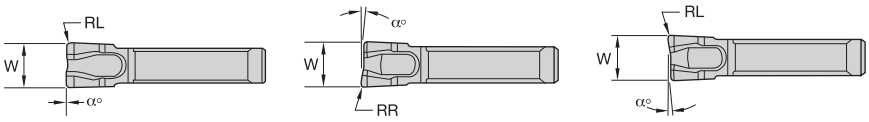
catalog number	W mm	W in	RL mm	RL in	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507306	2,39	.094	0,14	.006	5	R - Right							●	●
507309	3,20	.126	0,17	.007	5	R - Right							●	●

X² Ultra

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

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

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



● first choice
○ alternate choice

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

S²

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

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

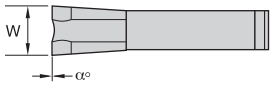
catalog number	W mm	W in	RL mm	RL in	RR α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507276	2,39	.094	0,20	.008	5	R - Right				●	●		●	●
507301	2,39	.094	–	–	5	R - Right							●	
507298	3,20	.126	–	–	5	R - Right					●		●	●
507279	3,20	.126	0,20	.008	5	R - Right				●	●		●	●
507282	4,78	.188	0,20	.008	5	R - Right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

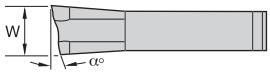
S² Ultra

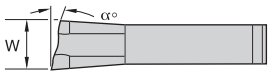
catalog number	W mm	W in	RR mm	RR in	RR α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507329	2,39	.094	0,15	.006	–	N - Neutral						●		
507332	3,18	.125	0,15	.006	–	N - Neutral						●		

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

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







● first choice
○ alternate choice

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

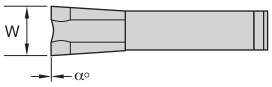
Classic

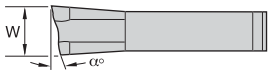
catalog number	W mm	W in	W α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507196	1,60	.063	—	N - Neutral				●			●	
507140	2,39	.094	—	N - Neutral				●			●	●
507117	3,20	.126	—	N - Neutral	●		●	●			●	●
507116	4,78	.188	—	N - Neutral		●	●	●			●	
507118	6,35	.250	—	N - Neutral			●					

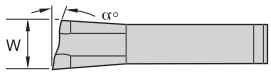
catalog number	W mm	W in	W α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507213	1,60	.063	4	L - Left				●				
507152	2,36	.093	12	L - Left				●				
507144	2,39	.094	4	L - Left				●			●	
507154	3,15	.124	12	L - Left				●			●	
507129	3,20	.126	4	L - Left				●			●	
507125	4,78	.188	4	L - Left				●				

catalog number	W mm	W in	W α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507197	1,60	.063	4	R - Right				●			●	
507214	1,60	.063	12	R - Right				●			●	
507207	2,31	.091	4	R - Right							●	
507151	2,36	.093	12	R - Right				●	●		●	
507143	2,39	.094	4	R - Right	●			●			●	●
507161	2,39	.094	18	R - Right				●			●	
507171	3,12	.123	6	R - Right				●				
507146	3,15	.124	12	R - Right				●			●	
507155	3,15	.124	18	R - Right				●			●	
507128	3,20	.126	4	R - Right	●		●	●			●	●
507224	3,20	.126	4	R - Right				●			●	
507176	4,72	.186	12	R - Right				●			●	
507124	4,78	.188	4	R - Right	●		●	●			●	●

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







● first choice
○ alternate choice

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

■ F²

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

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

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

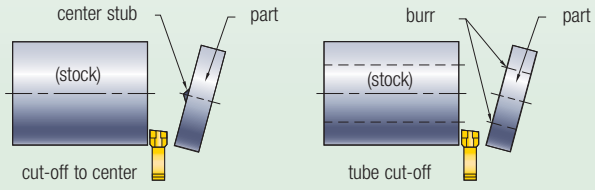
Definitions and Guidelines

1. Width of cut (W) = width of the insert.
2. Lead angle = 0° (neutral); 4°, 5°, 12°, 18° (RH or LH).

Reduce burr of cut-off faces:

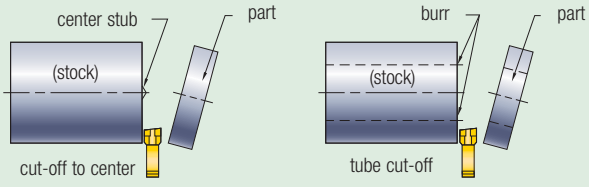
- Use lead angle-type inserts (Figures 1 and 2). Lead angle on a cut-off insert reduces the burr that remains on the part but decreases tool life and increases tool side deflection and possibly cycle time.

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



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

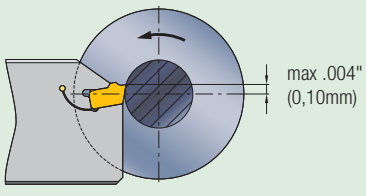
Figure 2
Insert selection **right-hand lead**



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

- Check total height and maintain on center with part diameter.
- The cutting edge height should be within ±.004" (0,1mm) to the center; recommended cutting position is .002" (0,05mm) above center.

Figure 3
Above center



- If 0° lead angle is mandatory, use the narrowest possible cut-off insert and blade. This will minimize the center stub or cut-off burr length. Decrease the feed rate to maximum .002" (0,05mm) or less at the point where diameter equals insert width.
- On tubing-type parts that require a chamfer on the I.D., align I.D. chamfer tool with cut-off surface. This will enable the chamfering operation to actually separate the part from the bar (see Figure 4). Note the part may drop onto the chamfering bar, which, in this case, will act like a catcher for the part.

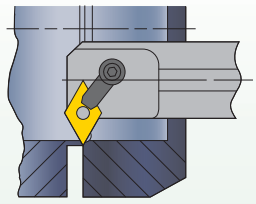


Figure 4
Internal chamfer line up

Improve surface finish of cut-off faces:

- Use insert with 0° lead angle.
- Increase coolant flow or improve application technique, as shown in Figure 5.
- Decrease the feed rate near the break-through point of the cut.
- Check that the grooving tool is set at the correct angle.
- Use blades with the greatest possible face height and smallest possible cutting width.
- Increase the speed.

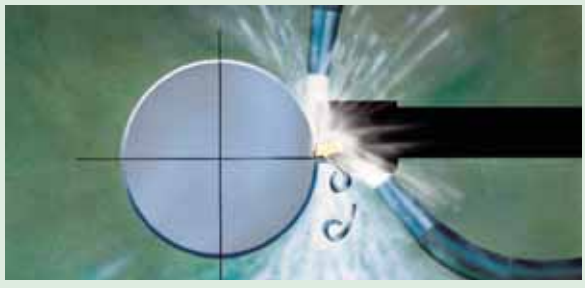


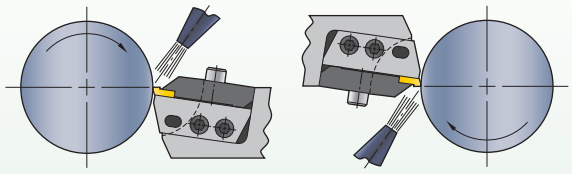
Figure 5
Preferred method for applying coolant

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

Improve chip control:

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

Figure A

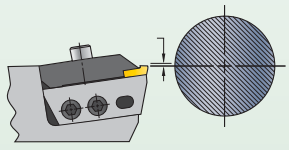


Coolant on cut-off tool | Preferred method of applying coolant

Improve flatness of cut-off surfaces:

- Maintain 90° position (perpendicular alignment) between cut-off tool and workpiece.
- For low to moderate speed (sfpm), use Separator F2.
- For moderate to high speed (sfpm), use Separator S² or X².
- Use strongest toolholder system possible.
- Use 0° lead angle inserts when possible. If lead angle inserts are needed, reduce the feed rate.
- Check for minimum overhang of holder and blade.
- Set up for minimum workpiece overhang (distance out of chuck).
- Reduce feed rate.
- Maintain sharp edge and corners on cut-off insert.
- Increase speed (RPM).
- Use ample amounts of well-directed coolant (see Figure A).
- Maintain proper tool center height .000–.005" (0–0,0001mm) above center (see Figure B).

Figure B



Improve surface finish:

- For low to moderate speed (sfpm), use Separator F2.
- For moderate to high speed (sfpm), use Separator S² or X².
- Avoid overly aggressive chip control.
- Increase speed.
- Reduce lead angle and feed rate.
- Determine if corner radius is too large or small.
- Use a coated grade.
- Use coolant (see Figure A).

Minimize edge chipping:

- Check to see if tool is significantly above or below center.
- Reduce feed prior to part drop off.
- Use Separator S² or X².
- Choose the proper speed associated with the insert grade used.
- Call Technical Support to see if a larger hone size is needed.
- Eliminate chatter.
- Avoid chip re-cutting.
- Check for these part and machine problems:
  - Slide is loose.
  - Slide travel is irregular.
  - Bar/tube I.D. and/or O.D. is out of round.
  - Bar/tube is bent.
  - Thin wall collapses (deforms) in the cut.
  - Part is unstable.
  - Cut-off through unturned stock.
  - Excessive tool overhang.
  - Bent or partly attached flash ring.

(continued)

(continued)

Eliminate chatter:

- Minimize tool blade and holder overhang.
- Minimize part overhang.
- Use strongest toolholder system.
- Use a more narrow width of insert.
- Chipbreaker might be too aggressive. (Call Technical Support.)
- Adjust speed and feed rate up or down.
- Hold workpiece rigidly.
- With a longer part, support with steady rest or live center.
- Avoid machine dwell.
- Use S² or X² to reduce cutting forces.

Reduce cut-off nib on solid bar or I.D. burr on tubing:

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

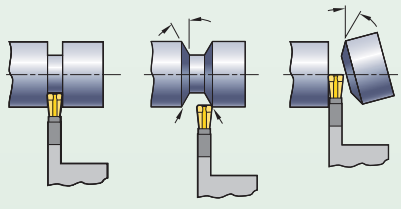
Eliminate built-up edge:

- Select proper grade for insert.
- Increase speed (RPM).
- Increase the feed rate.
- Use ample amounts of well-directed coolant (see Figure A on page A107).

Chamfer and cut-off operations:

- Use Separator S² or X².
- Groove or breakdown workpiece surface being machined.
- Machine the chamfer.
- For jobs requiring a chamfer on both ends of the part, begin by plunging to a depth just beyond the depth of the chamfers. Then, return to the part O.D. and profile each chamfer individually. Finish the cut-off after completion of the second chamfer.
- Cut off the workpiece (see Figure C).

Figure C



Modifications for Increased Depth of Cut

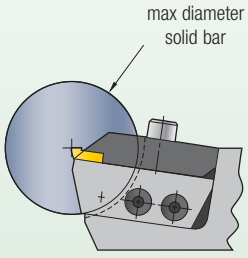


Figure 1
Standard bar capacity shown

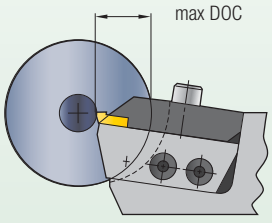


Figure 2
Larger bar diameter shown

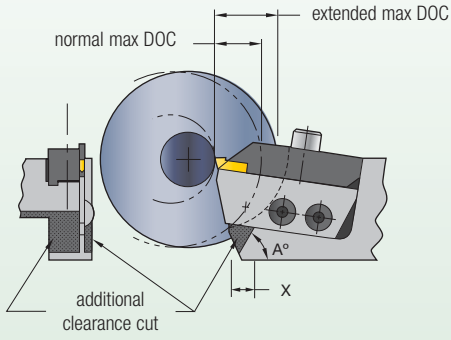


Figure 3
Modified toolholder with larger bar diameter shown

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

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

Ranger™

Adjustable Face Grooving System.

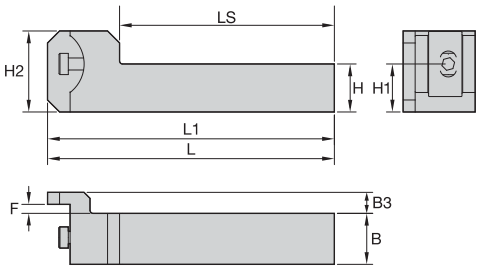
Features

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

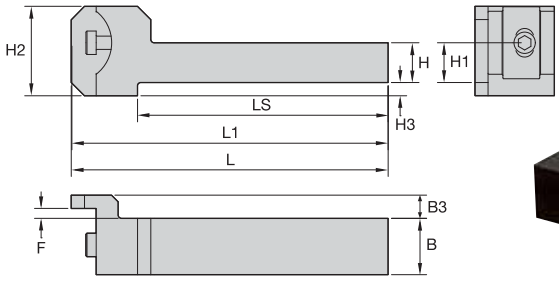
Ranger

Benefits

- Available in both CW and CCW rotation and in both sweep-in or sweep-out styles.
- 2.25–16" (57–406mm) O.D. face grooving with one adjustable assembly.



Right Hand Tool



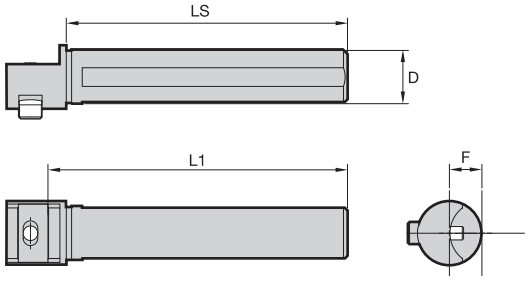
Right Hand Tool


Left Hand Assembly

Square Shank

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

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

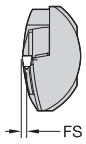


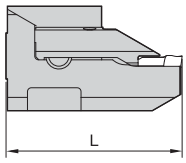

Left Hand Assembly

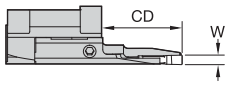
Round Shank

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

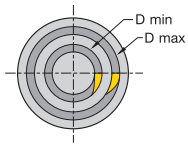
NOTE: Toolholders can be used as left hand or right hand.
These holders can use curve-in and curve-out cartridge assembly.

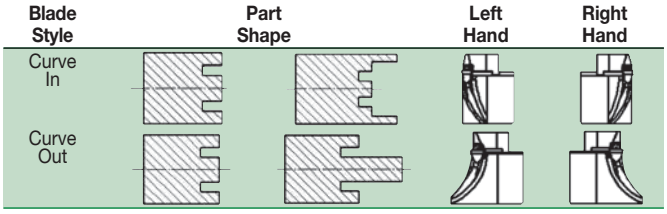






Left Hand Tool

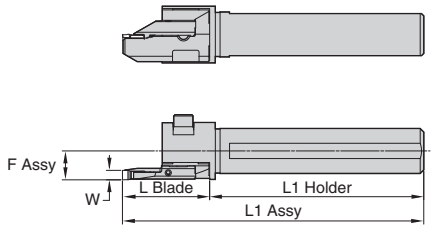




Curve In

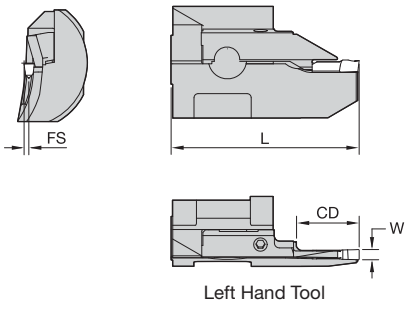
order number	catalog number	W	CD	D min	D max	FS	L	hand	clamp	clamp screw
3539537	**338123**	.125	.75	2.25	15.75	-0.071	2.30	L - Left	**440203**	**606219**
3539538	**338124**	.188	1.00	2.25	15.75	-0.094	2.30	L - Left	**440204**	**606219**
3539546	**338132**	.250	1.00	2.25	15.75	-0.125	2.30	L - Left	**4402122**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

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

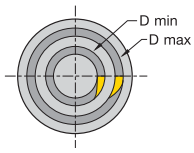


For Round Shank

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



Left Hand Tool

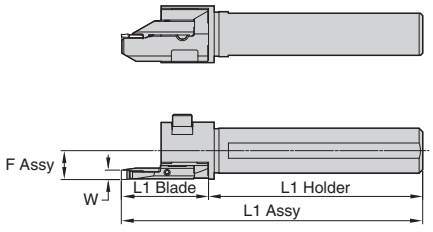


Blade Style	Part Shape	Left Hand	Right Hand
Curve In			
Curve Out			

Curve Out

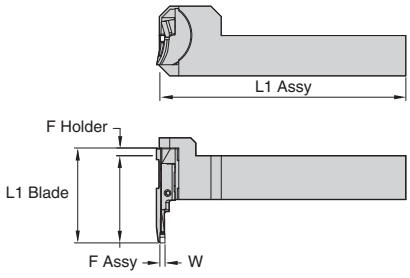
order number	catalog number	W	CD	D min	D max	FS	L	hand	clamp	clamp screw
3539539	**338125**	.125	.75	2.25	15.75	-0.058	2.30	L - Left	**440205**	**606219**
3539540	**338126**	.188	1.00	2.25	15.75	-0.094	2.30	L - Left	**440206**	**606219**
3539541	**338127**	.250	1.00	2.25	15.75	-0.125	2.30	L - Left	**440207**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

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



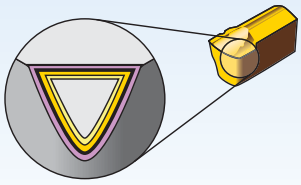
For Round Shank

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



For Square Shank

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



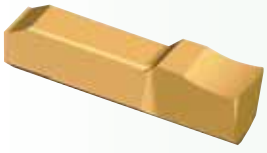
Coatings provide high-speed capability and are engineered for finishing to light roughing.

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

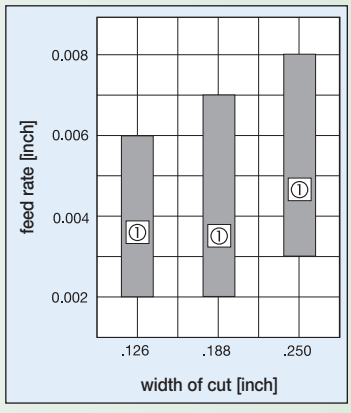
Grade

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

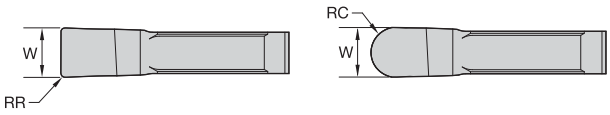
Ranger • Face Grooving



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



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



● first choice
○ alternate choice

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

Face Grooving

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

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

Technical Recommendations • Ranger Tool Systems

Application Information:

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

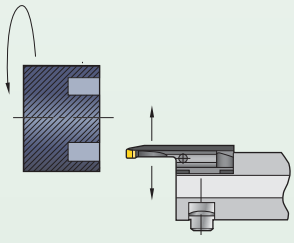
Face Grooving Ranges per Setting

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

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

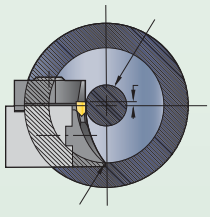
Widening a Face Groove

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



WMT™ Face Grooving Clearances

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



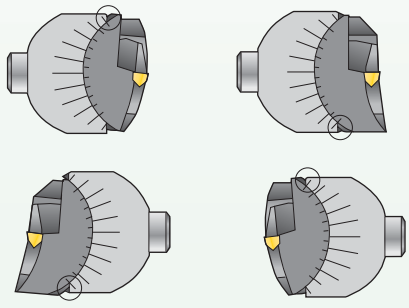
Adjusting Information for Ranger Tooling

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

- Appropriate diameter range setting can be accomplished as follows:

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

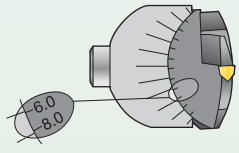
2.25 diameter settings



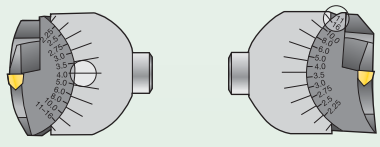
style 1 style 2

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

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



7.0 diameter setting



4.0 diameter setting 11–16 diameter setting

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

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

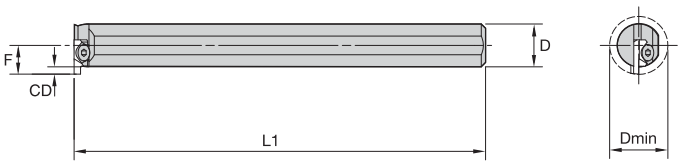
NOTE: It is important that these instructions are followed. Failure to do so may result in damage to the tool and the workpiece.

S-LOC™

I.D. Boring, Grooving, Face Grooving, and Threading.

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

S-LOC

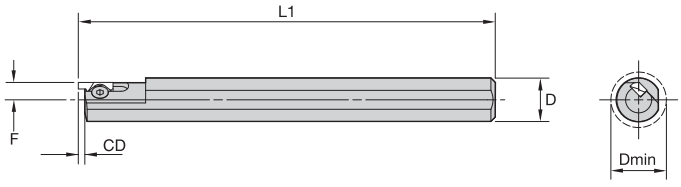


Right Hand Assembly

I.D. Grooving

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

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

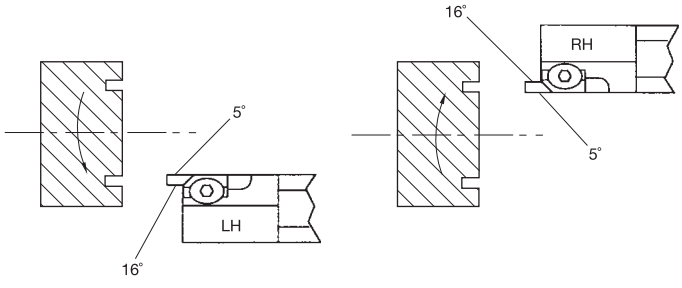


Left Hand Assembly

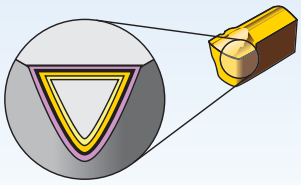
Face Grooving

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

NOTE: 1/2" and larger outside diameter.



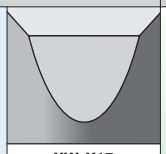
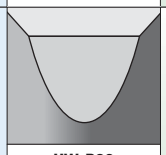
- Side clearance angles as noted.
- Use left-hand tooling for counterclockwise rotation only.
- Use right-hand tooling for clockwise rotation only.



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

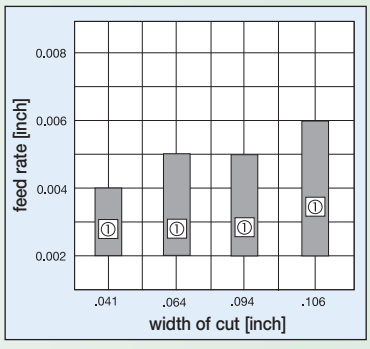
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

Grade

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

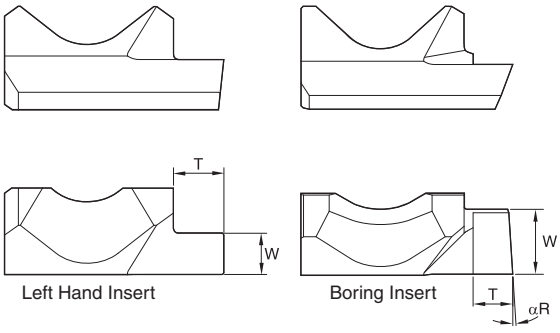
S-LOC

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



① Recommended feed

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



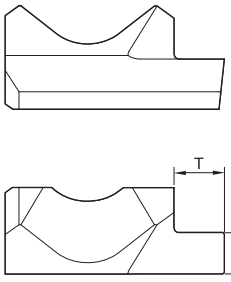
● first choice
○ alternate choice

P	●
M	●
K	○
N	●
S	○
H	

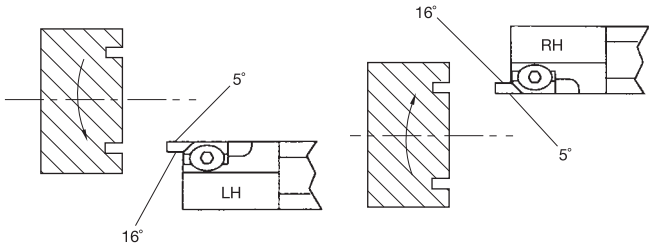
I.D. Grooving

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

NOTE: Insert 510102 is used for boring.



Left Hand Insert



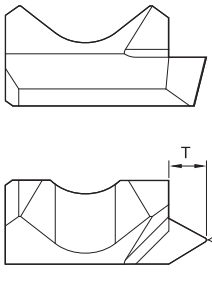
		C2	C5	GC	M40
P		●	●	●	●
M		●	●	●	●
K		○	○	○	○
N		●	●	●	●
S		○	○	○	○
H					

● first choice
○ alternate choice

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

Face Grooving

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



Left Hand Insert

Threading

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

NOTE: Minimum 10 threads per inch.

WIDIA™ Threading Systems

The WIDIA line offers two standard tooling systems, the TopThread™ and Laydown Threading (LT), to address all of your demanding threading operation requirements. Simply choose the system that best suits your specific needs and applications!

Threading

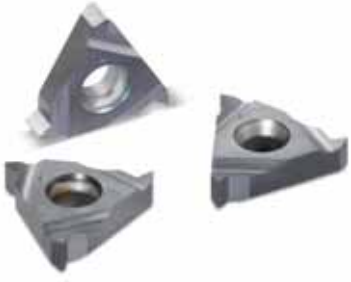
TopThread

With the largest selection of insert geometries and carbide grades available on the market today, the TopThread system is the best choice for coarse pitch and multi-tooth threading applications.

- Rigid insert clamping design ensures the best tool life, surface finish, and workpiece quality.
- Simple design does not require shim selection for thread helix angles.
- Excellent choice for heavy-duty applications like Acme, Buttress, and round threads machining.
- Use the same toolholders and boring bars for threading and grooving inserts.
- Ideal for special insert shapes and toolholders.

Reduce your cost per part with the addition of the third cutting edge with the Laydown Threading platform.

Eliminate the need for shims with the rigid TopClamp™ design.

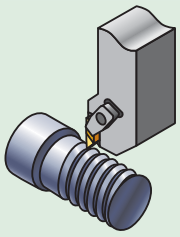


Laydown Threading

The Laydown Threading design is specially engineered to enable single-point threading in small diameter bores.

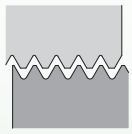
- Extensive selection of metric (ISO) and common European thread forms.
- Inserts available in PVD-coated carbide grades for high-performance applications.
- Low-profile design enables unrestricted chip flow.
- Three cutting edges per insert for superior, consistent results.

TopThread External Threading



Square Shank Toolholder Sizes:
- Inch — .375–1.5"
- Metric — 10–32mm

Fine Pitch

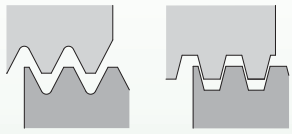


Cresting (Full Profile):
UN maximum TPI of 32
ISO minimum pitch of 1,5mm

Partial Profile — Flat Top (NTF and NTK):
UN maximum TPI of 44
ISO minimum pitch of 0,6mm

Partial Profile — Chip Control (NT-K):
UN maximum TPI of 36
ISO minimum pitch of 0,7mm

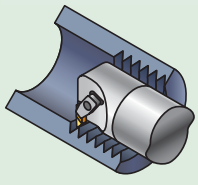
Coarse Pitch/Heavy Duty



Cresting (Full Profile):
UN minimum TPI of 7
ISO maximum pitch of 3mm

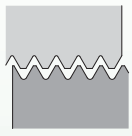
Partial Profile — Flat Top and Chip Control (NT-C and NT-CK):
UN minimum TPI of 4.5
ISO maximum pitch of 5,5mm

TopThread Internal Threading



Boring Bar Diameters:
- Inch — .312–2.5"
- Metric — 10–50mm
- Minimum bore — .440" (11,5mm)
- Steel

Fine Pitch

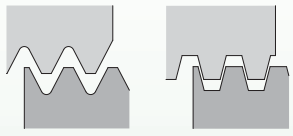


Cresting (Full Profile):
UN maximum TPI of 16
ISO minimum pitch of 1,5mm

Partial Profile — Flat Top (NT-1L, NTF and NTK):
UN maximum TPI of 24
ISO minimum pitch of 1mm

Partial Profile — Chip Control (NT-K):
UN maximum TPI of 20
ISO minimum pitch of 1,25mm

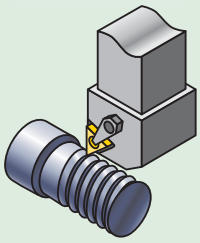
Coarse Pitch/Heavy Duty



Cresting (Full Profile):
UN minimum TPI of 8
ISO maximum pitch of 3mm

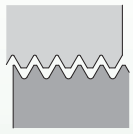
Partial Profile — Flat Top and Chip Control (NT-C and NT-CK):
UN minimum TPI of 4.5
ISO maximum pitch of 5,5mm

Laydown External Threading



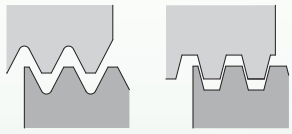
Square Shank Toolholder Sizes:
- Inch — .500–1.25" available
- Metric — 8–40mm available

Fine Pitch



Cresting (Full Profile) and Partial Profile:
UN maximum TPI of 48
ISO minimum pitch of 0,5mm

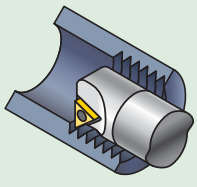
Coarse Pitch/Heavy Duty



Cresting (Full Profile):
UN minimum TPI of 8
ISO maximum pitch of 5mm

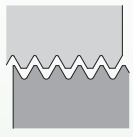
Partial Profile:
UN minimum TPI of 5
ISO maximum pitch of 5mm

Laydown Internal Threading



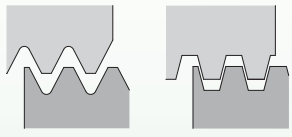
Boring Bar Diameters:
- Inch — .375–1.25"
- Metric — 12–50mm
- Minimum bore — .500" (13mm)
- Steel and carbide

Fine Pitch



Cresting (Full Profile) and Partial Profile:
UN maximum TPI of 48
ISO minimum pitch of 0,5mm

Coarse Pitch/Heavy Duty



Cresting (Full Profile):
UN minimum TPI of 8
ISO maximum pitch of 5mm

Partial Profile:
UN minimum TPI of 5
ISO maximum pitch of 5mm

WIDIA™ TopThread™

Threading operations place extraordinary demands upon carbide inserts. Extreme tangential forces converge on the very small insert nose radius. In addition, thread pitch often requires a high feed rate (compared to regular turning operations), the insert cutting edge requires clearance, and high heat is generated in the cut. The WIDIA TopThread system is the best way to address these problems.

A superior choice for heavy-duty applications like machining Acme, Buttress, and API threads, the WIDIA TopThread system is the best solution for coarse pitch and multi-tooth threading applications.

TopThread

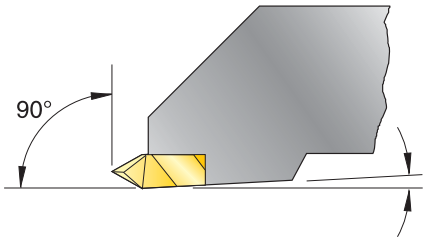
TopThread Insert Technology

TopThread insert technology brings superior chip control to your threading operations. Unlike competitors' designs, the WIDIA recessed chip groove, when used according to our recommendations, will break the chip in most applications, bringing you better tool life and lower cutting pressures.

- Reduced inconsistencies and better workpiece finish.
- Superior chip control reduces the danger to operators.
- Increased productivity in all of your threading operations.
- Carbide grades are available for outstanding performance.
- Excellent choice for special thread forms and toolholder designs.

TopThread™ inserts are available in TN6010™ and TN6025™ grades to withstand the unusually harsh demands placed on the cutting edge of the threading insert.

The versatility of the TopThread steel enables you to use both threading and grooving inserts in the same toolholder.



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

The Simple Solution

With the WIDIA™ TopThread solution, there is no need to worry about costly setup mistakes. TopThread insert selection is easy, quick, and enables accurate indexing to keep your machine spindle turning.

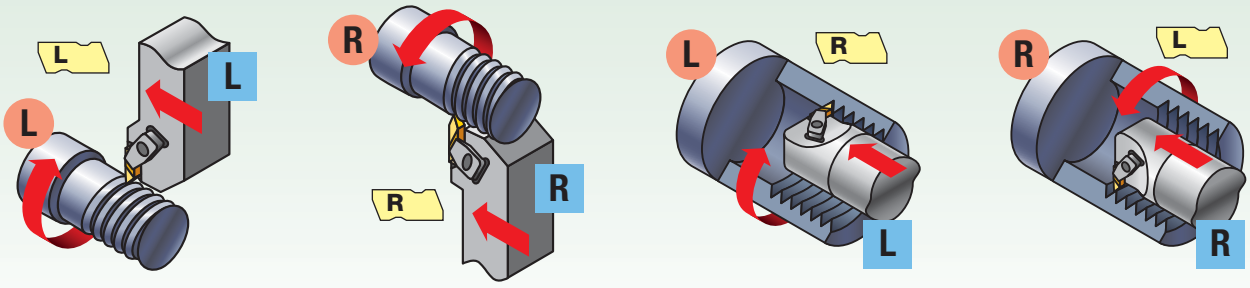
- Rigid design for increased insert stability during high feed rate applications.
- Good quality threads, minimized insert breakage, and improved tool life and surface finishes.
- Locking forces in three directions for superior resistance to thrust and tangential force.
- Unique 3° insert relief angle for back clearance.
- Available in partial profile inserts for 60° thread forms.

Step 1 • Select Threading Method and Hand of Tooling

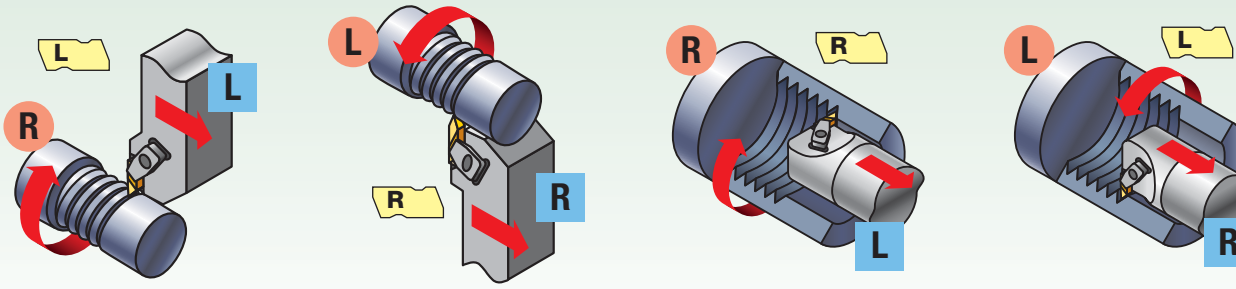
Required Information:

- External/internal operation.
- Spindle rotation/hand of thread.
- Feed direction.

Feed direction toward the chuck • standard helix



Feed direction away from the chuck • reverse helix



Step 2 • Select Holder from Catalog Page

The insert size must match the gage insert size of your toolholder selection:

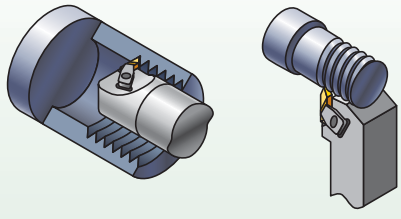
Required Information:

- External/internal operation.
- Minimum bore diameter (for internal operations).
- Hand of tool.
- Insert size (gage insert).

catalog number	gage insert
NSR-163D	N.3R
NSR-164D	N.4R

NOTE: TopThread toolholders and boring bars are listed with a gage insert to indicate the size and hand required. They are compatible with both grooving and threading inserts of the same size.

Select the appropriate holder for the insert size and hand:



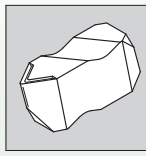
NOTE: Optimize your threading operation by using the proper infeed angle and the recommended infeed values.

See the Technical section on pages A189–A197 of this catalog.

For internal threading, minimum bore varies depending on thread type. See page A202 for details.

Step 3 • Choose Insert for Application

- See threading insert overview on page A132.
- Select cresting inserts for fully controlled thread form including diameter control. Cresting inserts eliminate the need for deburring.
- Non-cresting partial profile inserts can cut a variety of thread pitches. Chip control is only available with partial profile inserts.
- Note insert size for toolholder selection.



insert size	catalog number	TN6025	TN6010
2	NT-2RK	●	●
3	NT-3RK	●	●
4	NT-4RK	●	●

Step 4 • Select Grade and Speed

Recommendations for Grade and Speed Selection — m/min (SFM)

workpiece material	steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys
insert style	chip control or neutral 	chip control or positive 	neutral 	positive 	positive 
optimum cutting conditions	**TN6010** 50–230n (160–750)	**TN6010** 50–185 (160–600)	**TN6010** 70–210 (230–700)	—	**TN6010** 20–120 (65–400)
first choice	**TN6025** 40–200 (130–650)	**TN6025** 40–135 (130–450)	**TN6025** 60–145 (200–475)	**TN6025** 50–360 (160–1150)	**TN6025** 10–100 (35–330)

NOTE: Also available as an optimum cutting tool for steel and stainless steel or partial profile threading. Increase speed by 15% over the recommendations above.

Examples:

Chip Control: NT-K or NT-CK (partial profile only)

Neutral: NT, NT-C, NTF, NTC, NJ, NJF, NDC-V, NA, NDC, NTB-A/B

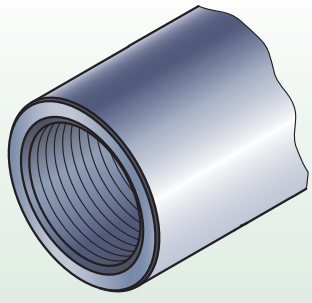
Positive: NTP, NTK, NJP, NJK

TopThread Threading Example:

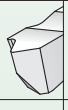
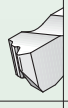
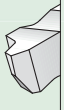
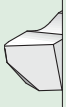
application: 8 TPI Acme internal right-hand thread
material: alloy steel
workpiece diameter: 4.5" (114,3mm)
good cutting conditions
feed towards the chuck

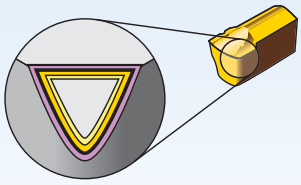
Recommendation:

insert: NA3L8
grade: TN6010
insert size: 3
boring bar: A40NER3
gage insert: N.3L
speed: 150 m/min (500 SFM)
infeed passes*: 12 passes



** Infeed recommendations provided in technical data section on pages A196–A201.*

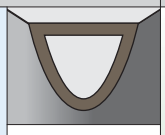
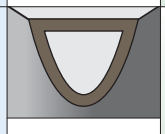
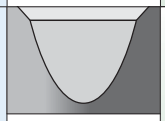
style			thread profile	standard	tolerance class	cresting	application	page(s)
chip control — K	neutral	positive						
NT-K 	NT 	NTP 	Partial Profile 60º	—	—	N	General use for 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches.	**A147–A148**
NT-CK 			Partial Profile 60º — coarse pitch	—	—	N	Coarse pitch 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches.	**A149**
	NTF 	NTK 	Partial Profile 60º — fine pitch	—	—	N	Fine pitch 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches — able to thread close to shoulders.	**A149–A150**
	NTC 		American UN	ANSI B1.1:74	2A/2B	Y	Widely used inch-based 60° V-form for all industries.	**A151**
		NJP 	UNJ	SAEA588791	3A/3B	N	Controlled root radius on external threads for military and aerospace industries.	**A152**
		NJK 	UNJ — fine pitch	SAEA588790	3A/3B	N	Controlled root radius on external threads for military and aerospace industries — able to thread close to shoulders.	**A152**
	NDC-V 		NPT	ANSI/ACME B1.201: 1983	Standard NPT	Y	National Pipe Thread standard forms for pipe fittings.	**A153**
	NDC-V-M 		NPT — multi-tooth	ANSI/ACME B1.201: 1983	Standard NPT	Y	High-productivity multi-tooth threading inserts for NPT threads.	**A153**
	NWC 		Whitworth, BSW, BSP	BS 84:1956, ISO 228/1: 1982, DIN 259	Medium Class A	Y	Widely used 55° form for gas and water connections.	**A154**
	NDC-RD 		API Round	API STD. 5B:1979	Standard API RD	Y	60° V-form with large radius for casing, tubing and line pipe in the oil and gas industry, including 8 and 10 round forms.	**A154**
	NA 		Acme	ANSI B1.5:1988	3G	N	29° truncated thread form for motion applications in a wide variety of industries.	**A155**
	NAS 		Stub Acme	ANSI B1.8:1988	2G	N	Shallow depth 29° truncated thread form for motion applications in a wide variety of industries.	**A156**
	NTB-B 		American Buttress — 45° clearance flank leading (Pull)	ANSI B1.9:1973	Class 2	N	Sawtooth form for axial load bearing applications in a variety of industries — use the “B” style when the 45° clearance flank is the leading edge.	**A156**



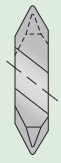
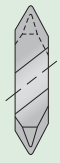
Coatings provide high-speed capability and are engineered for finishing to light roughing.

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

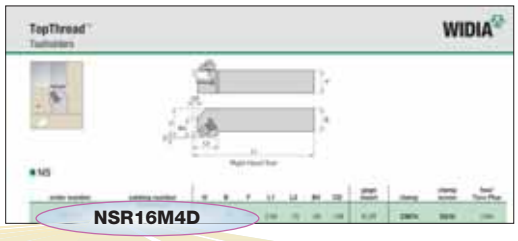
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

Grade	Coating		Grade Description	05	10	15	20	25	30	35	40	45
TN6010		HC-P10	PVD-TiAlN multilayer coated carbide. For finishing and general machining of steels, stainless steels, cast irons, non-ferrous materials, and difficult-to-machine materials. Recommended at high cutting speeds under stable conditions.	P	P	P	P					
				M	M	M	M					
				K	K	K	K					
				N	N	N	N					
				S	S	S	S					
TN6025		HC-P25	PVD-TiAlN multilayer coated carbide. General-purpose machining for steels, stainless steels, cast irons, non-ferrous materials, and difficult-to-machine materials. Recommended at low to medium cutting speeds when higher toughness is required.	P			P	P	P			
				M			M	M	M			
				K			K	K	K			
				N			N	N	N			
				S			S	S	S			
THM		HW-K15	Uncoated carbide for light and medium machining. For cast iron, all non-ferrous metals, and non-metals. Also capable of machining hardened materials at low cutting speeds.									
				K	K	K	K					
				N	N	N	N					
				S	S	S	S					
				H	H	H	H					

- All TopThread inserts are precision-ground to provide accurate edge location and secure locking of the insert in the toolholder pocket.
- TopThread inserts can be used in either toolholders or boring bars.
- All non-cresting-type threading inserts can be used for either external or internal applications. All cresting-type inserts are designated specifically for external or internal use.
- Right-hand TopThread toolholders use right-hand inserts. Left-hand TopThread toolholders use left-hand inserts.
- Right-hand TopThread boring bars use left-hand inserts. Left-hand TopThread boring bars use right-hand inserts.
- See this page for carbide grade selection and more technical information.

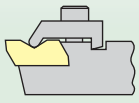
left-hand insert	right-hand insert
	

TopThread Holder Identification System



N — Insert Holding Method

N — TopThread*

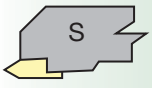


*Proprietary standard only.

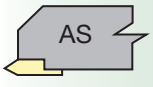
S — Insert Mounting Location

End mount

Side mount, offset

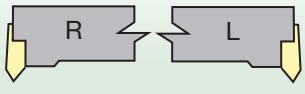


Side mount, no offset

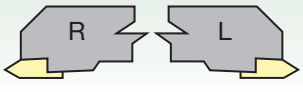


R — Hand of Tool

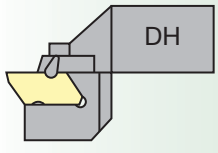
End mount



Side mount



Drop Head



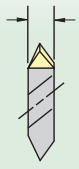
16 — Shank Size

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

M — Tool Length

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

4 — Insert Size



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

D — Qualified Surface and Length

A – qualified back and end, 4" (101,60mm) long

B – qualified back and end, 4.5" (114,30mm) long

C – qualified back and end, 5" (127,00mm) long

D – qualified back and end, 6" (152,40mm) long

E – qualified back and end, 7" (177,80mm) long

V – qualified back and end, 3.5" (88,90mm) long

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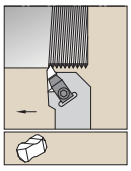
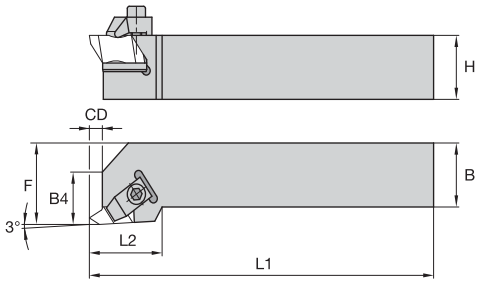


See page A132 for inserts.

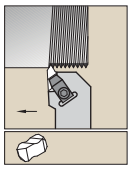


Right Hand Tool

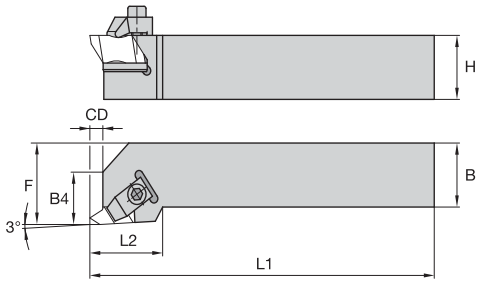
NS

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

NOTE: F dimension shown over N-style gage insert.



See page A132 for inserts.

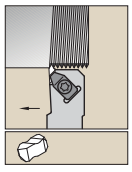


Right Hand Tool

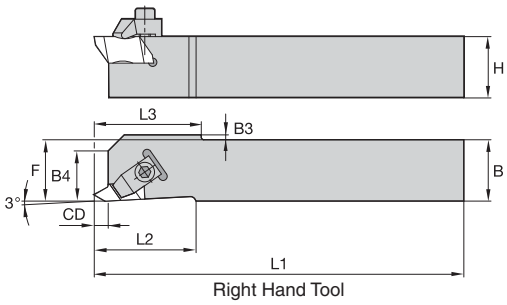
NS (with Shim)

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

NOTE: F dimension shown over N-style gage insert.



See page A132 for inserts.

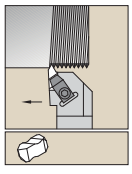


Right Hand Tool

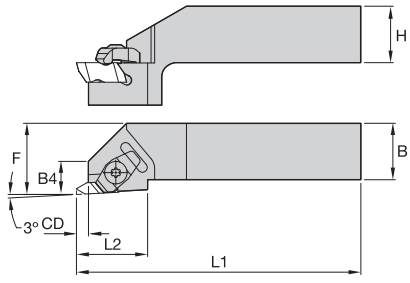
NAS

order number	catalog number	H	B	F	L1	L2	B4	CD	B3	L3	gage insert	clamp	clamp screw	hex/ Torx Plus
	right hand													
3632140	**NASR062D**	.375	.375	.375	6.00	.75	.35	.138	.070	.88	N.2R	**CM182**	**S310**	7/64
3636529	**NASR082D**	.500	.500	.500	6.00	.75	.35	.138	—	—	N.2R	**CM182**	**S310**	7/64
3639039	**NASR102B**	.625	.625	.625	4.50	.75	.35	.138	—	—	N.2R	**CM74**	**S310**	7/64
3639042	**NASR083D**	.500	.500	.500	6.00	1.25	.50	.210	.125	1.32	N.3R	**CM184LP**	**S2112**	25 IP
3636532	**NASR103B**	.625	.625	.625	4.50	1.25	—	.210	—	—	N.3R	**CM184LP**	**S2112**	25 IP
	left hand													
3637531	**NASL062D**	.375	.375	.375	6.00	.75	.35	.138	.070	.88	N.2L	**CM183**	**S310**	7/64
3636534	**NASL082D**	.500	.500	.500	6.00	.75	.35	.138	—	—	N.2L	**CM183**	**S310**	7/64
3637489	**NASL102B**	.625	.625	.625	4.50	.75	.35	.138	—	—	N.2L	**CM75**	**S310**	7/64
3637497	**NASL083D**	.500	.500	.500	6.00	1.25	.50	.210	.125	1.32	N.3L	**CM185**	**S412**	25 IP
3636524	**NASL103B**	.625	.625	.625	4.50	1.25	—	.210	—	—	N.3L	**CM185LP**	**S2112**	25 IP

NOTE: F dimension shown over N-style gage insert.



See page A132 for inserts.

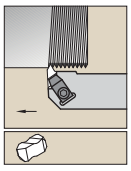


Right Hand Tool

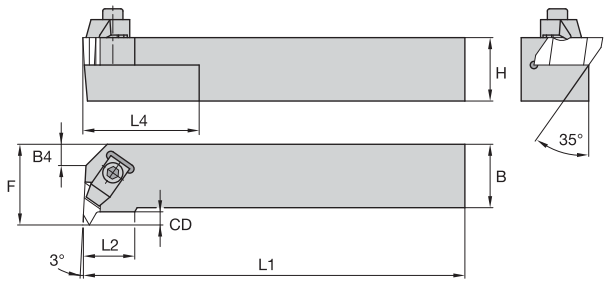
NS-DH

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

NOTE: F dimension shown over N-style gage insert.



See page A132 for inserts.

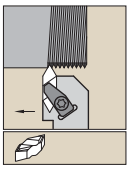


Right Hand Tool

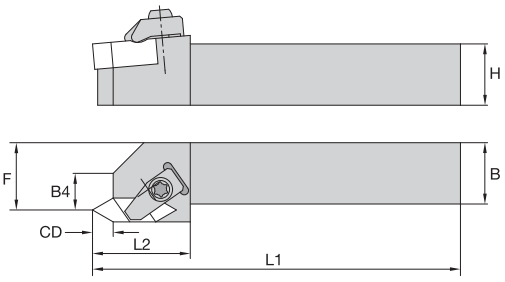
NE

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

NOTE: F dimension shown over N-style gage insert.



See page A132 for inserts.



Right Hand Tool

NSU

order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus
	right hand											
3641698	**NSUR124C**	.750	.750	.875	5.00	1.25	.50	.240	NTU4R	**CM72LP**	**S2112**	25 IP
3637545	**NSUR164D**	1.000	1.000	1.125	6.00	1.25	.50	.240	NTU4R	**CM72LP**	**S2112**	25 IP
	left hand											
3641701	**NSUL164D**	1.000	1.000	1.125	6.00	1.25	.50	.240	NTU4L	**CM73LP**	**S2112**	25 IP

NOTE: F dimension shown over N-style gage insert.
NSU toolholders only for NTU4 threading inserts.

WIN WITH WIDIA™

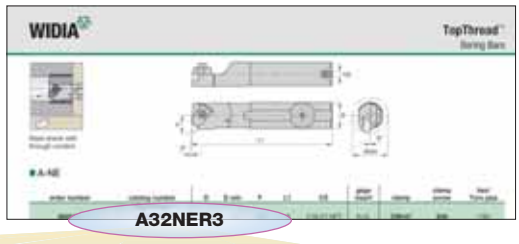
TopThread™ System

A superior choice for heavy-duty applications like machining Acme, Buttress, and API threads. The WIDIA™ TopThread system is the best solution for coarse pitch and multi-tooth threading applications. With unmatched tooling technology, you can trust WIDIA TopThread tools for all of your threading and grooving needs.

- Largest selection of insert geometries and grades in the industry.
- Rigid insert clamping design ensures the best tool life, surface finish, and workpiece quality.
- Minimizes built-up edges, reduces cutting forces, and precisely cuts most common materials.
- Ensures accurate, high-quality threads. Excellent for internal threading operations.

Turning

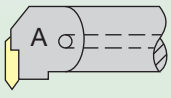
TopThread
Boring Bar Identification System



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

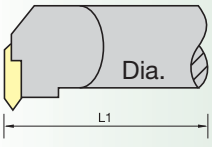
A — Bar Type

Steel with coolant



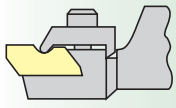
32 — Bar Diameter

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



N — Insert Holding Method

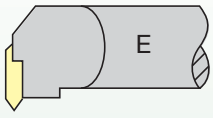
N — TopThread*



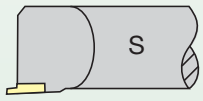
*Proprietary standard only.

E — Insert Location

End mount

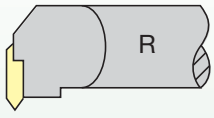


Side mount

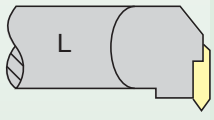


R — Hand of Tool

Right hand

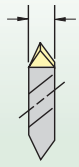


Left hand

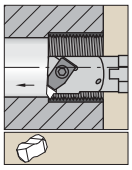


3 — Insert Size

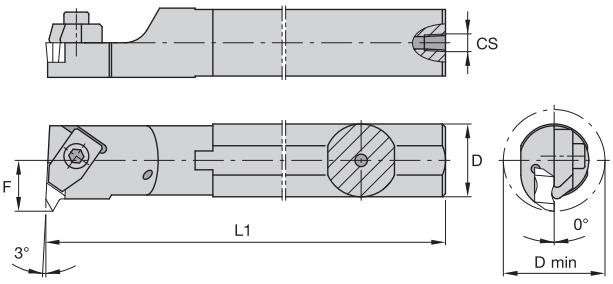
W1



insert size	W1
1	.100"
2	.150"
3	.195"
4	.255"
5	.380"
6	.383"
8	.438"



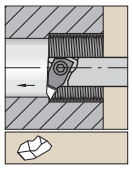
Steel shank with through coolant.



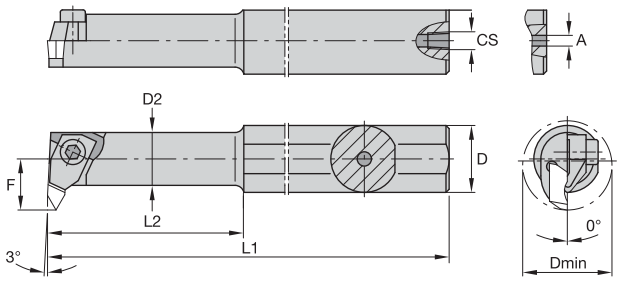
A-NE

order number	catalog number	D	D min	F	L1	CS	gage insert	clamp	clamp screw	hex/ Torx plus
	right hand									
3632117	**A08NER2**	.500	.730	.437	8	1/16-27 NPT	N.2L	**CM147**	**S39**	7/64
3632114	**A10NER2**	.625	1.000	.500	10	1/8-27 NPT	N.2L	**CM75**	**S310**	7/64
3632118	**A12NER2**	.750	1.125	.562	10	1/8-27 NPT	N.2L	**CM75**	**S310**	7/64
3632130	**A16NER2**	1.000	1.375	.688	12	1/4-18 NPT	N.2L	**CM75**	**S310**	7/64
3632113	**A16NER3**	1.000	1.375	.688	12	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632116	**A20NER3**	1.250	1.750	.875	14	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632115	**A24NER3**	1.500	2.000	1.000	14	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632132	**A28NER3**	1.750	2.250	1.125	14	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632122	**A32NER3**	2.000	2.500	1.250	16	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632146	**A40NER3**	2.500	3.000	1.500	16	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632123	**A28NER4**	1.750	2.500	1.250	14	1/4-18 NPT	N.4L	**CM73LP**	**S2112**	25 IP
3632125	**A32NER4**	2.000	2.750	1.375	16	1/4-18 NPT	N.4L	**CM73LP**	**S2112**	25 IP
3632136	**A40NER4**	2.500	3.250	1.625	16	1/4-18 NPT	N.4L	**CM73LP**	**S2112**	25 IP
3637514	**A32NER5**	2.000	2.812	1.406	16	1/4-18 NPT	N.5L	**CM81**	**S352**	1/4
3632143	**A32NER6**	2.000	2.750	1.375	16	1/4-18 NPT	N.6L	**CM121**	**S412**	5/32
3637498	**A40NER6**	2.500	3.250	1.625	16	1/4-18 NPT	N.6L	**CM121**	**S412**	5/32
	left hand									
3632131	**A08NEL2**	.500	.730	.437	8	1/16-27 NPT	N.2R	**CM146**	**S39**	7/64
3632127	**A10NEL2**	.625	1.000	.500	10	1/8-27 NPT	N.2R	**CM74**	**S310**	7/64
3632126	**A12NEL2**	.750	1.125	.562	10	1/8-27 NPT	N.2R	**CM74**	**S310**	7/64
3632142	**A16NEL2**	1.000	1.375	.688	12	1/4-18 NPT	N.2R	**CM74**	**S310**	7/64
3632120	**A16NEL3**	1.000	1.375	.688	12	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3632124	**A20NEL3**	1.250	1.750	.875	14	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3632128	**A24NEL3**	1.500	2.000	1.000	14	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3637490	**A28NEL3**	1.750	2.250	1.125	14	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3632139	**A32NEL3**	2.000	2.500	1.250	16	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3637504	**A40NEL3**	2.500	3.000	1.500	16	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3632141	**A28NEL4**	1.750	2.500	1.250	14	1/4-18 NPT	N.4R	**CM72LP**	**S2112**	25 IP
3632149	**A32NEL4**	2.000	2.750	1.375	16	1/4-18 NPT	N.4R	**CM72LP**	**S2112**	25 IP
3637491	**A40NEL4**	2.500	3.250	1.625	16	1/4-18 NPT	N.4R	**CM72LP**	**S2112**	25 IP
3637527	**A32NEL5**	2.000	2.812	1.406	16	1/4-18 NPT	N.5R	**CM80**	**S352**	1/4
3637512	**A32NEL6**	2.000	2.750	1.375	16	1/4-18 NPT	N.6R	**CM120**	**S412**	5/32

NOTE: F dimension shown over N-style gage insert.



Necked steel shank
with through coolant.



Right Hand Tool

A-NE-1

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

NOTE: F dimension shown over N-style gage insert.

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Your complete satisfaction.

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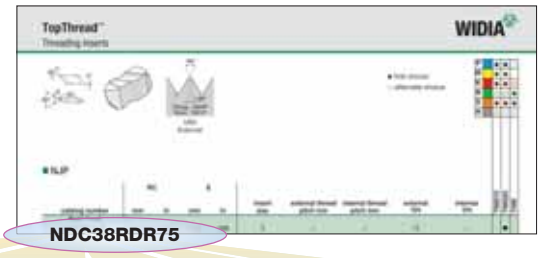
Turning

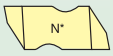
TopThread Insert Identification System



N	D	C	3	8RD	R	75	
Type of Insert	Insert Style	Additional Information	Insert Size	Industry Thread Identification	Hand of Insert	Definition of Insert	Additional Information

N — Type of Insert

N — TopThread*



*Proprietary standard only.

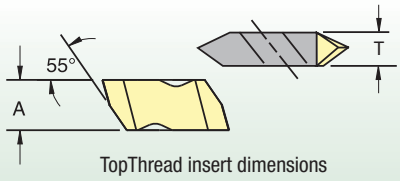
D — Insert Style

- A — Acme
- D — API or NPT
- J — UNJ thread
- T — 60° V thread
- W — 55° V Whitworth

C — Additional Information

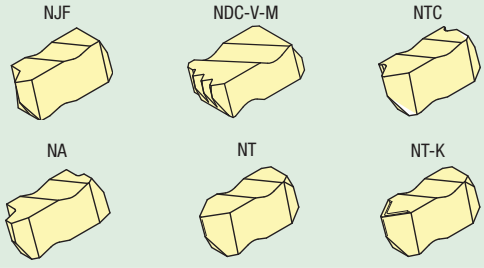
- B — Buttress
- F — Fine pitch
- S — Stub Acme
- C — Cresting
- P — Positive rake
- K — Fine pitch, positive

3 — Insert Size



TopThread insert dimensions

insert size	A inch	A mm	T inch	T mm
1	.100	2,54	.100	2,54
2	.219	5,56	.150	3,81
3	.344	8,74	.195	4,95
4	.453	11,51	.255	6,48
5	.688	17,48	.380	9,65
6	.453	11,51	.383	9,73
8	.312	7,93	.438	11,13



8RD — Industry Thread Identification

Indicates API or drilling industry form designation (e.g., 10RD, 8RD, .038)

or

controlled root radius threading inserts indicate the root radius in .001" increments (NJ, NJF, NJP, NJK)

or

M indicates metric ISO thread

R — Hand of Insert

R — Right hand

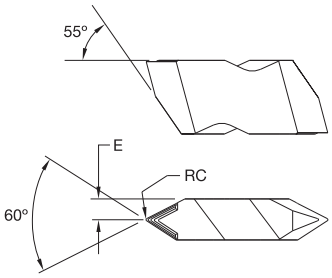
L — Left hand

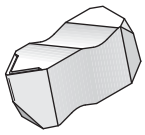
75 — Definition of Insert

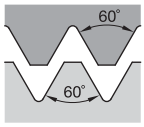
- Threads per inch or pitch (for metric)
- "A" or "B" type Buttress insert
- Taper per foot — API threads

Additional Information

- I — Internal thread
- E — External thread (used only if internal and external thread forms are different)
- M — Multiple tooth
- K — Standard chip control
- C — Coarse pitch
- D — Dryseal







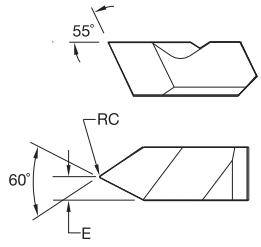
Partial Profile 60°

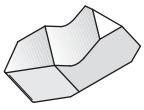
● first choice
○ alternate choice

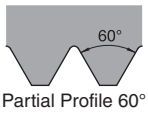
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

■ NT-K

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand												
NT2RK	0,10	.004	1,91	.075	2	0,70–3,00	1,25–3,50	8–36	7–20	●	●	
NT3RK	0,17	.007	2,49	.098	3	1,25–4,00	2,00–5,00	6–20	5–12	●	●	
NT4RK	0,17	.007	3,25	.128	4	1,25–6,25	2,00–6,25	4–20	4–12		●	
left hand												
NT2LK	0,10	.004	1,91	.075	2	0,70–3,00	1,25–3,50	8–36	7–20	●	●	
NT3LK	0,17	.007	2,49	.098	3	1,25–4,00	2,00–5,00	6–20	5–12	●	●	



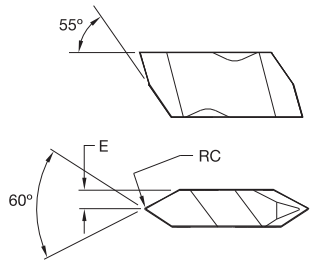


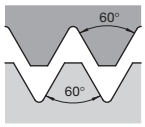


Partial Profile 60°
Internal

■ NT-1L

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI			
left hand												
NT1L	0,08	.003	1,09	.043	1	–	1,00–2,00	–	12–24	●	●	





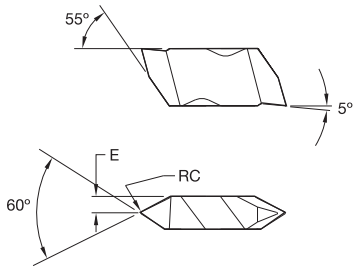
Partial Profile 60°

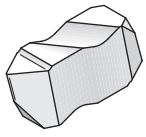
● first choice
○ alternate choice

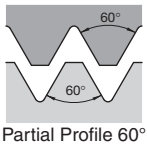
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

■ NT

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand												
NT2R	0,10	.004	1,91	.075	2	0,70–3,00	1,25–3,50	8–36	7–20	●	●	
NT3R	0,17	.007	2,49	.098	3	1,25–4,00	2,00–5,00	6–20	5–12	●	●	
NT4R	0,17	.007	3,25	.128	4	1,25–6,25	2,00–6,25	4–20	4–12	●	●	
left hand												
NT2L	0,10	.004	1,91	.075	2	0,70–3,00	1,25–3,50	8–36	7–20	●	●	
NT3L	0,17	.007	2,49	.098	3	1,25–4,00	2,00–5,00	6–20	5–12	●	●	
NT4L	0,17	.007	3,25	.128	4	1,25–6,25	2,00–6,25	4–20	4–12		●	



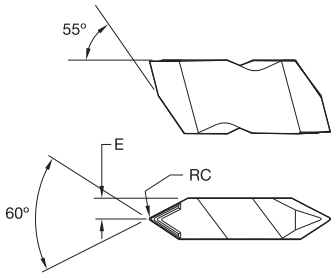


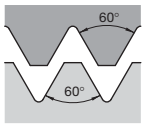


Partial Profile 60°

■ NTP

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI			
right hand												
NTP2R	0,10	.004	1,91	.075	2	0,70–3,00	1,25–3,50	8–36	7–20	●	●	
NTP3R	0,17	.007	2,49	.098	3	1,25–4,00	2,00–5,00	6–20	5–12	●	●	
NTP4R	0,17	.007	3,25	.128	4	1,25–6,25	2,00–6,25	4–20	4–12		●	
left hand												
NTP2L	0,10	.004	1,91	.075	2	0,70–3,00	1,25–3,50	8–36	7–20	●	●	
NTP3L	0,17	.007	2,49	.098	3	1,25–4,00	2,00–5,00	6–20	5–12	●	●	





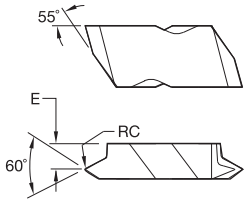
Partial Profile 60°

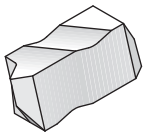
● first choice
○ alternate choice

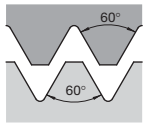
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

■ NT-CK

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand **NT3RCK**	0,34	.014	2,46	.097	3	2,50–4,00	4,00	6–11	6	●	●	



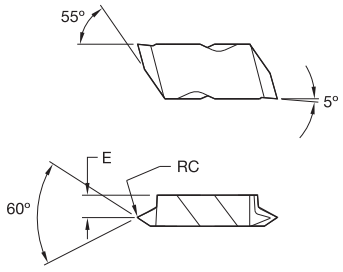


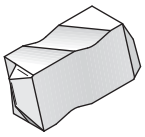


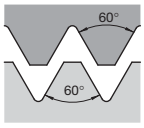
Partial Profile 60°

■ NTF

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand **NTF2R**	0,08	.003	2,79	.110	2	0,60–1,75	1,00–2,00	14–44	12–24	●	●	
NTF3R left hand	0,08	.003	3,58	.141	3	0,60–2,50	1,00–2,50	10–44	9–24	●	●	
NTF3L	0,08	.003	3,58	.141	3	0,60–2,50	1,00–2,50	10–44	9–24	●	●	







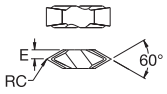
Partial Profile 60°

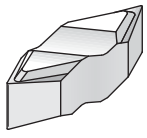
● first choice
○ alternate choice

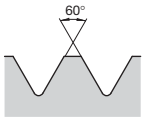
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

■ NTK

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand **NTK2R**	0,08	.003	2,79	.110	2	0,60–1,75	1,00–2,00	14–44	12–24	●	●	
NTK3R left hand	0,08	.003	3,58	.141	3	0,60–2,50	1,00–2,50	10–44	9–24	●	●	
NTK3L	0,08	.003	3,58	.141	3	0,60–2,50	1,00–2,50	10–44	9–24		●	



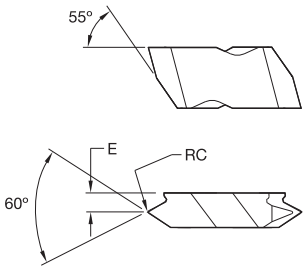


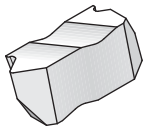


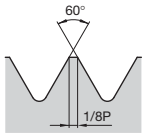
Partial Profile 60°
External

■ NTU

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand **NTU4R**	0,11	.005	3,18	.125	4U	1,25–6,25	–	4–20	–		●	
left hand **NTU4L**	0,11	.005	3,18	.125	4U	1,25–6,25	–	4–20	–		●	







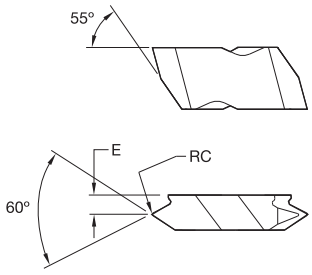
American
UN-External

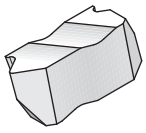
● first choice
○ alternate choice

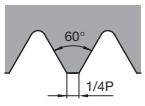
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

■ NTC-E

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand												
NTC3R16E	0,19	.008	3,76	.148	3	–	–	16	–	●	●	
NTC3R14E	0,22	.009	3,76	.148	3	–	–	14	–	●		
NTC3R12E	0,25	.010	3,76	.148	3	–	–	12	–	●	●	



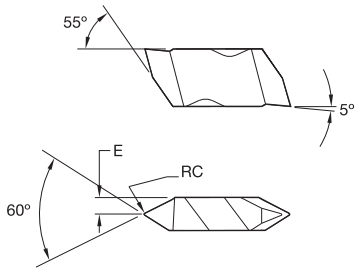


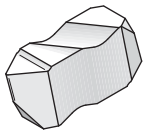


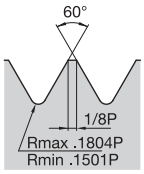
American
UN-Internal

■ NTC-I

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
left hand												
NTC3L12I	0,10	.004	3,76	.148	3	–	–	–	12		●	







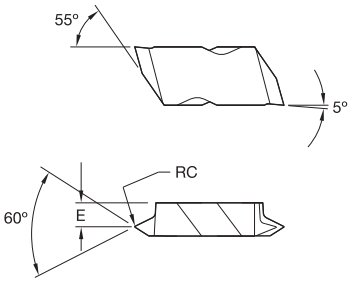
UNJ
External

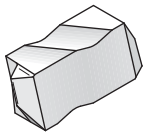
● first choice
○ alternate choice

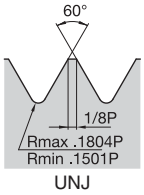
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

■ NJP

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand												
NJP3014R12	0,33	.013	2,49	.098	3	–	–	12	–		●	



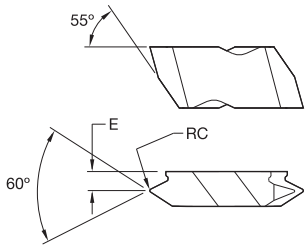


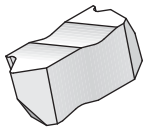


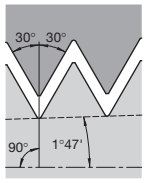
UNJ
External

■ NJK

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand												
NJK3008R20	0,20	.008	3,58	.141	3	–	–	20	–	●		







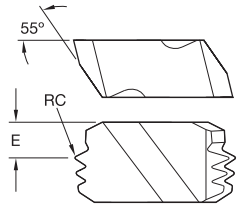
NPT

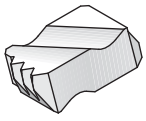
● first choice
○ alternate choice

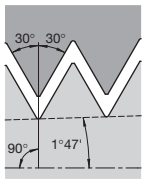
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

■ NDC-V

catalog number	RC mm	RC in	E mm	E in	insert size	TPI	TPF	TN6010	TN6025	THM
right hand **NDC3115VR75**	0,10	.004	3,66	.144	3	11.5	.750	●		



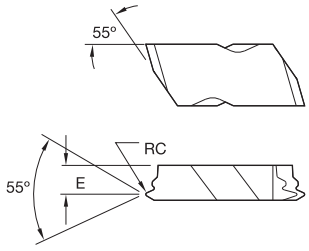


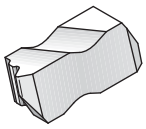


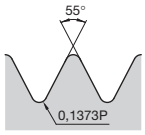
NPT

■ NDC-V-M

catalog number	RC mm	RC in	E mm	E in	insert size	TPI	TPF	TN6010	TN6025	THM
right hand **NDC8115VR75M**	0,10	.004	2,59	.102	8	11.5	.750	●		
NDC88VR75M	0,13	.005	2,41	.095	8	8	.750	●		







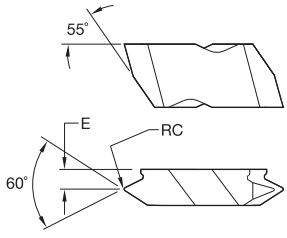
Whitworth BSW,
BSP-External

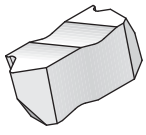
● first choice
○ alternate choice

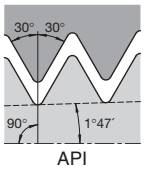
		TN6010	TN6025	THM
P		●	●	
M		●	●	
K		●	●	○
N		○	○	●
S		●	●	●
H		○		

NWC-E

catalog number	RC mm	RC in	E mm	E in	insert size	TPI	TPF	TN6010	TN6025	THM
right hand										
NWC3R14E	0,24	.009	3,43	.135	3	14	–		●	
NWC3R11E	0,30	.012	3,43	.135	3	11	–		●	



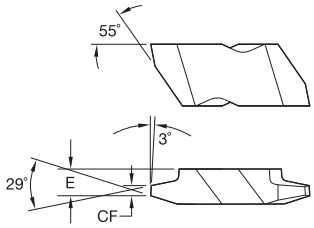


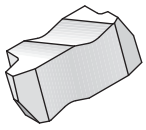


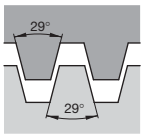
API
Round

NDC-RD

catalog number	RC mm	RC in	E mm	E in	insert size	TPI	TPF	TN6010	TN6025	THM
right hand										
NDC38RDR75	0,43	.017	3,18	.125	3	8	.750		●	
left hand										
NDC310RDL75	0,36	.014	3,18	.125	3	10	.750		●	
NDC38RDL75	0,43	.017	3,18	.125	3	8	.750		●	







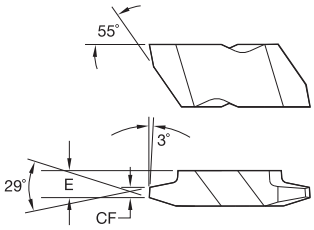
ACME

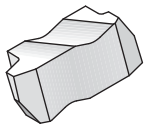
● first choice
○ alternate choice

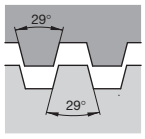
P	●	●		
M	●	●		
K	●	●	○	
N	○	○	●	
S	●	●	●	
H	○			

NA

catalog number	RC mm	RC in	CF mm	CF in	E mm	E in	insert size	TPI	TPF	TN6010	TN6025	THM
right hand												
NA3R8	–	–	1,04	.041	3,79	.149	3	8	–		●	
NA3R6	–	–	1,44	.057	3,79	.149	3	6	–		●	
NA3R4	–	–	2,22	.088	3,38	.133	3	4	–		●	
NA4R4	–	–	2,22	.088	5,13	.202	4	4	–		●	
NA6R3	–	–	3,01	.118	7,19	.283	6	3	–		●	
NA6R2	–	–	4,58	.180	7,19	.283	6	2	–		●	
left hand												
NA3L8	–	–	1,04	.041	3,79	.149	3	8	–		●	
NA3L6	–	–	1,44	.057	3,79	.149	3	6	–		●	
NA3L4	–	–	2,22	.088	3,38	.133	3	4	–		●	
NA4L4	–	–	2,22	.088	5,13	.202	4	4	–		●	
NA6L3	–	–	3,01	.118	7,19	.283	6	3	–		●	
NA6L2	–	–	4,58	.180	7,19	.283	6	2	–		●	







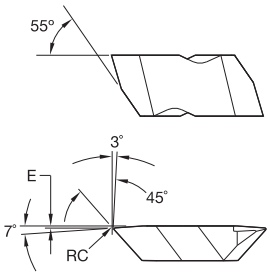
Stub ACME

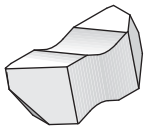
● first choice
○ alternate choice

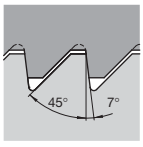
P		●	●
M		●	●
K		●	●
N		○	○
S		●	●
H		○	

NAS

catalog number	RC mm	RC in	CF mm	CF in	E mm	E in	insert size	TPI	TPF	TN6010	TN6025	THM
right hand												
NAS3R8	–	–	1,21	.048	3,79	.149	3	8	–		●	
left hand												
NAS3L12	–	–	0,83	.033	3,79	.149	3	12	–		●	
NAS3L8	–	–	1,21	.048	3,79	.149	3	8	–		●	
NAS3L6	–	–	1,66	.065	3,79	.149	3	6	–		●	







American
Buttress-Pull

NTB-B

catalog number	RC mm	RC in	E mm	E in	insert size	TPI	TPF	TN6010	TN6025	THM
left hand										
NTB3LB	0,17	.007	0,31	.012	3	8–16	–		●	

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

The WIDIA™ high-performance carbide grades, coupled with our rigid TopThread clamping design, offer the metalworking industry optimum threading productivity.

When WIDIA's large inventory of standard products does not completely satisfy your productivity requirements, consider having TopThread inserts custom ground to meet your unique application needs.

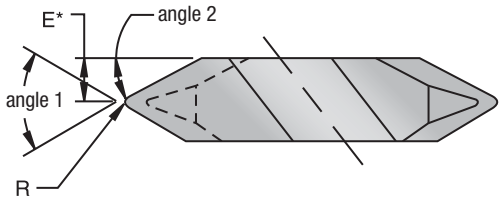
The large variety of TopThread blank sizes allows maximum flexibility in threading endform design, especially for extra wide or oil field applications.

Common examples of special forms are shown here. Please contact your local WIDIA representative for recommendations on satisfying your special threading needs.

Features and Benefits:

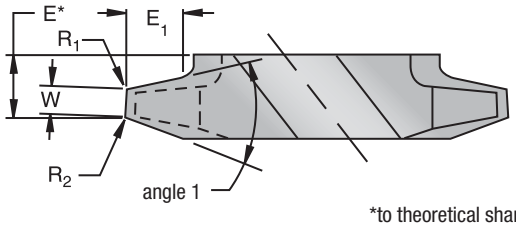
- Quotes are handled quickly and efficiently using state-of-the-art CAD design software and electronic database software.
- Our Carbide Custom Solutions Design Team is your link to one of the industry's largest electronic databases. They can solve your most challenging design problems.
- Where necessary or required, concept drawings are available to facilitate your engineering development.
- A large number of high-performance carbide grades are available to optimize your productivity. The option of producing standard insert styles in non-standard carbide grades allows you to optimize tool life performance.

style C2 RH shown



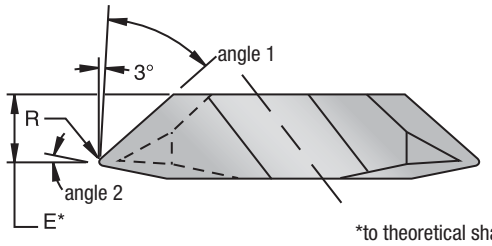
*to theoretical sharp point

style C3 RH shown



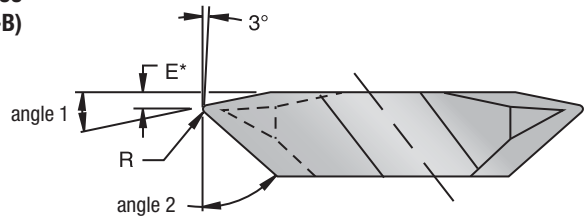
*to theoretical sharp point

style C4 (NTB-A) RH shown



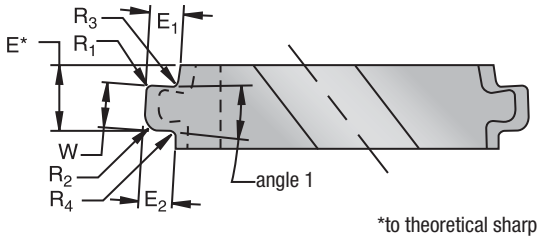
*to theoretical sharp point

style C5 (NTB-B) RH shown



*to theoretical sharp point

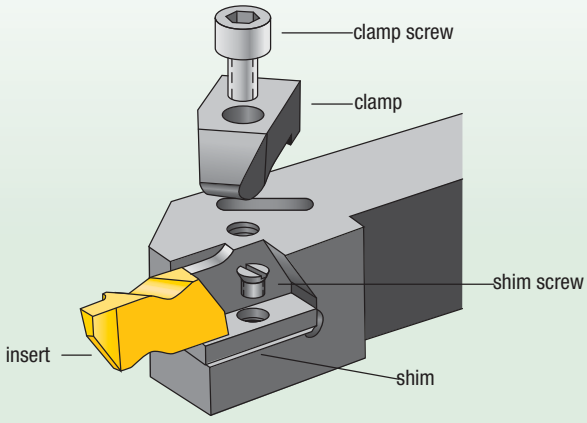
style C6 RH shown



*to theoretical sharp point

NOTE: Right-hand inserts shown; left-hand inserts are also available.

TopThread and TopGroove Toolholders and Boring Bars



insert size and style	clamp	clamp screw	shim	shim screw
NG-1L	CM-109	S-304	–	–
NG-2R	CM-182	S-310	–	–
NG-2L	CM-183	S-310	–	–
NG-2R	CM-74	S-310	–	–
NG-2L	CM-75	S-310	–	–
NG-3R	CM-184	S-412	–	–
NG-3L	CM-185	S-412	–	–
NG-3R	CM-72	S-412	–	–
NG-3L	CM-73	S-412	–	–
NG-3R*	CM-78	S-412	–	–
NG-3L*	CM-70	S-412	–	–
NG-4R	CM-72	S-412	SM-420	SL-344
NG-4L	CM-73	S-412	SM-420	SL-344
NG-5R	CM-80	S-352	–	–
NG-5L	CM-81	S-352	–	–
NG-6R	CM-120	S-412	SM-416	S-111
NG-6L	CM-121	S-412	SM-416	S-111
NG-8R	CM-144	S-422	SM-419	S-112
NG-8L	CM-145	S-422	SM-419	S-112
NG-8R**	CM-144	S-422	SM-427	S-111
NG-8L**	CM-145	S-422	SM-427	S-111
TopGroove relief grooving				
NU-3125R	CM-72	S-412	–	–
NU-3125L	CM-73	S-412	–	–
NU-3125R**	CM-72	S-618	–	–
NU-3125L**	CM-73	S-618	–	–
Utility threading				
NTU-4R	CM-72	S-412	–	–
NTU-4L	CM-73	S-412	–	–

**25mm diameter boring head.*
***Boring head.*

WIDIA™ Laydown Threading

For increased reliability and productivity, look no further than the WIDIA Laydown Threading System for all of your I.D. and O.D. threading applications. With variable shim angles and the proper cutting geometry, the Laydown Threading system maximizes tool life and improves thread quality.

This specially engineered system meets all modern production standards. With an extensive range of inserts and toolholders available, the Laydown Threading platform is ideal for all of your threading requirements.

Laydown

Laydown Insert Technology

Laydown insert technology, with its wide range of available tools and inserts, guarantees increased tool life, minimized built-up edges, and precise cuts of most common materials.

- TN6025™ premium PVD TiAlN-coated grade outperforms conventional PVD grades by up to 30%.
- Enables superior chip control and reduced cutting forces.
- Partial and full profile insert options available for all common thread forms.

The Laydown Threading Solution

With the WIDIA™ Laydown Threading System, you experience reliable countersunk screw locking for unhindered chip flow and precise insert positioning accuracy.

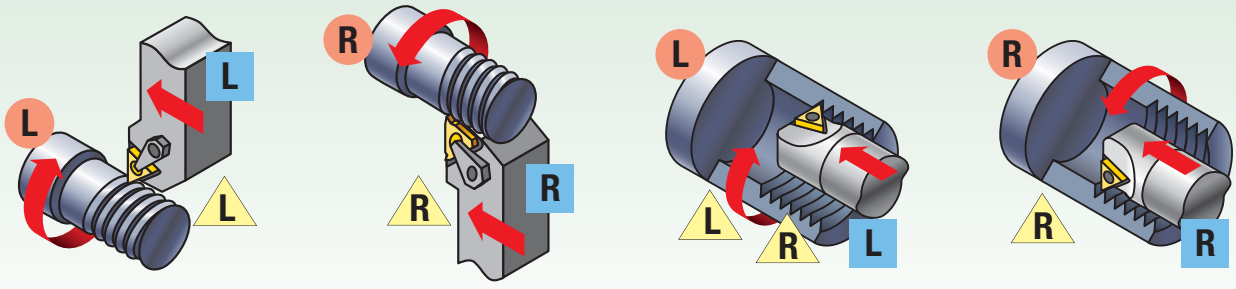
- Four insert sizes available to cover a wide range of thread-making operations.
- Ideal for fine-pitch threads, high-helix/multi-start threads, and single-point threading in small-diameter bores.
- Maximized tool life and low-profile design for unhindered chip flow and superior performance.

Step 1 • Select Threading Method and Hand of Tooling

Required Information:

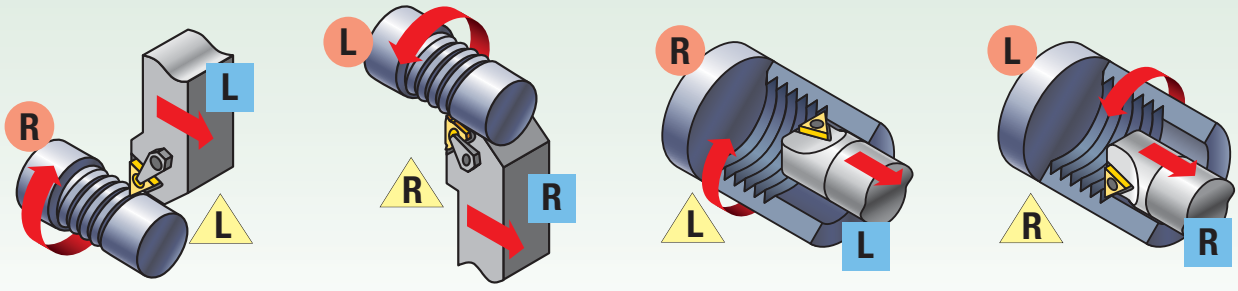
- External/internal operation.
- Spindle rotation/hand of thread.
- Feed direction.

Feed direction toward the chuck • standard helix



external left-hand thread | external right-hand thread | internal left-hand thread | internal right-hand thread

Feed direction away from the chuck • reverse helix



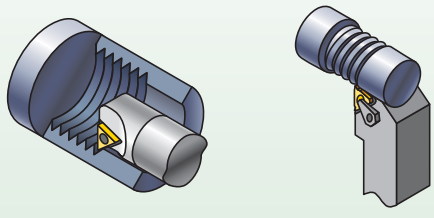
external right-hand thread | external left-hand thread | internal right-hand thread | internal left-hand thread

Step 2 • Select Holder from Catalog Page

Required Information:

- External/internal operation.
- Minimum bore diameter (for internal operations).
- Hand of tool.
- Insert size (gage insert).

Select the appropriate holder for the insert size and hand:



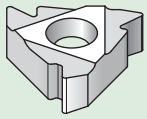
The insert size must match the gage insert size of your toolholder selection:

catalog number	gage insert	minimum bore diameter	shim
S0812LSER2	2IRA60	650"	—
S2020LSER3	3IR...	1.45"	SM-YI3

Step 3 • Choose Insert for Application

- Select cresting inserts for fully controlled thread form including diameter.
- Cresting inserts eliminate the need for deburring and are optimized for the best tool life at that pitch.
- Non-cresting partial profile inserts offer the flexibility to cut a variety of thread pitches with one insert.
- Note insert size for toolholder selection.

See threading insert overview on page A164.



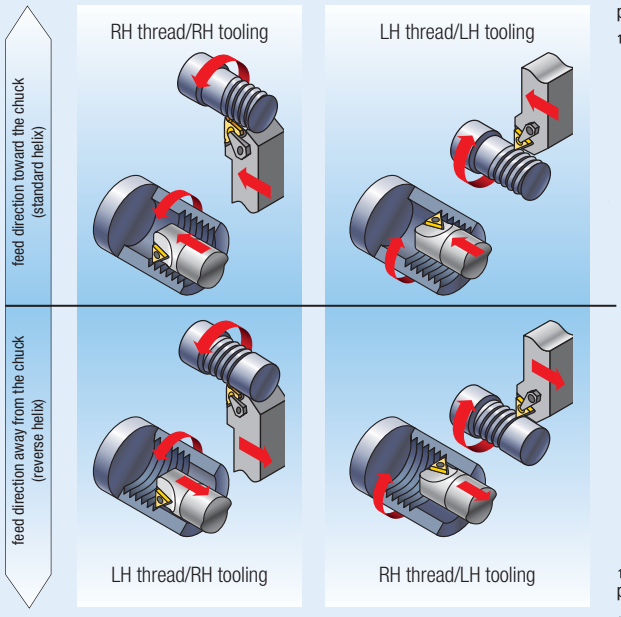
insert size	catalog number	TN6025
11	2IRA60	●
16	3IRAG60	●

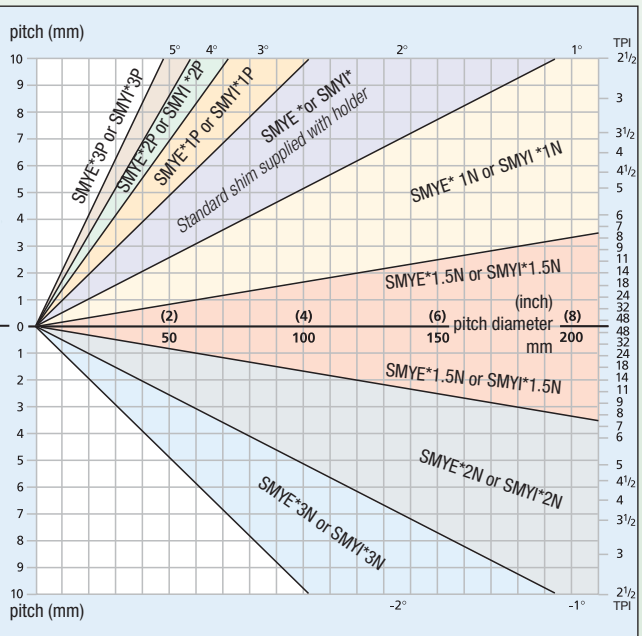
Step 4 • Select Appropriate Shim

Required Information:

- Thread form (TPI or pitch).
- Pitch diameter.
- Helix method (hand of tool, feed direction, hand of thread).

Select the proper shim: SMYE... for external RH or internal LH
SMYI... for internal RH or external LH





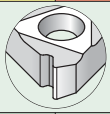
*denotes shim size: 3 = insert size 16 (3/8" D)
4 = insert size 22 (1/2" D)

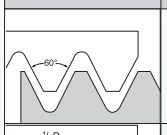
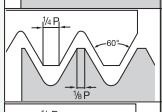
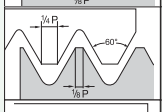
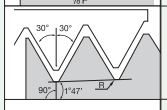
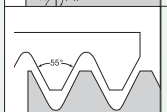
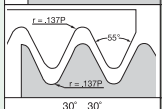
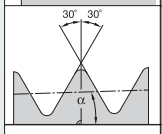
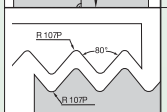
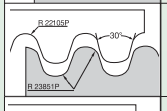
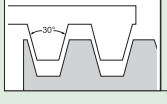
If recommended shim is different from shim supplied with toolholder, order shim separately.

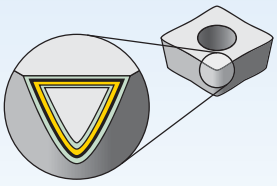
NOTE: Optimize your threading operation by using the proper infeed angle and the recommended infeed values. See the Technical Section on pages A189–A197. Also see detailed shim selection information on page A210–A211.

Step 5 • Select Grade and Speed

Recommendations for Grade and Speed Selection — m/min (SFM)

workpiece material	steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys
insert style	 precision ground				
first choice	**TN6025** 40–200 (130–650)	**TN6025** 40–135 (130–450)	**TN6025** 60–145 (200–475)	**TN6025** 50–360 (160–1150)	**TN6025** 10–100 (35–330)

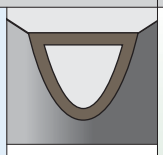
style			thread profile	standard	tolerance class	cresting	application	page(s)
	flat top							
	60		Partial profile 60º	—	—	N	General use for 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches.	**A173–A175**
	ISO		Metric ISO	ISO R262, DIN 13	6g/6H	Y	Widely used metric 60° V-form for all industries.	**A176–A177**
	UN		American UN	ANSI B1.1:74	2A/2B	Y	Widely used inch-based 60° V-form for all industries.	**A178–A179**
	NPT		NPT	ANSI/ASME B1.20.1S1983	Standard NPT	N	National Pipe Thread standard 60° thread form for pipe fittings.	**A180**
	55		Partial profile 55º	—	—	N	General use for 55° thread forms such as Whitworth, BSW, and BSP where non-cresting inserts are desired to cut a variety of pitches.	**A181**
	W		Whitworth, BSW, BSF, BSP	BS 84:1956, ISO 228/1:1982, DIN 259	Medium Class A	Y	Widely used 55° form for gas and water connections.	**A182–A183**
	API RD		API round	API STD. 5B:1979	Standard API RD	Y	60° V-form with large radius for casing, tubing, and line pipe in the oil and gas industry, including 8 and 10 round forms.	**A183–A184**
	PG		PG	DIN 404B0		Y	80° steel conduit thread.	**A184–A185**
	RD		Round	DIN 405	7e/7H	Y	Round thread form for tube fittings in the chemical and food industries.	**A185–A186**
	TR		Trapez	DIN 103	7e/7H	N	30° truncated metric thread form for motion applications.	**A186–A187**



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

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

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

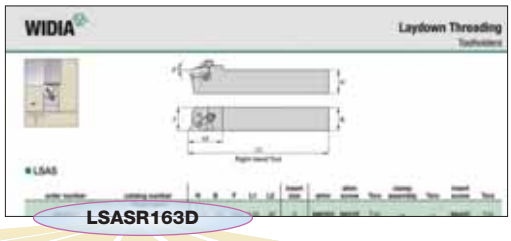
Grade	Coating	Grade Description	05	10	15	20	25	30	35	40	45
TN6025	 HC-P25	PVD-TiAlN Nano-multilayer coated carbide. General-purpose machining for steels, stainless steels, cast irons, non-ferrous materials, and difficult-to-machine materials. Recommended at low to medium cutting speeds when higher toughness is required.									

Laydown Threading Thread Form Guide

- All Laydown Threading inserts are precision ground to provide accurate thread forms and indexing.
- Both cresting and non-cresting partial profile inserts are specifically designed for either external or internal threading operations.
- Cresting inserts provide a fully controlled thread form including diameter for a given pitch. The need for deburring is eliminated and the inserts are optimized for the best tool life at that pitch.
- Non-cresting partial profile inserts offer the flexibility to cut a variety of thread pitches with one insert.
- Right-hand Laydown Threading toolholders use right-hand inserts. Left-hand Laydown Threading toolholders use left-hand inserts.
- Right-hand Laydown Threading boring bars use right-hand inserts. Left-hand Laydown Threading boring bars use left-hand inserts.

Turning

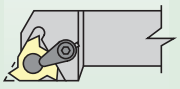
Laydown Threading
Toolholder Identification System



L	S	AS	R		16	3	D
Insert Style	Insert Holding Method	Tool Style	Hand of Tool	Drop Head	Shank Size	Insert Size	Qualified Surface and Length

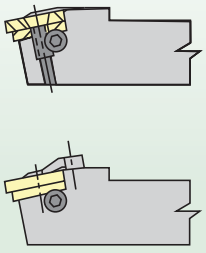
L — Insert Style

L — Laydown triangle



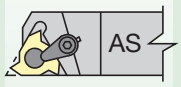
S — Insert Holding Method

S — Insert screw or clamp only

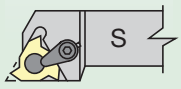


AS — Tool Style

Straight shank

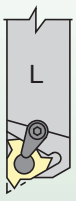


Offset shank

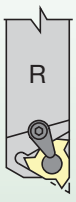


R — Hand of Tool

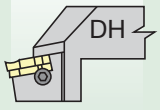
Left hand



Right hand



Drop Head

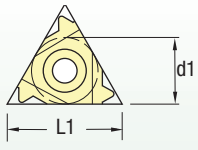


16 — Shank Size

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

3 — Insert Size

Size equals number of 1/8" increments of IC.



inch insert size	metric insert size	d1 inch	L1 mm
2	11	1/4	11,0
3	16	3/8	16,5
4	22	1/2	22,0
5	27	5/8	27,0

D — Qualified Surface and Length

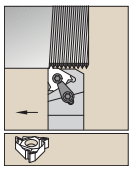
C — qualified back and end, 5" long

D — qualified back and end, 6" long

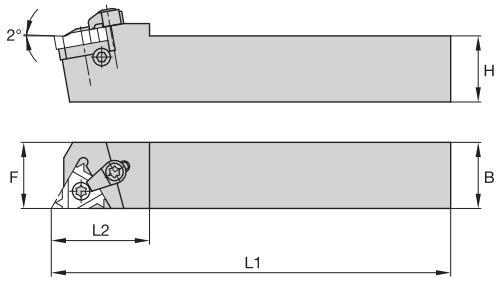
E — qualified back and end, 7" long

T — qualified back and end, 3.25" long

Q — qualified metric holder



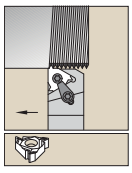
See page A164 for inserts.



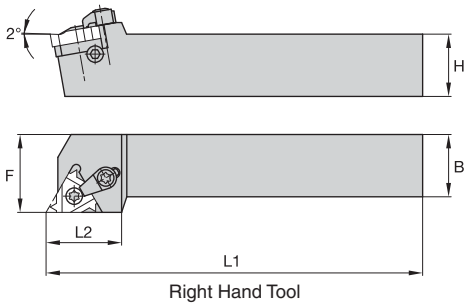
Right Hand Tool

LSAS

order number	catalog number	H	B	F	L1	L2	insert size	shim	shim screw	Torx	clamp assembly	Torx	insert screw	Torx
	right hand													
2968567	LSASR83	.500	.500	.500	3.25	.87	3	SMYE3	SSY3T	T10	—	—	SSA3T	T10
2968583	LSASR103	.625	.625	.630	5.00	1.20	3	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968584	LSASR123	.750	.750	.750	5.00	1.20	3	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968585	LSASR163	1.000	1.000	1.000	6.00	1.20	3	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968587	LSASR203	1.250	1.250	1.250	7.00	1.18	3	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968586	LSASR164	1.000	1.000	1.000	6.00	1.42	4	SMYE4	SSY4T	T20	CKC4	T20	SSA4T	T20
	left hand													
2968572	LSASL83	.500	.500	.500	3.25	.87	3	SMYI3	SSY3T	T10	—	—	SSA3T	T10
2968568	LSASL103	.625	.625	.630	5.00	1.20	3	SMYI3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968569	LSASL123	.750	.750	.750	5.00	1.20	3	SMYI3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968570	LSASL163	1.000	1.000	1.000	6.00	1.20	3	SMYI3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968571	LSASL164	1.000	1.000	1.000	6.00	1.42	4	SMYI4	SSY4T	T20	CKC4	T20	SSA4T	T20



See page A164 for inserts.



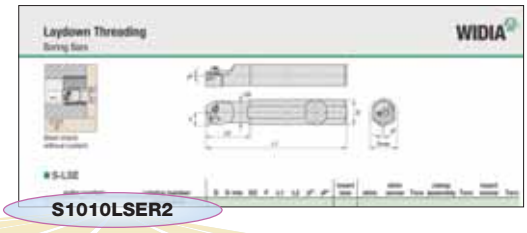
Right Hand Tool

LSS

order number	catalog number	H	B	F	L1	L2	insert size	shim	shim screw	Torx	clamp assembly	Torx	insert screw	Torx
	right hand													
2968591	LSSR123D	.750	.750	1.000	6.00	1.00	3	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968592	LSSR163D	1.000	1.000	1.250	6.00	1.00	3	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968594	LSSR203D	1.250	1.250	1.500	6.00	1.00	3	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968593	LSSR164D	1.000	1.000	1.250	6.00	1.20	4	SMYE4	SSY4T	T20	CKC4	T20	SSA4T	T20
	left hand													
2968588	LSSL123D	.750	.750	1.000	6.00	1.00	3	SMYI3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968589	LSSL163D	1.000	1.000	1.250	6.00	1.00	3	SMYI3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968590	LSSL164D	1.000	1.000	1.250	6.00	1.20	4	SMYI4	SSY4T	T20	CKC4	T20	SSA4T	T20

Turning

Laydown Threading
Boring Bar Identification System

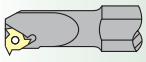


S	10	10	L	S	E	R	2
Bar Type	Primary Necked Shank Bar Diameter	Secondary (mounting) Bar Diameter	Insert Style	Insert Holding Method	Bar Style	Hand of Tool	Insert Size

S — Bar Type

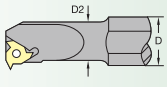
E — Carbide with coolant

S — Steel shank without coolant



10 — Primary Necked Shank Bar Diameter

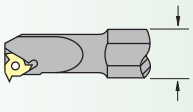
Indicates the primary bar diameter in 1/16" increments.



NOTE: Boring bars with primary bar diameters larger than 5/8" are supplied with clamp and insert screw. Secure the insert with either the clamp or insert screw. **Do not use both.**

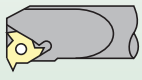
10 — Secondary (mounting) Bar Diameter

Indicates the secondary bar diameter in 1/16" increments.



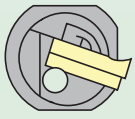
L — Insert Style

L — Laydown triangle



S — Insert Holding Method

S — Insert screw or clamp only

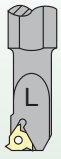


E — Bar Style

End cutting edge mount

R — Hand of Tool

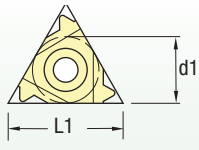
Left hand



Right hand

2 — Insert Size

Size equals number of 1/8" increments of IC.



inch insert size	metric insert size	d1 inch	L1 mm
2	11	1/4	11,0
3	16	3/8	16,5
4	22	1/2	22,0

WIN WITH WIDIA™

Laydown Threading System

The specially engineered WIDIA Laydown Threading System ensures the highest accuracy and quality available to meet all modern production standards. With an extensive range of inserts and toolholders available, the Laydown Threading platform is ideal for all of your internal and external threading applications.

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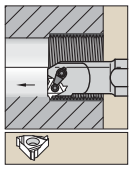
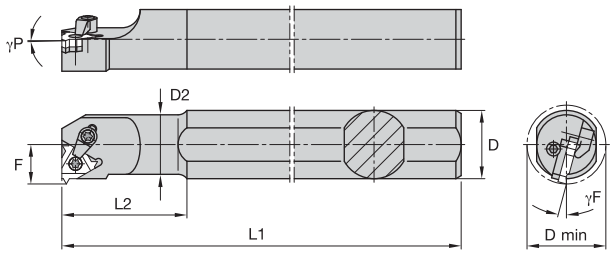


Steel shank without coolant.
See page A164 for inserts.

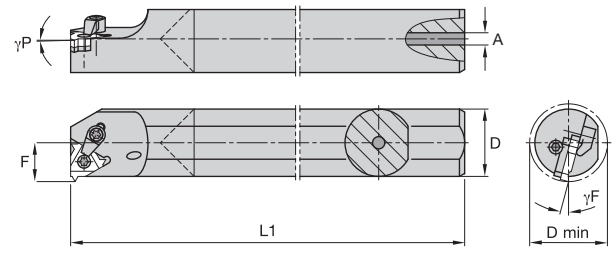


S-LSE

order number	catalog number	D	D min	D2	F	L1	L2	γF°	γP°	insert size	shim	shim screw	Torx	clamp assembly	Torx	insert screw	Torx
	right hand																
2968597	S0612LSER2	.750	.500	.375	.28	7.00	1.00	-15.0	-1.5	2	–	–	–	–	–	SSN2T	T8
2968599	S0812LSER2	.750	.650	.500	.34	7.00	1.25	-15.0	-1.5	2	–	–	–	–	–	SSN2T	T8
2968601	S1012LSER3	.750	.800	.625	.46	7.00	1.50	-15.0	-1.5	3	–	–	–	–	–	SN3TPKG	T10
2968763	S1212LSER3	.750	.900	–	.51	7.00	1.57	-15.0	-1.5	3	SMYI3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968765	S1620LSER3	1.250	1.200	1.000	.65	10.00	2.50	-15.0	-1.5	3	SMYI3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968595	S2020LSER3	1.250	1.450	–	.77	10.00	2.03	-15.0	-1.5	3	SMYI3	SSY3T	T10	CKC3	T15	SSA3T	T10
	left hand																
2968596	S0612LSEL2	.750	.500	.375	.28	7.00	1.00	-15.0	-1.5	2	–	–	–	–	–	SSN2T	T8
2968598	S0812LSEL2	.750	.650	.500	.34	7.00	1.25	-15.0	-1.5	2	–	–	–	–	–	SSN2T	T8
2968600	S1012LSEL3	.750	.800	.625	.46	7.00	1.50	-15.0	-1.5	3	–	–	–	–	–	SN3TPKG	T10
2968602	S1212LSEL3	.750	.900	–	.51	7.00	1.57	-15.0	-1.5	3	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968764	S1620LSEL3	1.250	1.200	1.000	.65	10.00	2.50	-15.0	-1.5	3	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10

NOTE: Items listed without a shim are designed for a 1.5° inclination angle.

Carbide shank with through coolant.
See page A164 for inserts.



Right Hand Tool

E-LSE

order number	catalog number	D	D min	F	L1	A	γF°	γP°	insert size	shim	shim screw	Torx	clamp assembly	Torx	insert screw	Torx
	right hand															
2892518	E06LSER2	.375	.500	.280	6.00	.13	-15.0	-1.5	2	–	–	–	–	–	SSN2T	T8
2892520	E08LSER2	.500	.650	.350	8.00	.19	-15.0	-1.5	2	–	–	–	–	–	SSN2T	T8
2892522	E10LSER3	.625	.800	.460	10.00	.22	-15.0	-1.5	3	–	–	–	–	–	SN3TPKG	T10
2892554	E12LSER3	.750	.900	.510	10.00	.22	-15.0	-1.5	3	SMYI3	SSY3T	T10	CKC3	T15	SSA3T	T10
	left hand															
2892519	E06LSEL2	.375	.500	.280	6.00	.13	-15.0	-1.5	2	–	–	–	–	–	SSN2T	T8
2892521	E08LSEL2	.500	.650	.350	8.00	.19	-15.0	-1.5	2	–	–	–	–	–	SSN2T	T8
2892553	E10LSEL3	.625	.800	.460	10.00	.22	-15.0	-1.5	3	–	–	–	–	–	SN3TPKG	T10
2892555	E12LSEL3	.750	.900	.510	10.00	.22	-15.0	-1.5	3	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10

NOTE: Items listed without a shim are designed for a 1.5° inclination angle.

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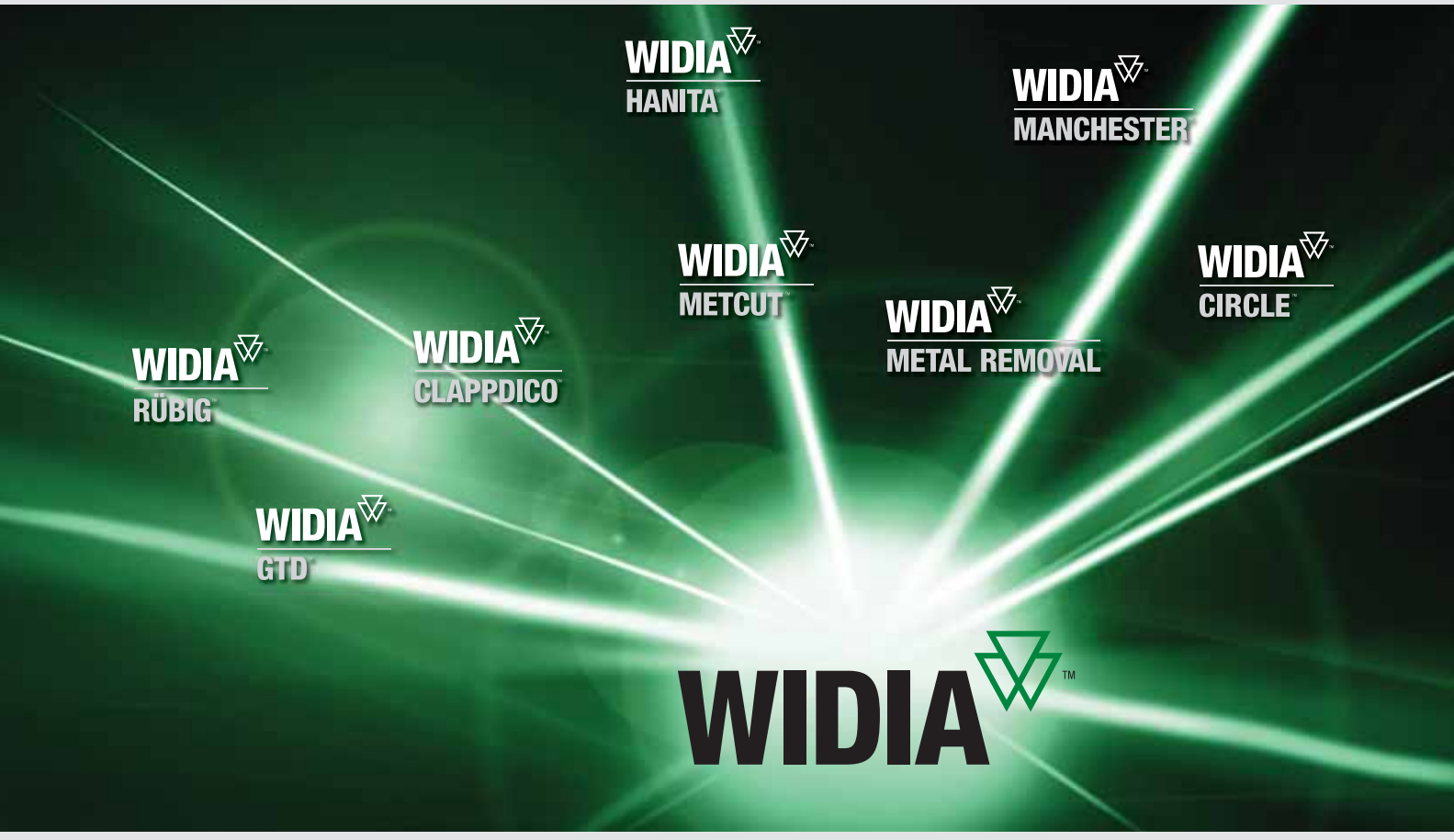

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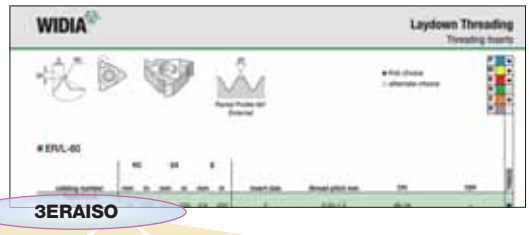
Turning

Laydown Threading
Insert Identification System



3	E	R	A	ISO	
Insert Size	Insert Type	Hand of Insert	Thread Pitch	Thread Profile	Number of Teeth

Insert Type

E — External thread

I — Internal thread

UE — External thread

UI — Internal thread

VE — External thread

VI — Internal thread

Hand of Insert

R — Right-hand thread

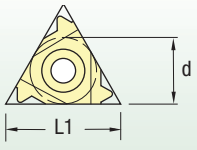
L — Left-hand thread

Number of Teeth

Single tooth profile — No symbol

Multi-tooth profile — Number of teeth (cutting edge and symbol)

Multi-tooth profile with two teeth — 2M



symbol	d	L1
2	0.250	11
3	0.375	16
4	0.500	22
5	0.625	27

Partial profile inserts

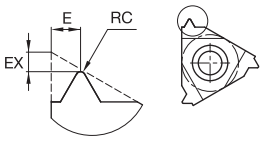
symbol	inch	mm
A	48–16	0,5–1,5
AG	48–8	0,5–3,0
G	14–8	1,7–3,0
N	7–5	3,5–5,0
Q	4–5	5,5–6,0

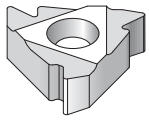
Full profile inserts

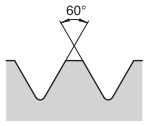
symbol	inch	mm
Actual TPI	48–8	0,5–0,4

Thread Profile

55	Partial Profile 55°
60	Partial Profile 60°
ISO	ISO Metric 60°
TR	ISO Trapezoidal
UN	ISO Inch/American UN 60°
UNJ	Controlled Root Radius 60°
ACME	American ACME
W	Whitworth 55°
BSPT	British Standard Pipe Thread 55°
NPT	American National Pipe Thread 60°
BUT	API Buttress Casing
EL	API Extreme Line
RD	Round
PG	Steel Conduit
APIRD	API Round
API	American Petroleum Institute
H-90	Hughes Oil Pipe
VAM	French Oil Pipe







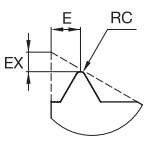
Partial Profile 60° External

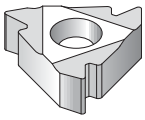
● first choice
○ alternate choice

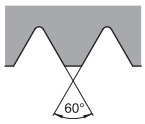
P	●
M	●
K	●
N	○
S	●
H	

■ ER/L-60

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
right hand											
2ERA60	0,05	.002	0,9	.035	0,8	.032	2	0,50-1,5	48-16	–	●
3ERA60	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,5	48-16	–	●
3ERAG60	0,08	.003	1,2	.047	1,7	.067	3	0,50-3,0	48-8	–	●
3ERG60	0,28	.011	1,2	.047	1,7	.067	3	1,75-3,0	14-8	–	●
4ERN60	0,53	.021	1,7	.067	2,5	.098	4	3,5-5,0	7-5	–	●
5ERQ60	0,64	.025	2,1	.083	3,1	.122	5	5,5-6,0	4.5-4	–	●
left hand											
2ELA60	0,05	.002	0,8	.031	0,9	.035	2	–	–	–	●
3ELAG60	0,08	.003	1,2	.047	1,7	.067	3	0,50-3,0	48-8	–	●
3ELG60	0,28	.011	1,2	.047	1,7	.067	3	1,75-3,0	14-8	–	●







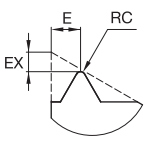
Partial Profile 60° Internal

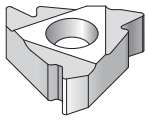
● first choice
○ alternate choice

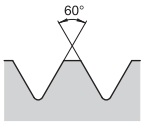
P	●
M	●
K	●
N	○
S	●
H	

IR/L-60

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
right hand											
2IRA60	0,05	.002	0,8	.031	0,9	.035	2	0,50-1,5	48-16	–	●
3IRA60	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,5	48-16	–	●
3IRAG60	0,05	.002	1,2	.047	1,7	.067	3	0,50-3,0	48-8	–	●
3IRG60	0,15	.006	1,2	.047	1,7	.067	3	1,75-3,0	14-8	–	●
4IRN60	0,31	.012	1,7	.067	2,5	.098	4	3,5-5,0	7-5	–	●
left hand											
3ILAG60	0,05	.002	1,2	.047	1,7	.067	3	0,50-3,0	48-8	–	●







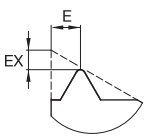
Partial Profile 60° External

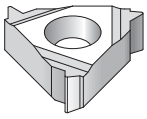
● first choice
○ alternate choice

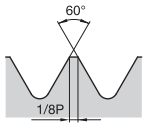
P	●	●
M	●	●
K	●	●
N	○	○
S	●	●
H		

ER-60

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	PN120	TTS
right hand												
44315900	0,05	.002	0,8	.031	0,9	.035	3	0,50–1,5	48–8	–	●	●
44315901	0,28	.011	1,2	.047	1,7	.067	3	1,75–3,0	14–8	–	●	●







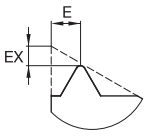
ISO Metric-External

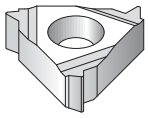
● first choice
○ alternate choice

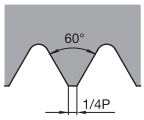
P	●
M	●
K	●
N	○
S	●
H	

ER/L-ISO

catalog number	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
right hand									
2ER15ISO	1,0	.039	0,8	.032	2	1,5	–	–	●
3ER30ISO	1,2	.047	1,6	.063	3	3,0	–	–	●
3ER25ISO	1,1	.043	1,5	.059	3	2,5	–	–	●
3ER20ISO	1,0	.039	1,3	.051	3	2,0	–	–	●
3ER175ISO	0,9	.035	1,2	.047	3	1,75	–	–	●
3ER15ISO	0,8	.031	1,0	.039	3	1,5	–	–	●
3ER125ISO	0,8	.031	0,9	.035	3	1,25	–	–	●
3ER10ISO	0,7	.027	0,7	.027	3	1,0	–	–	●
3ER08ISO	0,6	.024	0,6	.024	3	0,80	–	–	●
3ER075ISO	0,6	.024	0,6	.024	3	0,75	–	–	●
3ER07ISO	0,6	.024	0,6	.024	3	0,70	–	–	●
3ER05ISO	0,6	.024	0,4	.016	3	0,50	–	–	●
4ER50ISO	1,7	.067	2,5	.098	4	5,0	–	–	●
4ER35ISO	1,6	.063	2,3	.090	4	4,5	–	–	●
4ER45ISO	1,7	.067	2,4	.094	4	4,5	–	–	●
4ER40ISO	1,6	.063	2,3	.090	4	4,0	–	–	●
5ER60ISO	2,9	.114	2,0	.079	5	6,0	–	–	●
5ER55ISO	2,7	.106	1,9	.075	5	5,5	–	–	●
left hand									
2EL175ISO	0,8	.031	1,1	.043	2	1,75	–	–	●
2EL15ISO	0,8	.031	1,0	.039	2	1,5	–	–	●
2EL125ISO	0,8	.031	0,9	.035	2	1,25	–	–	●
2EL10ISO	0,7	.028	0,7	.028	2	1,0	–	–	●
2EL08ISO	0,6	.024	0,6	.024	2	0,8	–	–	●
2EL075ISO	0,6	.024	0,6	.024	2	0,75	–	–	●
2EL07ISO	0,6	.024	0,6	.024	2	0,7	–	–	●
2EL06ISO	0,6	.024	0,6	.024	2	0,6	–	–	●
2EL05ISO	0,6	.024	0,4	.016	2	0,5	–	–	●
3EL30ISO	1,2	.047	1,6	.063	3	3,0	–	–	●
3EL25ISO	1,1	.043	1,5	.059	3	2,5	–	–	●
3EL20ISO	1,3	.051	1,0	.039	3	2,0	–	–	●
3EL175ISO	0,9	.035	1,2	.047	3	1,75	–	–	●
3EL15ISO	0,8	.031	1,0	.039	3	1,5	–	–	●
3EL10ISO	0,7	.027	0,7	.027	3	1,0	–	–	●
3EL06ISO	0,6	.024	0,6	.024	3	0,6	–	–	●
3EL045ISO	0,7	.028	0,4	.016	3	0,45	–	–	●
3EL04ISO	0,7	.028	0,4	.016	3	0,4	–	–	●
3EL035ISO	0,8	.031	0,4	.016	3	0,35	–	–	●
4EL40ISO	1,6	.063	2,3	.090	4	4,0	–	–	●
4EL50ISO	1,7	.067	2,5	.098	4	–	–	–	●







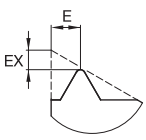
ISO Metric-Internal

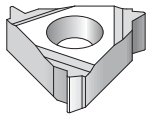
● first choice
○ alternate choice

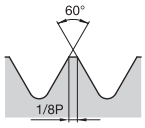
P	●
M	●
K	●
N	○
S	●
H	

IR/L-ISO

catalog number	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
right hand									
2IR15ISO	0,8	.032	1,0	.039	2	1,5	–	–	●
2IR10ISO	0,6	.024	0,7	.028	2	1,0	–	–	●
3IR30ISO	1,1	.043	1,5	.059	3	3,0	–	–	●
3IR25ISO	1,1	.043	1,5	.059	3	2,5	–	–	●
3IR20ISO	1,0	.039	1,3	.051	3	2,0	–	–	●
3IR175ISO	0,9	.035	1,2	.047	3	1,75	–	–	●
3IR15ISO	0,8	.032	1,0	.039	3	1,5	–	–	●
3IR125ISO	0,8	.032	0,9	.035	3	1,25	–	–	●
3IR10ISO	0,6	.024	0,7	.028	3	1,0	–	–	●
4IR50ISO	1,6	.063	2,3	.091	4	5,0	–	–	●
4IR45ISO	1,6	.063	2,4	.095	4	4,5	–	–	●
4IR40ISO	1,6	.063	2,3	.091	4	4,0	–	–	●
4IR35ISO	1,6	.063	2,3	.091	4	3,5	–	–	●
5IR60ISO	1,8	.071	2,5	.098	5	6,0	–	–	●
5IR55ISO	1,6	.063	2,3	.091	5	–	–	–	●
left hand									
2IL15ISO	0,8	.032	1,0	.039	2	1,5	–	–	●
2IL125ISO	0,8	.031	0,9	.035	2	1,25	–	–	●
2IL08ISO	0,6	.024	0,6	.024	2	0,8	–	–	●
2IL075ISO	0,6	.024	0,6	.024	2	0,75	–	–	●
2IL07ISO	0,6	.024	0,6	.024	2	0,7	–	–	●
2IL06ISO	0,6	.024	0,6	.024	2	0,6	–	–	●
2IL05ISO	0,6	.024	0,4	.016	2	0,50	–	–	●
2IL04ISO	0,7	.028	0,4	.016	2	0,4	–	–	●
2IL035ISO	0,8	.031	0,4	.016	2	0,35	–	–	●
3IL30ISO	1,1	.043	1,5	.059	3	3,0	–	–	●
3IL25ISO	1,1	.043	1,5	.059	3	2,5	–	–	●
3IL20ISO	1,0	.039	1,3	.051	3	2,0	–	–	●
3IL15ISO	0,8	.032	1,0	.039	3	1,5	–	–	●
3IL10ISO	0,6	.024	0,7	.028	3	1,0	–	–	●
3IL07ISO	0,6	.024	0,6	.024	3	0,7	–	–	●
3IL06ISO	0,6	.024	0,6	.024	3	0,6	–	–	●
3IL05ISO	0,6	.024	0,4	.016	3	0,50	–	–	●
3IL04ISO	0,8	.031	0,4	.016	3	0,4	–	–	●
3IL035ISO	0,8	.031	0,3	.012	3	0,35	–	–	●
4IL40ISO	1,6	.063	2,3	.090	4	4,0	–	–	●
4IL35ISO	1,6	.063	2,3	.090	4	3,5	–	–	●
4IL45ISO	1,6	.063	2,4	.094	4	–	–	–	●
5IL60ISO	1,8	.071	2,5	.098	5	6,0	–	–	●
5IL55ISO	1,6	.063	2,3	.091	5	5,5	–	–	●







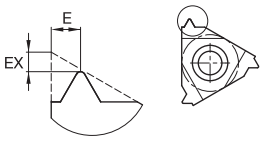
American UN-External

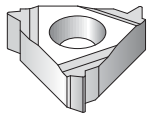
● first choice
○ alternate choice

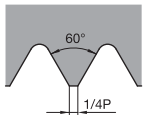
P	●
M	●
K	●
N	○
S	●
H	

ER/L-UN

catalog number	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
right hand									
3ER8UN	1,2	.047	1,6	.063	3	–	8	–	●
3ER48UN	0,6	.024	0,6	.024	3	–	48	–	●
3ER40UN	0,6	.024	0,6	.024	3	–	40	–	●
3ER36UN	0,6	.024	0,6	.024	3	–	36	–	●
3ER32UN	0,6	.024	0,6	.024	3	–	32	–	●
3ER28UN	0,6	.024	0,7	.028	3	–	28	–	●
3ER24UN	0,7	.028	0,8	.032	3	–	24	–	●
3ER20UN	0,8	.032	0,9	.035	3	–	20	–	●
3ER18UN	0,8	.032	1,0	.039	3	–	18	–	●
3ER16UN	0,9	.035	1,1	.043	3	–	16	–	●
3ER12UN	1,1	.043	1,4	.055	3	–	12	–	●
3ER11UN	1,1	.043	1,5	.059	3	–	11	–	●
3ER10UN	1,1	.043	1,5	.059	3	–	10	–	●
left hand									
3EL8UN	1,2	.047	1,6	.063	3	–	8	–	●
3EL13UN	1,0	.039	1,3	.051	3	–	13	–	●
3EL12UN	1,1	.043	1,4	.055	3	–	12	–	●
3EL11UN	1,1	.043	1,5	.059	3	–	11	–	●
3EL10UN	1,1	.043	1,5	.059	3	–	10	–	●







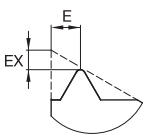
American UN-Internal

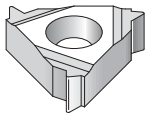
● first choice
○ alternate choice

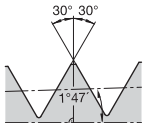
P	●
M	●
K	●
N	○
S	●
H	

■ IR/L-UN

catalog number	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
right hand									
2IR18UN	0,8	.031	1,0	.039	2	–	18	–	●
2IR16UN	0,9	.035	1,1	.043	2	–	16	–	●
3IR8UN	1,1	.043	1,5	.059	3	–	8	–	●
3IR32UN	0,6	.024	0,6	.024	3	–	32	–	●
3IR28UN	0,6	.024	0,7	.027	3	–	28	–	●
3IR24UN	0,7	.028	0,8	.032	3	–	24	–	●
3IR20UN	0,8	.032	0,9	.035	3	–	20	–	●
3IR18UN	0,8	.032	1,0	.039	3	–	18	–	●
3IR16UN	0,9	.035	1,1	.043	3	–	16	–	●
3IR14UN	0,9	.035	1,2	.047	3	–	14	–	●
3IR12UN	1,1	.043	1,4	.055	3	–	12	–	●
3IR11UN	1,1	.043	1,5	.059	3	–	11	–	●
left hand									
3IL9UN	1,2	.047	1,7	.067	3	–	9	–	●
3IL8UN	1,1	.043	1,5	.059	3	–	8	–	●
3IL64UN	0,8	.031	0,4	.016	3	–	64	–	●
3IL56UN	0,7	.028	0,4	.016	3	–	56	–	●







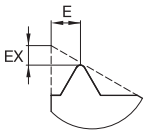
NPT-External

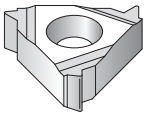
● first choice
○ alternate choice

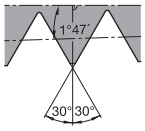
P	●
M	●
K	●
N	○
S	●
H	

ER/L-NPT

catalog number	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
right hand									
3ER27NPT	0,7	.028	0,8	.032	3	—	27	.75	●
3ER18NPT	0,8	.032	1,0	.039	3	—	18	.75	●
3ER14NPT	0,9	.035	1,2	.047	3	—	14	.75	●
3ER115NPT	1,1	.043	1,5	.059	3	—	11.5	.75	●
3ER8NPT	1,3	.051	1,8	.071	3	—	8	.75	●



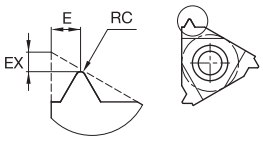


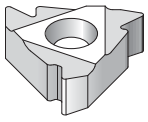


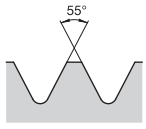
NPT-Internal

IR/L-NPT

catalog number	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	
right hand									
3IR115NPT	1,1	.043	1,5	.059	3	—	11.5	.75	●
3IR8NPT	1,3	.051	1,8	.071	3	—	8	.75	●
left hand									
3IL14NPT	0,9	.035	1,2	.047	3	—	14	.75	●







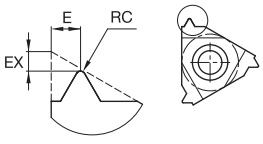
Partial Profile
55° External

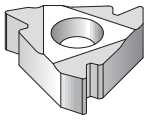
● first choice
○ alternate choice

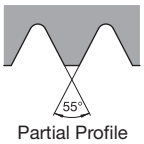
P	●
M	●
K	●
N	○
S	●
H	

■ ER/L-55

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
right hand											
3ERAG55	0,08	.003	1,2	.047	1,7	.067	3	0,50-3,0	48-8	–	●
3ERA55	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,5	48-16	–	●
3ERG55	0,20	.008	1,2	.047	1,7	.067	3	1,75-3,0	14-8	–	●
4ERN55	0,43	.017	1,7	.067	2,5	.098	4	3,5-5,0	7-5	–	●



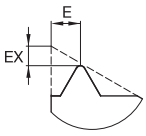


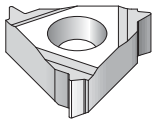


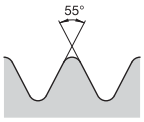
Partial Profile
55° Internal

■ IR/L-55

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	
right hand											
2IRA55	0,05	.002	0,8	.031	0,9	.035	2	0,50-1,5	48-16	–	●
3IRAG55	0,07	.003	1,2	.047	1,7	.067	3	0,50-3,0	48-8	–	●
3IRA55	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,5	48-16	–	●
3IRG55	0,21	.008	1,2	.047	1,7	.067	3	1,75-3,0	14-8	–	●
4IRN55	0,43	.017	1,7	.067	2,5	.098	4	3,5-5,0	7-5	–	●
left hand											
3ILAG55	0,07	.003	1,2	.047	1,7	.067	3	0,50-3,0	48-8	–	●
3ILA55	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,5	48-16	–	●







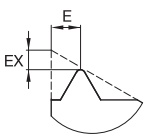
Whitworth BSW, BSF, BSP-External

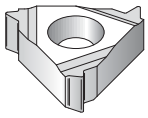
● first choice
○ alternate choice

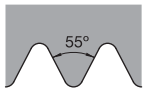
P	●
M	●
K	●
N	○
S	●
H	

ER/L-W

catalog number	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
right hand									
3ER32W	0,6	.024	0,6	.024	3	–	32	–	●
3ER28W	0,6	.024	0,7	.028	3	–	28	–	●
3ER24W	0,7	.028	0,8	.032	3	–	24	–	●
3ER19W	0,8	.032	1,0	.039	3	–	19	–	●
3ER18W	0,8	.031	1,0	.039	3	–	18	–	●
3ER16W	0,9	.035	1,1	.043	3	–	16	–	●
3ER14W	1,0	.039	1,2	.047	3	–	14	–	●
3ER11W	1,1	.043	1,5	.059	3	–	11	–	●
3ER10W	1,1	.043	1,5	.059	3	–	10	–	●
3ER8W	1,2	.047	1,5	.059	3	–	8	–	●
4ER5W	1,7	.067	2,4	.094	4	–	–	–	●
left hand									
3EL36W	0,6	.024	0,6	.024	3	–	36	–	●
3EL12W	1,1	.043	1,4	.055	3	–	12	–	●
3EL11W	1,1	.043	1,5	.059	3	–	11	–	●
5EL45W	1,8	.071	2,6	.102	5	–	4.5	–	●
5EL4W	2,0	.079	2,9	.114	5	–	4	–	●







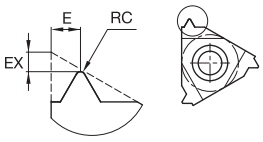
Whitworth BSW, BSF, BSP-Internal

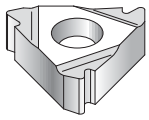
● first choice
○ alternate choice

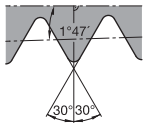
P	●
M	●
K	●
N	○
S	●
H	

IR/L-W

catalog number	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
right hand									
2IR19W	0,8	.032	1,0	.039	2	–	19	–	●
2IR14W	0,9	.035	1,1	.043	2	–	14	–	●
3IR19W	0,8	.032	0,9	.035	3	–	19	–	●
3IR18W	0,8	.031	1,0	.039	3	–	18	–	●
3IR16W	0,9	.035	1,1	.043	3	–	16	–	●
3IR14W	1,0	.039	1,2	.047	3	–	14	–	●
3IR11W	1,1	.043	1,5	.059	3	–	11	–	●
3IR8W	1,2	.047	1,5	.059	3	–	8	–	●
4IR7W	1,6	.063	2,3	.090	4	–	7	–	●
4IR6W	1,6	.063	2,3	.090	4	–	6	–	●
4IR5W	1,7	.067	2,4	.094	4	–	–	–	●
left hand									
3IL14W	1,0	.039	1,2	.047	3	–	14	–	●
5IL45W	1,8	.071	2,6	.102	5	5,5 - 6,0	4.5	–	●
5IL4W	2,0	.079	2,9	.114	5	–	4	–	●







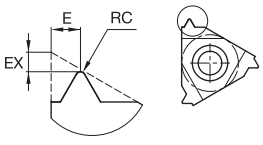
API Round-Internal

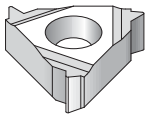
● first choice
○ alternate choice

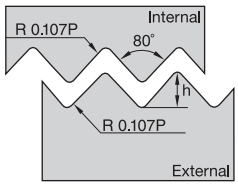
P	●
M	●
K	●
N	○
S	●
H	

IR-APIRD

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
right hand											
3IR10APIRD	0,34	.013	1,2	.047	1,4	.055	3	–	10	.75	●

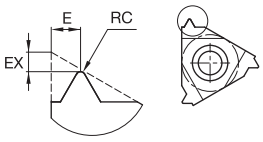


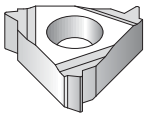


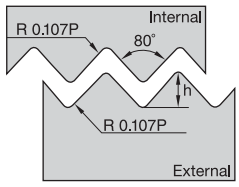


ER-PG

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	
right hand											
3ER18PG	0,09	.004	1,0	.039	0,8	.032	3	–	18	–	●
3ER16PG	0,11	.004	1,1	.043	0,9	.035	3	–	16	–	●





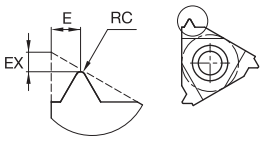


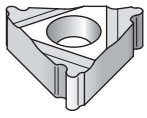
● first choice
○ alternate choice

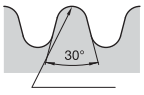
P	●
M	●
K	●
N	○
S	●
H	

IR-PG

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
right hand											
3IR18PG	0,09	.004	0,1	.039	0,8	.032	3	–	18	–	●
3IR16PG	0,11	.004	1,1	.043	0,8	.032	3	–	16	–	●



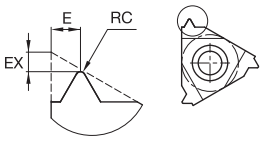


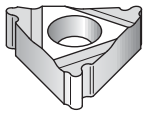


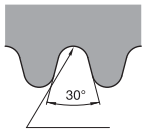
Round External

ER-RD

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	
right hand											
3ER8RD	0,76	.030	1,4	.055	1,3	.051	3	–	8	–	●
4ER6RD	1,01	.040	1,5	.059	1,7	.067	4	–	6	–	●
4ER4RD	1,52	.060	2,3	.091	2,2	.087	4	–	4	–	●
left hand											
5EL4RD	–	–	2,2	.087	2,3	.091	5	4,0	–	–	●







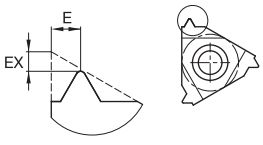
R = .221P
Round-Internal

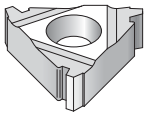
● first choice
○ alternate choice

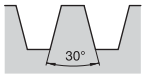
P	●
M	●
K	●
N	○
S	●
H	

IR/L-RD

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
right hand											
3IR8RD	0,70	.028	1,4	.055	1,4	.055	3	–	8	–	●
4IR6RD	0,93	.037	1,5	.059	1,7	.067	4	–	6	–	●
4IR4RD	1,40	.055	2,3	.091	2,2	.087	4	–	4	–	●
left hand											
3IL6RD	–	–	1,4	.055	1,5	.059	3	6,0	–	–	●
3IL8RD	0,06	.022	1,4	.055	1,4	.055	3	–	8	–	●
5IL4RD	–	–	2,2	.087	2,3	.091	5	4,0	–	–	●



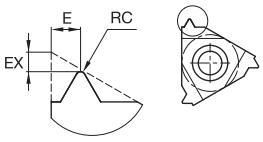


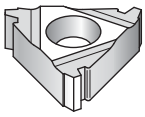


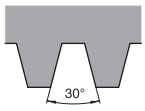
Trapez-External

ER/L-TR

catalog number	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	
right hand									
3ER3TR	1,3	.051	1,5	.059	3	3,0	–	–	●
3ER2TR	1,1	.043	1,3	.051	3	2,0	–	–	●
3ER15TR	1,0	.039	1,1	.043	3	1,5	–	–	●
4ER5TR	2,1	.083	2,5	.098	4	5,0	–	–	●
4ER4TR	1,7	.067	1,9	.075	4	4,0	–	–	●
5ER6TR	2,3	.091	2,7	.106	5	6,0	–	–	●
left hand									
3EL3TR	1,3	.051	1,5	.059	3	3,0	–	–	●
3EL2TR	1,1	.043	1,3	.051	3	2,0	–	–	●
4EL4TR	1,7	.067	1,9	.075	4	4,0	–	–	●
5EL6TR	2,3	.091	2,7	.106	5	6,0	–	–	●







Trapez-Internal

● first choice
○ alternate choice

P	●
M	●
K	●
N	○
S	●
H	

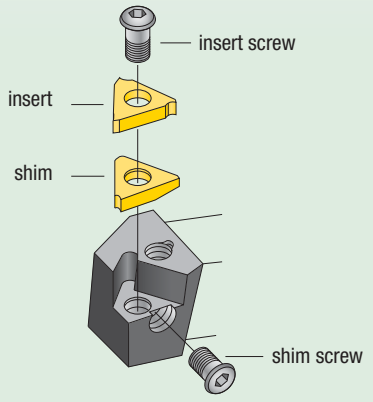
■ IR/L-TR

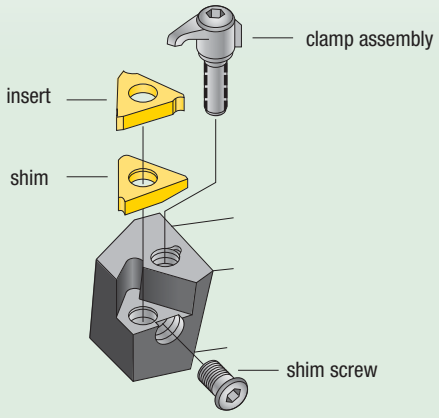
catalog number	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
right hand									
3IR3TR	1,3	.051	1,5	.059	3	3,0	–	–	●
4IR5TR	2,1	.083	2,5	.098	4	5,0	–	–	●
4IR4TR	1,7	.067	1,9	.075	4	4,0	–	–	●
5IR6TR	2,3	.091	2,7	.106	5	6,0	–	–	●

Laydown Threading Toolholders

In all cases, the proper shim selection is important.

WIDIA™ toolholders are supplied with a shim for a 1.5° lead angle. Change the shim if your thread is more than 1° different. For more details on proper shim selections see pages A210–A211.





insert size and style	insert screw	shim	shim screw and washer	clamp assembly
3ER	S-SA3T	SM-YIE3	S-SY3T	CK-C3
3EL	S-SA3T	SM-YI3	S-SY3T	CK-C3
4ER	S-SA4T	SM-YIE4	S-SY4T	CK-C4
4EL	S-SA4T	SM-YI4	S-SY4T	CK-C4
Laydown Threading boring bars				
2IR	S-SN2T	—	—	—
2IL	S-SN2T	—	—	—
3IR	S-SA3T	SM-YI3	S-SY3T	CK-C3
3IL	S-SA3T	SM-YIE3	S-SY3T	CK-C3
4IR	S-SA4T	SM-YI4	S-SY4T	CK-C4
4IL	S-SA4T	SM-YIE4	S-SY4T	CK-C4

SM	-	Y	E	3	-	2P
Shim		Y-shim for Laydown standard inserts	E — External I — Internal	IC — 1/8"		Shim Angle

2P	2° positive
1P	1° positive
—	0°
1N	1° negative
2N	2° negative
3N	3° negative

resultant angle		3.5°	2.5°	1.5°	0.5°	-0.5°	-1.5°
insert size (iC)	toolholder	shim ordering code					
3/8"	ex. RH/in. LH ex. LH/in. RH	SM-YE3-2P SM-YI3-2P	SM-YE3-1P SM-YI3-1P	SM-YE3 SM-YI3	SM-YE3-1N SM-YI3-1N	SM-YE3-2N SM-YI3-2N	SM-YE3-3N SM-YI3-3N
1/2"	ex. RH/in. LH ex. LH/in. RH	SM-YE4-2P SM-YI4-2P	SM-YE4-1P SM-YI4-1P	SM-YE4 SM-YI4	SM-YE4-1N SM-YI4-1N	SM-YE4-2N SM-YI4-2N	SM-YE4-3N SM-YI4-3N

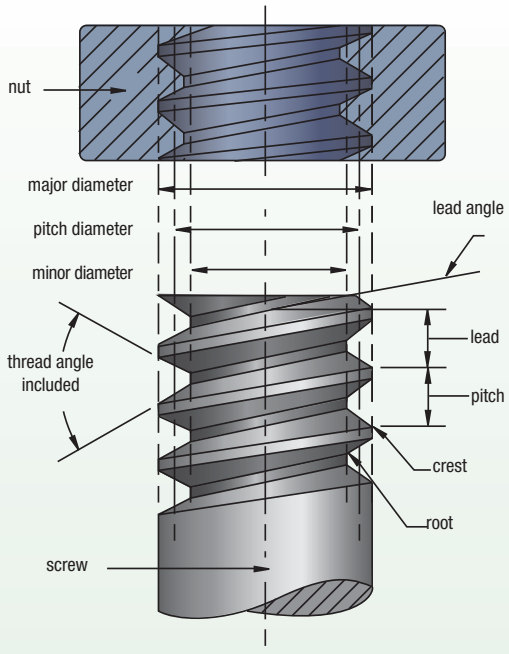
Slanted Shim Kit

Because you might occasionally need different shims than those supplied with our standard toolholders, we strongly recommend that shim kits be readily available in every tool shop.

insert size	shim size (D)	ordering code	contains slanted shims
3x	3/8"	ABY3	SM-YE3-2P, 1P, 1N, 2N, 3N SM-YI3-2P, 1P, 1N, 2N, 3N
4x	1/2"	ABY4	SM-YE4-2P, 1P, 1N, 2N, 3N SM-YI4-2P, 1P, 1N, 2N, 3N

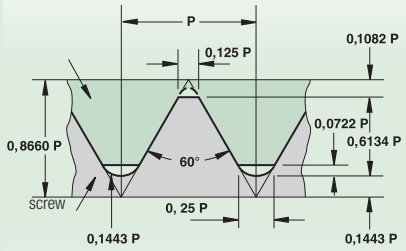
Screw Thread Definitions

1. Major diameter — The largest diameter of a straight screw thread. This applies to both internal and external threads.
2. Pitch diameter — On a straight thread, it is the diameter which passes through the thread profiles at such points which make the thread width of the groove equal to one-half of the basic pitch. On a "perfect thread," this occurs at the point where the widths of the thread and groove are equal.
3. Thread angle (included) — The included angle between the individual flanks of the thread form.
4. Minor diameter — The smallest diameter of a straight screw thread. This applies to both internal and external threads.
5. Lead angle — On a straight thread, the lead angle is the angle created by the helix of the thread at the pitch diameter with a plane perpendicular to the axis.
6. Lead — The distance a screw thread advances axially in one revolution. On a single start, the pitch and lead are identical. The lead is equal to the pitch times the number of starts.
7. Pitch — The distance from a point on a screw thread to a corresponding point on the next thread measured parallel to the thread axis.
8. Crest — The outer most surface of the thread form which joins the flanks.
9. Root — The inner most surface of the thread form which joins the flanks.



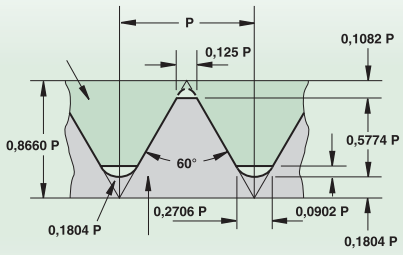
NOTE: Threads per inch (TPI) not shown:
The number of threads per inch measured axially.
The terms pitch and TPI are often used interchangeably. TPI=1/pitch

ISO M (Metric) and UN (Unified National)



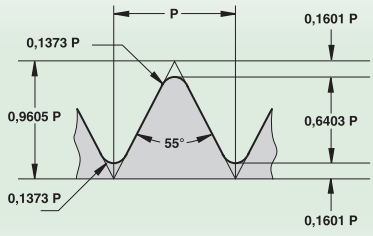
Use: All branches of mechanical industry.

UNJ (controlled root radius)



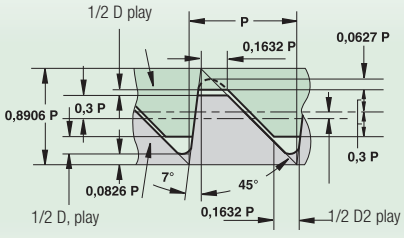
Use: Aircraft and space industry.

Whitworth (BSW)



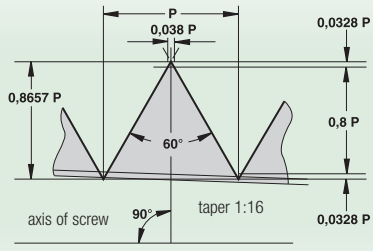
Use: Fittings and pipe couplings for gas, water, and sewer lines (replaced by ISO).

American Buttress



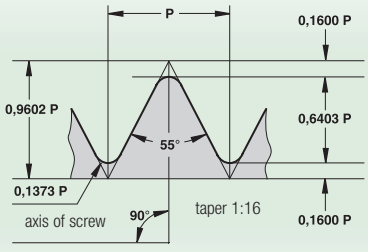
Use: Fittings and pipe couplings.

NPT (American National Pipe Thread)



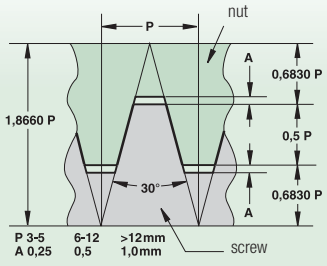
Use: Fittings and pipe couplings.

BSPT (British Standard Pipe Thread)



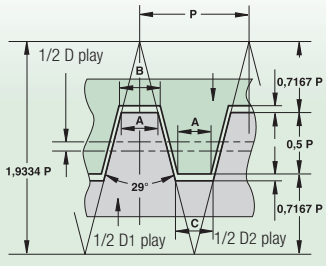
Use: Pipe thread for steam, gas, and water lines.

TR DIN 103



Use: Mechanical industry for motion transmission screws.

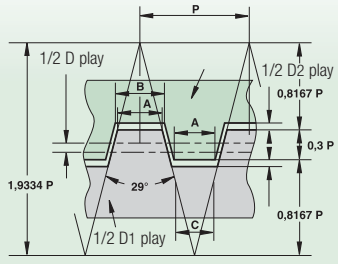
Acme



A = 0,0307 P
B = 0,3707 P—x D play
C = 0,3707 P—(D1 play—D2 play)

Use: Acme-General is used in mechanical industry for motion transmission screws.

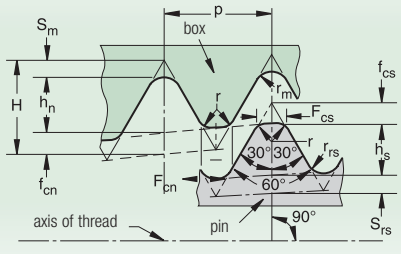
Acme, truncated (Stub)



A = 0,4224 P
B = 0,4224 P—x D play
C = 0,4224 P—(D1 play—D2 play)

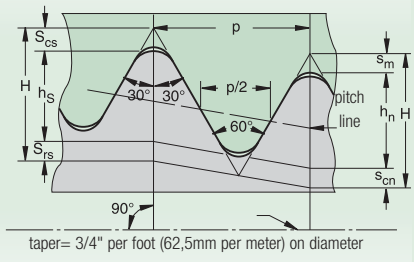
Use: Where normal Acme is too deep.

API Rotary Shoulder Connection



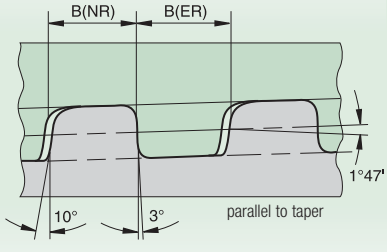
NOTE: Taper shown exaggerated.

API Casing and Tubing Round Thread Form



NOTE: Taper shown exaggerated.

API Buttress

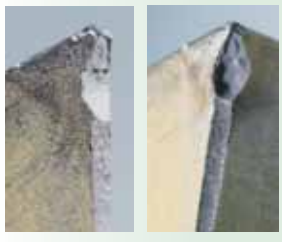


Suggested Grades and Speeds for Threading Various Workpiece Materials

workpiece group	workpiece material	recommendations surface speed – SFM			
		uncoated	PVD coated		CVD coated
		THM	TN6010	TN6025	TN7110
free-machining carbon steel	10L18, 10L45, 1213, 12L13, 12L14, 1140, 1141, 11L44, 1151, 10L50	—	300–650	150–650	525–980
plain carbon steel	10063, 1008, 1010, 1015, 1018, 1020, 1025, 1026, 1108, 1117	—	250–650	150–575	500–920
alloy steels/tool steels 150–325 HB (up to 35 HRC)	1042, 1045, 1070, 1080, 1085, 1090, 1095, 1541, 1561, 1572, 5140, 8620, W1, O1, S1, P20, H13, D2, A6, H13, L6	—	250–650	125–550	300–920
alloy steels/tool steels 330–450 HB (36–47 HRC)		—	200–525	—	260–560
martensitic/ferritic stainless/precipitation hardening	416, 420F, 440F, 405, 409, 429, 430, 434, 436, 442, PH	—	150–525	100–400	215–780
austenitic stainless steel	201, 202, 301, 302, 303, 304, 304, 305, 321, 347, 348, 310, 314, 316, 316L, 330	200–350	200–650	150–450	—
gray cast iron 135–270 HB	class 20, 30, 35, 45	200–300	200–775	150–400	525–980
gray cast iron 275–450 HB	class 50, 55, 60	150–250	150–575	50–250	390–920
alloy/ductile iron	A536, J434C, 60-40-18, 80-55-06, 100-70-03	150–250	150–650	100–525	590–985
free-machining aluminum alloys	2024-T4, 2014-T6, 6061-T6 2011-T3, 3003-H18, A2, Alcan, Alcoa 510, Duralumin	400–800	400–1200	—	—
high-silicon aluminum alloys	A380, A390, A380-1, A390-1, A380-2	—	—	—	—
copper/zinc/brass		250–600	250–1000	150–775	—
non-metallics	Graphite, Nylon, Plastics, Rubbers, Phenolics, Carbon	400–1500	400–1300	150–1000	—
high-temperature alloys 125–269 HB (up to 27 HRC)	Nickel 200, Monel, R405, Monel K500, INCONEL 600, INCONEL 625/901x750/718, Waspaloy, Hastelloy C	80–120	80–400	40–250	—
high-temperature alloys 260–450 HB (26–47 HRC)	Rene 95, Waspaloy A286, Incoloy 800, Haynes 188, Stellite F, Haynes 25	80–100	100–250	20–200	—
titanium alloys	Ti-6Al-4V, TI-5Al-2.5Sn	110–180	110–325	—	—

NOTE: When workpiece hardness levels are at the top of a range, starting SFM should be at the lower end. Regularly inspect insert clamps for worn flats.

Edge preparation:
Uncoated — sharp
PVD coated — light hone except positive top rake, top rake-sharp

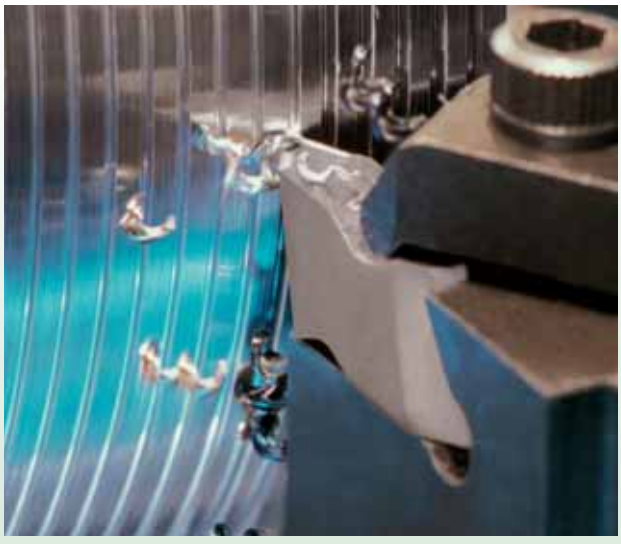
problem	cause	possible solution
thread with torn finish 	• Burrs. • Torn finish. • Steps.	• Use positive rake or full profile insert. • Increase coolant concentration. • Alter infeed. • Increases SFM. • Check machine “Z” travel axis. • Check insert form. • Check for correct shim in LT system.
chatter 	• Poor rigidity. • Incorrect speed. • Insert movement. • Improper infeed. • Off centerline. • Wrong edge prep.	• Minimize tool overhang. • Check for workpiece deflection. • Adjust SFM. • Check insert and clamp. • Use modified feed angle. • Verify that tool cutting position is at workpiece centerline. • Adjust hone level by ordering special insert.
built-up edge 	• Speed too low. • Insufficient coolant. • Chip load. • Wrong edge prep.	• Increase SFM. • Increase coolant concentration and/or flow. • Adjust infeed angle. • Increase depth of cut per pass. • Adjust hone level by ordering special insert.
deformation 	• Wrong grade. • Speed too high. • Improper infeed angle. • Insufficient coolant.	• Use a more wear-resistant grade (e.g., TN6010™). • Reduce SFM. • Alter infeed method/angle. • Increase coolant flow.
chipping 	• Improper infeed. • Chip load. • Wrong grade. • Incorrect speed. • Poor rigidity. • Wrong edge prep.	• Alter infeed to modified flank. • Increase or decrease number of passes. • Eliminate spring passes. • Use tougher grade (e.g., TN6025™). • Increase SFM if chipping on trailing edge. • Decrease SFM if chipping on leading edge. • Minimize tool overhang. • Check for insert movement/check clamp. • Check for possible part deflection. • Adjust hone size by ordering special insert.
broken nose 	• Heavy chip load. • Small nose radius. • Wrong grade. • Improper infeed. • Wrong edge prep.	• Decrease chip load. • Use large nose radius if allowable. • Use tougher grade (e.g., TN6025). • Alter infeed to modified flank. • Adjust hone size by ordering special insert.
flank wear 	• Wrong grade. • Insufficient coolant. • Off centerline.	• Use a more wear-resistant grade (e.g., TN6025). • Increase coolant flow. • Check the centerline height of the tool. (The smaller the diameter, the more critical the need for centerline accuracy.)

problem	possible solution																
	increase SFM	reduce SFM	increase chip load	decrease chip load where failure occurs	use tougher carbide grade	use harder carbide grade	apply coolant	use coated carbide	use topping insert	change infeed angle	check for insert movement and reseat	reduce tool overhang	reselect shim	apply chipbreaker style	reduce DOC	adjust center height	begin cutting threads .472" before workpiece
chatter	●			●							●	●				●	
burr on crest	●								●								
short tool life		●	●	●		●		●									
chipped leading edge			●	●	●												
chipped trailing edge					●					●							
broken nose (first pass)	●														●	●	
broken nose (after first pass)				●	●					●			●				
built-up on cutting edge	●		●				●	●									
premature topping													●				
splitting threads																	●
poor chip evacuation														●			

WIDIA™ insert technology brings chip control to your threading operations with the TopThread™ platform. The proprietary WIDIA recessed chip groove, when used according to our recommendations, breaks the chip in most applications. Our positive rake design lowers cutting pressures, which in turn lowers damaging heat generation thus providing better tool life. Long, stringy chips no longer mar the workpiece surface finish. The danger to operators when removing long chips from the workpiece and chuck is eliminated. All of these benefits combine to improve the productivity of your threading operations.

The Last Pass

Some CNC controls require the last pass to be at a 0° infeed angle because the chip will not break on the last pass. On most carbon and alloy steels, the last pass can remain at .005" (0,127mm) depth of cut and produce an acceptable finish. For some materials, a .001" (0,025mm) to .003" (0,076mm) (spring) pass may be used to improve surface finish, however, chip breaking action may be compromised.

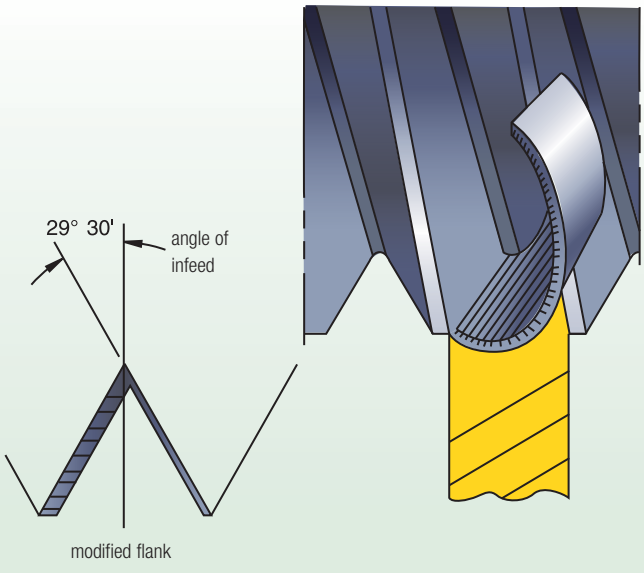


Machine Programming

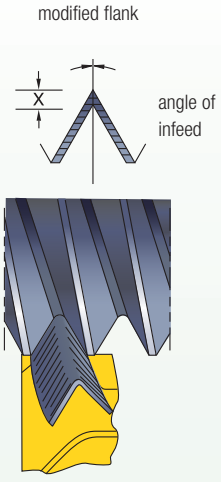
Modern CNC controls allow the programmer to easily adjust infeed angle, the number of passes, and depth of cut for each pass. The chip control threading insert performs best at an infeed angle of 29° 30', although 15° to 30° is acceptable. Also, it is important to maintain a minimum of .005" (0,127mm) depth of cut on every pass. In most applications, use of CNC canned cycles produce only marginally successful results. Custom written programs are better and are recommended.

Infeed Angle

In order to effectively and consistently break the chip, it is important to use an infeed angle between 28° and 29° 30'. Do not apply chip control inserts at infeed angles less than 15°.



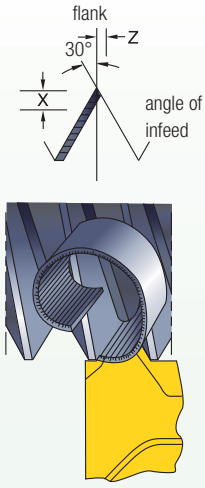
Radial



Advantage —
- Cutting on both sides of the thread form places all of the cutting edge in the cut and protects edge from chipping.
- Even wear on the insert.

Disadvantage —
- Tool develops a channel chip that may be difficult to handle.
- Tip chipping occurs when cutting high-tensile materials.
- Burr condition is increased.
- Entire cutting edge is engaged at finish of thread, causing increased tendency to chatter.

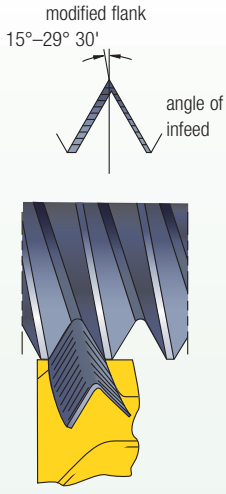
Flank



Advantage —
- Cutting with the leading edge of the threading tool gives the chip a definite flow out of the thread form area. This reduces the burr problem on the trailing edge of the tool. To avoid bad surface finish, chipping, or excessive flank wear due to rubbing of the trailing edge, the infeed angle should be 3° to 5° smaller than the angle of the thread. This is a type of modified flank.

Disadvantage —
- Trailing edge of threading insert may drag or rub and tends to chip.
- Torn or poor surface finish threads result when cutting soft, gummy materials like low-carbon steels, aluminum, and stainless steels.

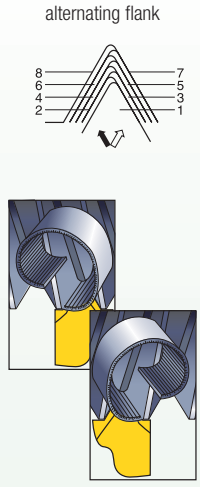
Modified flank



Advantage —
- Tool cuts both sides of thread form, so it is protected from chipping similar to 0° infeed. Channel-type chip develops, but uneven chip thickness helps remove the chip similar to flank infeed.
- This is the preferred method, especially when used with a chip control insert.
- Combined radial and/or alternating flank infeed.
- Results in good tool life, with wear evenly distributed over both flanks.

Disadvantage —
- Similar disadvantages as with 0° infeed, although reduced somewhat in magnitude as cutting forces are better equalized and chip flow is much less of a problem.

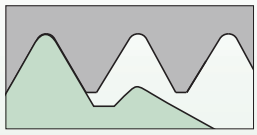
Alternating flank



Advantage —
- Increased tool life because both edges are used equally. NOTE: Some machine tools may require special programming techniques to achieve this method of infeed.

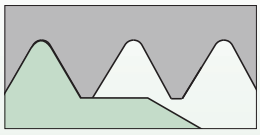
Disadvantage —
- Difficult to cut on conventional machinery.

Partial Profile



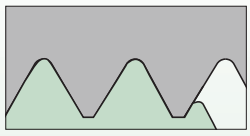
Tooth profile with universal profile shape:
- 55° or 60° without cutting edges for the tooth tapers.
- Reduced inventory.
- For various pitches in a limited range.
- Preferably one time production.
- Outside/core diameters must be accurately pre-turned.

Full Profile



Tooth profile with full profile shape including tooth height:
- For burr-free, precise threads in the specified pitch.
- General application.
- Machining allowance for outside/core diameter around .004–.006".

Multi-Tooth Profile



Multi-tooth full profile generally with 2–3 teeth:
- Highly productive threading with fewer passes and longer tool life.
- Requires a rigid setup and long thread runout.
- Minimum clearance width approximately 1.25 x E as per indexable insert dimensions table.

Formulas

inch formula		
to find	**given**	**formula**
SFM	D (inch) RPM	$SFM = \frac{\pi \times D}{12"} \times RPM$
RPM	D (inch) SFM	$RPM = \frac{SFM \times 12"}{D \times \pi}$

metric formula		
to find	**given**	**formula**
m/min	D (mm) RPM	$m/min = \frac{\pi \times D}{1000} \times RPM$
RPM	D (mm) m/min	$RPM = \frac{m/min \times 1000}{D \times \pi}$

Legend

IPM	=	inch per minute
SFM	=	surface feet per minute
m/min	=	meters per minute
RPM	=	revolutions per minute
D	=	part diameter
π	=	3.1416

Maximum Cutting Speeds

Maximum cutting speed is often limited by the maximum travel speed (IPM or mm/min) of the tool allowed by the machine. Check your maximum speed with the following formulas:

inch formula: maximum cutting speed (SFM) =
part diameter (inch) x 3.14 x TPI x $\frac{\text{max IPM}}{12"}$

metric formula: maximum cutting speed (m/min) =
part diameter (mm) x 3.14 x (1/pitch) x $\frac{\text{max mm/min}}{1000mm}$

Recommendation for Threading Infeed Passes

TPI	48–32	28–24	20–16	14–12	11.5–9	8–6	5–4	3–2
metric pitch (mm)	0,50–0,75	0,80–1	1,25–1,5	1,75–2	2,5–3	3,5–4	4,5–6	8
Thread Type	**recommended number of passes**							
Common V-thread forms ISO, UN, UNJ, NPT, Whitworth, BSPT, API Rotary Shoulder	4–5	5–6	6–8	8–10	9–12	12–15	14–16	15–25
Acme, Trapez, Round, API Round	—	—	5–6	7–8	10–11	12–13	13–15	18–20
Stub Acme, API Buttress	—	—	5	5–6	7–8	8–10	10–12	14–16
American Buttress	—	—	7–8	9–10	11–12	13–15	17–19	22–24

Maintain minimum .002" (0,05mm) infeed on last passes to avoid work hardening and excessive abrasion of the threading tool.

Constant Volume Infeed Values for Threading Operations

In most applications, use of CNC canned cycles produces only marginally successful results. This is the case as these programs do not satisfy the .002" (0,05mm) minimum depth of cut specification recommended.

Example:
Infeed per pass formula: accumulated depth = initial doc x √ # pass
For example, an 8-pitch external thread has a depth of .0789" (2mm).
25% of .0789" (2mm) = approximately .0197" (0,50mm)
(This is the infeed/doc for the first pass.)

.0197" (0,500mm) x √ 2 = .0278" (0,708mm)
.0278" (0,708) - .0197" (0,500mm) = .0082" (0,207mm)
(This is the infeed/doc for the second pass.)

.0197" (0,500mm) x √ 3 = .0341" (0,867mm)
.0341" (0,867mm) - .0278" (0,708mm) = .0063" (0,159mm)
(This is the infeed/doc for the third pass.)

.0197" (0,500mm) x √ 4 = .0394" (1,001mm)
.0394" (1,001mm) - .0341" (0,867mm) = .0053" (0,134mm)
(This is the infeed/doc for the fourth pass.)

Using Radial Infeed

Bending stress on the cutting edge caused by V-shaped chips from long-chippping steel workpiece materials.

High cutting forces with small cutting thicknesses require sharp edges with high strength.

Its application is recommended for tough and hard, wear-resistant carbides with good resistance to thermal and mechanical shocks.

Using Flank Infeed

Lower bending stress and stabilized cutting edges produce more favorable chip shapes and larger cutting thicknesses.

Carbides with high hardness, good wear resistance, and temperature stability are advantageous.

When turning short threads with short engagement times, there is a good resistance to thermal and mechanical shocks.

Guidelines for Infeeds — How to Determine the Number and the Size of Passes

The number of passes “s” per thread is decisive for successful threading and crest turning. The following tables give standard values for the application condition when machining steel. The proper number of passes must be determined empirically.

If insert breakage occurs, the number of passes must be increased. With increased wear, we recommend decreasing the number of passes. The chip thickness should not be less than .0019" (0,05mm). The allowance at the diameter should not exceed .0078" (0,2mm).

Metric ISO, External Thread Cutting

thread pitch P (mm)	0,50	0,75	1,00	1,25	1,50	1,75	2,00	2,50	3,00	3,50	4,00	4,50	5,00
depth h1	.012	.018	.024	.030	.036	.042	.048	.060	.072	.085	.097	.109	.121
number of passes	4	4	5	6	6	8	8	10	12	14	15	15	16
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	.005/-	.007/-	.008/-	.008/-	.01/-	.009/-	.01/-	.009/-	.009/-	.008/-	.008/-	.009/-	.009/-
2	.003/.002	.005/.003	.006/.003	.006/.004	.008/.004	.008/.004	.009/.005	.01/.006	.011/.006	.012/.007	.013/.007	.014/.008	.015/.009
3	.002/.001	.004/.002	.004/.002	.005/.003	.006/.003	.006/.039	.007/.004	.007/.004	.008/.005	.009/.005	.01/.006	.011/.006	.012/.007
4	.002/.001	.003/.002	.004/.002	.004/.002	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004	.007/.004	.008/.005	.009/.005	.01/.006
5			.003/.002	.004/.002	.004/.002	.004/.003	.005/.003	.006/.003	.006/.004	.007/.004	.007/.004	.008/.005	.009/.005
6				.003/.002	.004/.002	.004/.002	.004/.003	.005/.003	.006/0.003	.006/.003	.007/.004	.007/.004	.008/.005
7						.004/.002	.004/.002	.005/.003	.005/0.003	.005/.003	.006/.004	.007/.004	.007/.004
8						.003/.002	.004/.002	.004/.002	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004
9								.004/.002	.004/.003	.005/.003	.005/.003	.006/.003	.006/.004
10								.004/.002	.004/.002	.005/.003	.005/.003	.006/.003	.006/.004
11									.004/.002	.004/.002	.005/.003	.005/.003	.006/.003
12									.004/.002	.004/.002	.005/.003	.005/.003	.006/.003
13										.004/.002	.004/.003	.005/.003	.005/.003
14										.004/.002	.004/.002	.005/.003	.005/.003
15											.004/.002	.005/.003	.005/.003
16													.005/.003

Metric ISO, Internal Thread Cutting

thread pitch P (mm)	0,50	0,75	1,00	1,25	1,50	1,75	2,00	2,50	3,00	3,50	4,00	4,50	5,00
depth h1	.011	.016	.021	.027	.032	.037	.043	.053	.064	.075	.085	.096	.107
number of passes	4	4	5	6	6	8	8	10	11	12	14	15	16
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	.004/-	.006/-	.007/-	.008/-	.009/-	.008/-	.01/-	.01/-	.01/-	.011/-	.01/-	.011/-	.011/-
2	.003/.002	.004/.002	.005/.003	.005/.003	.006/.004	.007/.004	.007/.004	.008/.005	.01/.006	.011/.006	.011/.007	.012/.007	.013/.008
3	.002/.001	.003/.002	.004/.002	.004/.002	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004	.008/.005	.009/.005	.009/.005	.01/.006
4	.002/.001	.003/.001	.003/.002	.004/.002	.004/.002	.004/.002	.005/.003	.005/.003	.006/.004	.007/.004	.007/.004	.008/.005	.009/.005
5			.003/.002	.003/.002	.037/.002	.004/.002	.004/.002	.005/.003	.005/.003	.006/.004	.006/.004	.007/.004	.008/.004
6				.003/.002	.003/.002	.003/.002	.004/.002	.004/.002	.005/.003	.006/.003	.006/.003	.006/.004	.007/.004
7						.003/.002	.004/.002	.004/.002	.005/.003	.005/.003	.005/.003	.006/.003	.006/.004
8						.003/.002	.003/.002	.004/.002	.004/.002	.005/.003	.005/.003	.005/.003	.006/.003
9								.003/.002	.004/.002	.004/.003	.005/.003	.005/.003	.005/.003
10								.003/.002	.004/.002	.004/.002	.004/.003	.005/.003	.005/.003
11									.004/.002	.004/.002	.004/.002	.005/.003	.005/.003
12										.004/.002	.004/.002	.005/.003	.005/.003
13											.004/.002	.004/.002	.005/.003
14											.004/.002	.004/.002	.004/.003
15												.004/.002	.004/.002
16													.004/.002

UN Thread, External Thread Cutting

TPI	24	20	18	16	14	12	11	10	9	8	7	6	5
depth	.026	.031	.034	.038	.044	.051	.056	.061	.068	.077	.088	.102	.123
number of passes	5	6	6	7	9	9	10	11	12	13	14	15	16
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	.008/-	.008/-	.009/-	.009/-	.008/-	.009/-	.009/-	.008/-	.008/-	.008/-	.008/-	.009/-	.009/-
2	.006/.003	.006/.004	.007/.004	.007/.004	.007/.004	.009/.005	.009/.005	.009/.005	.01/.006	.011/.006	.012/.007	.014/.008	.016/.009
3	.004/.003	.005/.003	.005/.003	.006/.003	.006/.003	.007/.004	.007/.004	.007/.004	.008/.004	.008/.005	.009/.005	.01/.006	.012/.007
4	.004/.002	.004/.002	.005/.003	.005/.003	.005/.003	.006/.003	.006/.003	.006/.004	.006/.004	.007/.004	.008/.004	.009/.005	.01/.006
5	.003/.002	.004/.002	.004/.002	.004/.002	.004/.002	.005/.003	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004	.008/.004	.009/.005
6		.003/.002	.004/.002	.004/.002	.004/.002	.004/.003	.005/.003	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004	.008/.005
7				.004/.002	.004/.002	.004/.002	.004/.002	.004/.003	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004
8					.003/.002	.004/.002	.004/.002	.004/.002	.004/.003	.005/.003	.005/.003	.006/.003	.007/.004
9					.003/.002	.004/.002	.004/.002	.004/.002	.004/.002	.004/.003	.005/.003	.006/.003	.006/.004
10							.004/.002	.004/.002	.004/.002	.004/.002	.005/.003	.005/.003	.006/.004
11								.004/.002	.004/.002	.004/.002	.004/.003	.005/.003	.006/.003
12									.004/.002	.004/.002	.004/.002	.005/.003	.006/.003
13										.004/.002	.004/.002	.005/.003	.005/.003
14											.004/.002	.004/.003	.005/.003
15												.004/.002	.005/.003
16													.005/.003

UN Thread, Internal Thread Cutting

TPI	24	20	18	16	14	12	11	10	9	8	7	6	5
depth	.023	.027	.030	.034	.039	.045	.049	.054	.060	0.68	.077	.090	.108
number of passes	5	6	6	7	8	9	9	10	11	12	13	14	15
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	.008/-	.008/-	.009/-	.009/-	.009/-	.009/-	.01/-	.01/-	.01/-	.01/-	.01/-	.011/-	.012/-
2	.005/.003	.009/.003	.006/.004	.006/.004	.007/.004	.007/.004	.008/.005	.009/.005	.009/.005	.01/.006	.011/.006	.012/.007	.014/.008
3	.004/.002	.004/.002	.005/.003	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004	.007/.004	.007/.004	.008/.005	.009/.005	.011/.006
4	.003/.002	.004/.002	.004/.002	.004/.002	.004/.003	.005/.003	.005/.003	.006/.003	.006/.003	.006/.004	.007/.004	.008/.004	.009/.005
5	.003/.002	.003/.002	.003/.002	.004/.002	.004/.002	.004/.002	.005/.003	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004	.008/.005
6			.003/.002	.003/.002	.004/.002	.004/.002	.004/.002	.004/.003	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004
7				.003/.002	.003/.002	.004/.002	.004/.002	.004/.002	.004/.002	.005/.003	.005/.003	.006/.003	.007/.004
8					.003/.002	.003/.002	.004/.002	.004/.002	.004/.002	.004/.002	.005/.003	.005/.003	.006/.004
9						.003/.002	.003/.002	.004/.002	.004/0.002	.004/.002	.004/.003	.005/.003	.006/.003
10								.003/.002	.004/.002	.004/.002	.004/.002	.005/.003	.005/.003
11									.003/.002	.004/.002	.004/.002	.004/.003	.005/.003
12										.003/.002	.004/.002	.004/.002	.005/.003
13											.004/.002	.004/.002	.005/.003
14												.004/.002	.005/.003
15													.004/.003

NPT Thread, External, and Internal Machining

pitch, Gg/Z	27.0	18.0	14.0	11.5	8.0
depth	.003	.044	.057	.070	.100
number of passes	6	8	10	12	14
	values for flank infeed (X/Z)				
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z
1	.007/-	.009/-	.009/-	.009/-	.01/-
2	.006/.003	.007/.004	.008/.005	.008/.005	.01/.006
3	.005/.003	.006/.003	.007/.004	.007/.004	.01/.006
4	.004/.002	.006/.003	.006/.003	.007/.004	.009/.005
5	.004/.002	.005/.003	.006/.003	.006/.004	.008/.005
6	.003/.002	.005/.003	.005/.003	.006/.003	.008/.004
7		.004/.002	.005/.003	.005/.003	.007/.004
8		.003/.002	.004/.002	.005/.003	.007/.004
9			.004/.002	.005/.003	.007/.004
10			.004/.002	.004/.002	.006/.004
11				.004/.002	.006/.003
12				.004/.002	.005/.003
13					.004/.002
14					.004/.002

BSPT Thread, External, and Internal Machining

pitch, Gg/Z	28	19	14	11
depth	.023	.034	.046	BSPT thread
number of passes	5	6	8	10
	values for flank infeed (X/Z)			
order of passes	X/Z	X/Z	X/Z	X/Z
1	.007/-	.009/-	.009/-	.008/-
2	.005/.003	.007/.004	.008/.004	.01/.005
3	.004/.002	.005/.003	.006/.003	.007/.004
4	.003/.002	.005/.002	.005/.003	.006/.003
5	.003/.002	.004/.002	.005/.002	.005/.003
6		.004/.002	.004/.002	.005/.003
7			.004/.002	.005/.002
8			.004/.002	.004/.002
9				.004/.002
10				.004/.002

Trapezoid Thread to DIN 103, External, and Internal Machining

pitch	1.5	2.0	3.0	4.0	5.0
depth	.004	.049	.069	.089	.108
number of passes	6	8	10	12	14
	values for flank infeed (X/Z)				
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z
1	.009/-	.01/-	.01/-	.01/-	.011/-
2	.007/.002	.009/.002	.01/.003	.011/.003	.012/.003
3	.005/.001	.007/.002	.009/.002	.01/.003	.011/.003
4	.005/.001	.006/.002	.008/.002	.009/.002	.01/.003
5	.004/.001	.005/.001	.007/.002	.008/.002	.009/.002
6	.004/.001	.004/.001	.006/.002	.007/.002	.008/.002
7		.004/.001	.006/.002	.007/.002	.008/.002
8		.004/.001	.004/.001	.006/.002	.007/.002
9			.005/.001	.006/.002	.007/.002
10			.004/.001	.005/.001	.006/.002
11				.005/.001	.006/.001
12				.004/.001	.005/.001
13					.005/.001
14					.004/.001

Round Thread to DIN 405, External, and Internal Machining

pitch, Gg/Z	10	8	6
depth	.052	.064	.085
number of passes	8	10	12
	values for flank infeed (X/Z)		
order of passes	X/Z	X/Z	X/Z
1	.008/-	.009/-	.008/-
2	.008/.002	.008/.002	.01/.003
3	.008/.002	.008/.002	.001/.003
4	.007/.002	.007/.002	.009/.002
5	.006/.002	.007/.002	.008/.002
6	.006/.001	.006/.002	.008/.021
7	.005/.001	.006/.002	.007/.002
8	.004/.001	.005/.001	.006/.002
9		.004/.001	.006/.001
10		.006/.001	.005/.001
11			.004/.001
12			.003/.001

Whitworth, External, and Internal Thread Cutting

pitch, TPI	28	20	19	16	14	12	11	10	9	8	7	6	5
depth	.023	.032	.032	.034	.040	.053	.058	.064	.071	.080	.091	.107	0.128
number of passes	5	6	6	8	8	9	9	10	11	12	14	15	16
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	.007/-	.008/-	.009/-	.008/-	.009/-	.009/-	.01/-	.009/-	.009/-	.01/-	.008/-	.008/-	.008/-
2	.005/.003	.007/.004	.007/-	.007/.004	.008/.004	.009/.005	.01/5.236	.01/.005	.011/.006	.012/.006	.013/.007	.014/.007	.017/.009
3	.004/.002	.005/.003	.005/.003	.006/.003	.006/.003	.007/.004	.008/.004	.008/.004	.009/.004	.009/.005	.01/.005	.011/.006	.013/.007
4	.003/.002	.004/.002	.005/.002	.005/.002	.005/.003	.006/.003	.006/.003	.007/.004	.007/.004	.008/.004	.008/.004	.009/.005	.011/.006
5	.003/.002	.004/.002	.004/.002	.006/.002	.005/.002	.005/.003	.006/.003	.006/.003	.006/.003	.007/.004	.007/.004	.008/.004	.009/.005
6		.004/.002	.004/.002	.004/.002	.004/.002	.005/.002	.005/.003	.005/.003	.006/.003	.006/.003	.007/.003	.007/.004	.009/.004
7				.003/.002	.004/.002	.004/.002	.005/.002	.005/.003	.005/.003	.006/.003	.006/.003	.007/.004	.008/.004
8				.003/.002	.004/.002	.004/.002	.004/.002	.005/.002	.005/0	.005/.003	.006/.003	.006/.003	.007/.004
9						.038/.002	.004/.002	.004/.002	.005/.002	.005/.003	.005/.003	.006/.003	.007/.004
10								.004/.002	.004/.002	.005/.002	.005/.003	.005/.003	.006/.003
11									.004/.002	.004/.002	.005/.002	.005/.003	.006/.003
12										.004/.002	.004/.002	.005/.003	.006/.003
13											.004/.002	.005/.003	.006/.003
14											.004/.002	.005/.002	.005/.003
15												.005/.002	.005/.003
16													.005/.003

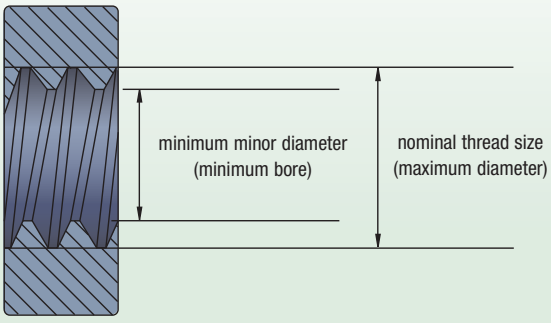
Multi-Tooth Threads, Internal

	ISO metric						ISO UN					Whitworth	NPT		
type	3M	2M	3M	2M	3M	2M	2M	3M	2M	3M	2M	2M	2M	3M	2M
pitch (mm)	1.0	1.5	1.5	2.0	2.0	3.0	—	—	—	—	—	—	—	—	—
TPI	—	—	—	—	—	—	16	16	12	12	8	11	11.5	11.5	8
total depth	.024	.033	.033	.460	.460	.070	.037	.037	.490	.490	.740	.620	.690	.690	.100
1	.013	.015	.020	.020	.028	.022	.017	.022	.022	.030	.023	.029	.023	.032	.035
2	.011	.010	.013	.015	.018	.019	.012	.015	.016	.019	.020	.019	.020	.022	.025
3	—	.008	—	.011	—	.017	.008	—	.011	—	.017	.014	.014	.015	.022
4	—	—	—	—	—	.012	—	—	—	—	.014	—	.012	—	.018

Recommendations for Steel Workpieces (<300 BHN)

			total depth — on radius		
catalog number	insert size	TPI profile	1st pass	2nd pass	3rd pass
NTC-8R/L8EM	8	8 UN	.048	.064	.079
NTC-8R/L8IM	8	8 UN	.047	.061	.074
NTC-8R/L10EM	8	10 UN	.036	.050	.063
NTC-8R/L10IM	8	10 UN	.035	.048	.060
NTC-8R/L12EM	8	12 UN	.030	.041	.052
NTC-8R/L12IM	8	12 UN	.030	.037	.047
NTC-8R/L14EM	8	14 UN	.027	.037	.044
NTC-8R/L14IM	8	14 UN	.024	.031	.041
NTC-8R/L16EM	8	16 UN	.023	.032	.038
NTC-8R/L16IM	8	16 UN	.020	.027	.037
NTC-8R/L18EM	8	18 UN	.019	.026	.034
NTC-8R/L18IM	8	18 UN	.019	.024	.033
NDC-68RDR/L-75M	8	8 round	.058	.065	.073
NDC-61RDR/L-75M	8	10 round	.044	.051	.057
NDC-88RDRD/L-75M	8	8 round	.051	.069	.073
NDC-88VR/L-75M	8	8 NPT	.040	.068	.096
NDC-8115VR/L-75M	8	11.5 NPT	.038	.054	.067
NDN-814VR/L-75M	8	14 NPT	.038	.048	.054

The following charts list the largest thread pitch that can be applied on internal applications using TopThread threading inserts for 60° V-threading and Acme threading.



Inch-Sized 60° V-Threading Limits

internal threading limitations
NT-1, NT-2 V-threading inserts

TPI	nominal thread size		minimum minor diameter (inch)	
	NT-1	NT-2	NT-1	NT-2
6	1-7/8	—	1.695	—
7	1-3/4	—	1.595	—
8	1-5/8	—	1.490	—
9	1-9/16	—	1.442	—
10	1-1/2	15/16	1.392	.830
11	1-7/16	15/16	1.339	.830
11-1/2	1-3/8	15/16	1.281	.830
12	1-3/8	9/16	1.285	.472
13	1-5/16	9/16	1.229	.472
14	1-1/4	9/16	1.173	.472
16	1-1/4	9/16	1.182	.472
18	1-1/8	9/16	1.065	.472
20	1-1/8	1/2	1.071	.440
24*	1-1/16	1/2	1.017	.440

*Twenty-four threads per inch and finer can be cut with an NT-2 insert provided the minor diameter is 1.000" or larger (.440" or larger with NT-1).

internal threading limitations
NT-3 and- 4 V-threading inserts

TPI	nominal thread size	minimum minor diameter (inch)
4**	3	2.729
4-1/2**	2-7/8	2.634
5	2-3/4	2.534
6	2-1/2	2.320
7	2-1/4	2.095
8	2	1.865
9	1-15/16	1.817
10	1-7/8	1.767
11	1-13/16	1.714
11-1/2	1-3/4	1.656
12	1-3/4	1.660
13	1-5/8	1.542
14	1-9/16	1.485
16*	1-7/16	1.370

*Sixteen threads per inch and finer can be cut provided minor diameter is 1.370" or larger.
**NT-4 insert only.

Metric-sized 60° V-Threading Limits

internal threading limitations
NT-1, NT-2 60° V-threading inserts

TPI	nominal thread size		minimum thread diameter (mm)	
	NT-1	NT-2	NT-1	NT-2
4,00	M48 x 4.00	—	43,67	—
3,00	M42 x 3.00	—	38,75	—
2,50	M39 x 2.50	M24 x 2,50	36,29	21,29
2,00	M33 x 2.00	M15 x 2,00	30,84	12,84
1,75	M32 x 1.75	M15 x 1,75	30,11	13,11
1,50	M32 x 1.50	M15 x 1,50	30,38	13,38
1,25	M29 x 1.29	M14 x 1,25	27,65	12,65
1,00*	M27 x 1.00	M14 x 1,00	25,92	12,92
0,75	M22 x 0.75	M12 x 0,75	21,19	11,19

*Thread pitch of 1mm and less can be cut with an NT-2 insert provided the core thread diameter is 25mm or larger (11mm or larger with NT-1).

internal threading limitations
NT-3 and NT-4 60° V-threading inserts

TP	nominal thread size	minimum thread diameter (mm)
6,00**	M76 x 6.00	69,50
5,50**	M73 x 5.50	67,05
5,00	M70 x 5.00	64,59
4,00	M64 x 4.00	59,67
3,00	M52 x 3.00	48,75
2,50	M48 x 2.50	45,29
2,00	M42 x 2.00	39,84
1,75	M40 x 1.75	38,11
1,50*	M38 x 1.50	36,38

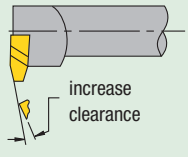
*Thread pitch of 1,5mm and less can be cut provided core thread diameter is 35mm or larger.
**NT-4-insert only.

Acme Threading Limits

internal threading limitations
NA and NAS-2, -3, -4, and -6 Acme threading inserts

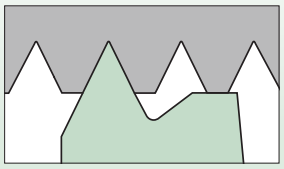
TPI	nominal thread size	minimum thread diameter	
		NT-1	NT-2
2**	5	4.500	114.3
2-1/2**	4-1/2	4.100	104.1
3**	4	3.665	93.1
4	3-1/2	3.250	82.6
5	3	2.800	71.1
6	2-1/2	2.333	59.3
8	2-1/4	2.125	54.0
10	2	1.900	48.3
12	1-3/4	1.667	42.4
14	1-5/8	1.554	39.5
16*	1-1/2	1.438	36.5

*Sixteen threads per inch and finer can be cut provided minor diameter is 36,5mm (1.438") or larger.
**NA-6 insert only.



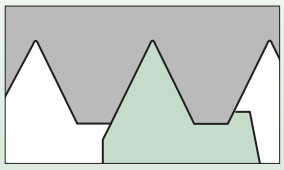
Additional secondary clearance can be ground on leading edge of insert to provide sufficient helical clearance for machining coarser threads and multiple start threads. Modified standard inserts may be furnished for machining threads outside of the limits shown.

60° V-Thread Crest Turning Application Data



feed direction

NTC crest turning insert for 12 threads per inch and finer (P ≤ 2mm)



feed direction

NTC crest turning insert for 11 threads per inch and coarser (P ≥ 3mm)

NOTE: NTC inserts automatically control root to crest dimensions. Therefore, in setting up threading operations with NTC inserts, check the O.D. or I.D. at the thread crest for correct dimensions.

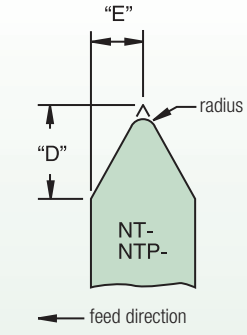
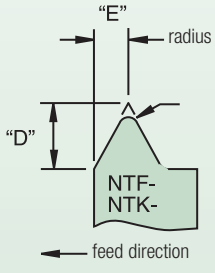
60° V-Thread Crest Turning Application Data

insert catalog number	nose radius on insert (inch)	thread radius per MIL-S-8879A (inch)
NJ-3014R/L12 NJK-3008R/L20	.0125/.0135 .0075/.0085	.0125/.0150 .0075/.0090

"J" thread note for catalog

The controlled root radius thread form (SAE8879C) is defined for the external thread only. To machine the corresponding internal thread, choose any insert that will cut a unified class 2B thread, then bore the minor diameter to size. Refer to SAE8879C and MIL-S-8879C and SAEAS8879D for the correct "J" thread minor diameter values.

60° V-Thread Application Data

insert description	insert	D** (inch)	E** (inch)	recommended TPI		recommended TP	
				external	internal	external	internal
	NT-1	.075	.044	—	24–12	—	1,00–2,00
	NT-2	.113	.075	36–8	20–7	0,70–3,00	1,25–3,50
	NT-2-K	.113	.075	36–8	20–7	0,70–3,00	1,25–3,50
	NTF-2	.062	.040	44–14	24–12	0,60–1,75	1,00–2,00
	NTK-2	.062	.040	44–14	24–12	0,60–1,75	1,00–2,00
	NTP-2	.113	.075	36–8	20–7	0,70–3,00	1,25–3,50
	NT-3	.148	.097	20–6	12–5	1,25–4,00	2,00–5,00
	NT-3-K	.148	.097	20–6	12–5	1,25–4,00	2,00–5,00
	NT-3-C	.148	.097	11–6	6 (only)	2,50–4,00	4,00 (only)
	NT-3-CK	.148	.097	11–6	6 (only)	2,50–4,00	4,00 (only)
	NTF-3	.083	.054	44–10	24–9	0,60–2,50	1,00–2,50
	NTK-3	.083	.054	44–10	24–9	0,60–2,50	1,00–2,50
	NTP-3	.148	.097	20–6	12–5	1,25–4,00	2,00–5,00
	NT-4	.196	.127	20–4	12–4	1,25–6,25	2,00–6,25
	NT-4-K	.196	.127	20–4	12–4	1,25–6,25	2,00–6,25
	NTP-4	.196	.127	20–4	12–4	1,25–6,25	2,00–6,25

**Based on maximum insert radius size and class 2A and 2B thread specifications.*
***For metric D and E dimensions, multiply by 25,4.*

API Thread Forms • Insert Applications Chart for API Rotary Shouldered Connections

thread form	WIDIA™ insert		tool joint application	minimum box size*
	cresting	non-cresting		
V-.038R 2" TPF 4 TPI	NDC-4038R/L2 4-E/IR4API382	ND-3038R/L	2-3/8 API internal flush 2-7/8 API internal flush 3-1/2 API internal flush 4 API internal flush 4-1/2 API internal flush 5-1/2 API internal flush 6-5/8 API internal flush 4 API full hole API #23, API #26, API #31, API #35, API #38, API #40, API #44, API #46, API #50	API #31 2-7/8 IF
V-.038R 3" TPF 4 TPI	NDC-4038R/L3 4-E/IR4API383	ND-3038R/L	API #56 API #61 API #70 API #77	API #56
V-.050 2" TPF 4 TPI	NDC-4050R/L2 4-E/IRAPI502	ND-4050R/L	5-1/2 API full hole 6-5/8 API regular 6-5/8 API full hole	5-1/2 API full hole
V-.050 3" TPF 4 TPI	NDC-4050R/L3 4-E/IR4API503	ND-4050R/L	5-1/2 API regular 7-5/8 API regular 8-5/8 API regular	5-1/2 API regular
V-.040 3" TPF 5 TPI	NDC-3040R/L3 NDC-4040R/L3 4-E/IR5API403	ND-3040R/L ND-4040R/L	2-3/8 API regular 2-7/8 API regular 3-1/2 API regular 4-1/2 API regular	3-1/2 API regular

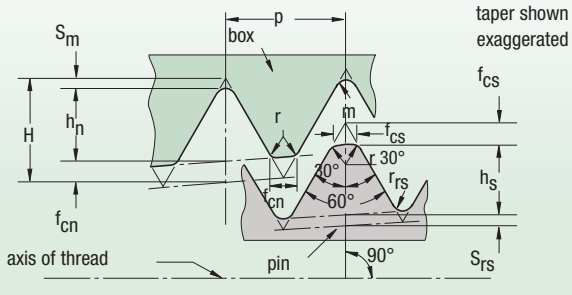
*Minimum box size that can be threaded with a standard TopThread insert due to minimum bore equipment.

API Thread Forms
Product Thread Dimensions • Rotary Shouldered Connections (Inch)

threadform	taper inch per ft.	thread height, not truncated H	thread height, truncated $h_n=h_s$	root truncation $S_m=S_{rs}$ $f_m=f_{rs}$	crest truncation $f_{cn}=f_{cs}$	width of flat		root radius $r_m=r_{rs}$	radius at thread corners r	pitch p
						crest $f_{cn}=f_{cs}$	crest $f_m=f_{rs}$			
V-.038R	2	.216005	.121844	.038000	.056161	.065	—	.038	.015	.250
V-.038R	3	.215379	.121381	.038000	.055998	.065	—	.038	.015	
V-.040	3	.172303	.117842	.020000	.034461	.040	—	.020	.015	.250
V-.050	3	.215379	.147303	.025000	.043076	.050	—	.025	.015	
V-.050	2	.216005	.147804	.025000	.043201	.050	—	.025	.015	.250

NOTE: All dimensions in inches.

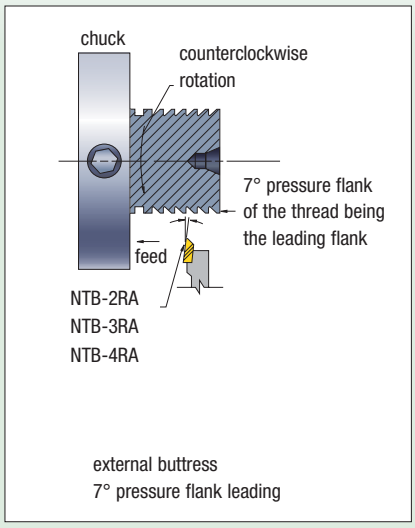
V-.040 and V-.050 Product Thread Form

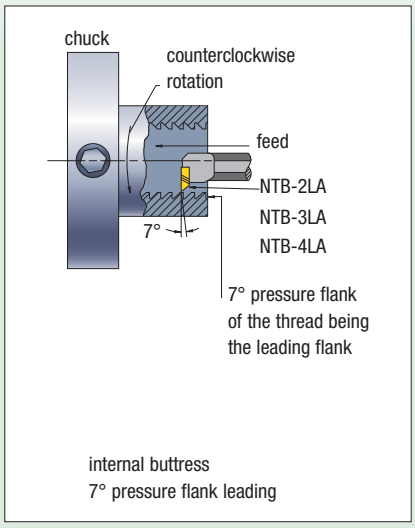


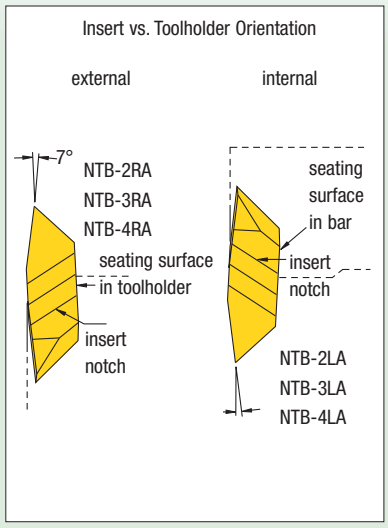
Casing and Tubing Round Thread
(Height Dimensions)

thread element		10 TPI p=.1000	8 TPI p=.1250
H	=.866p	.08660	.10825
$H_s = h_n$	=.626p-.007	.05560	.07125
$S_{rs} = S_m$	=.120p+.002	.01400	.01700
$S_{cs} = S_{cn}$	=.120p+.005	.01700	.02000

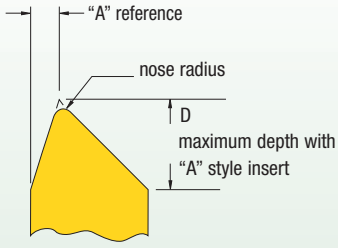
American Buttress (7° Pressure Flank Leading) NTB-A Inserts • Push Type







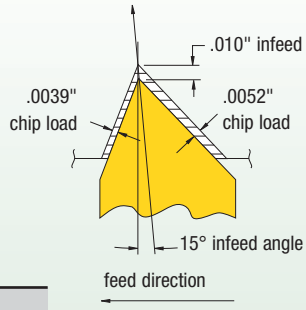
Reference Dimensions

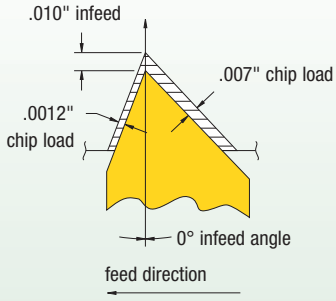


insert	D (inch)	"A" ref. (inch)	nose radius (inch)	pitch based on maximum radius
NTB-2A	.133	.024	.002–.004	16–20 TPI
NTB-3A	.171	.031	.005–.008	8–16 TPI
NTB-4A	.218	.049	.008–.012	4–6 TPI

NOTE: For balanced chip load, 15° infeed angle is suggested.

Infeed Angle vs. Chip Load: 7° Pressure Flank Leading





NTB-A insert

Internal Threading Limitations

internal threading limitations
NTB-2A Buttress threading inserts

TPI	nominal thread size	minimum minor diameter (inch)
8	1-3/4	1.600
10	1-5/8	1.505
12	1-1/2	1.400
16	1-1/4	1.175
20	1-1/16	1.002

internal threading limitations
NTB-3 and NTB-4A Buttress threading inserts

TPI	nominal thread size	minimum minor diameter (inch)
4*	2-1/2	2.200
5	2-1/4	2.010
6	2	1.800
8	1-3/4	1.600
10	1-5/8	1.505
12**	1-1/2	1.400

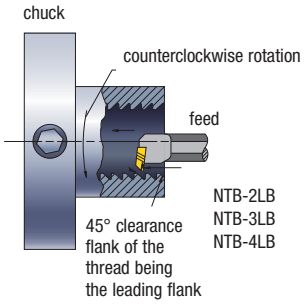
*NTB-4A insert only.
**Can cut 16 or 20 threads per inch provided minor diameter is 1.375" or larger.

Threads per Inch vs. Maximum Root Radius Chart (Inch)

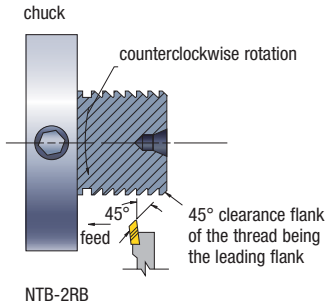
TPI	20	16	12	10	8	6	5	4	3	2-1/2	2	1-1/2	1-1/4	1
maximum root radius	0036	.0045	.0059	.0071	.0089	.0119	.0143	.0179	.0238	.0286	.0375	.0476	.0572	.0714

NOTE: Special Buttress forms are available upon request.

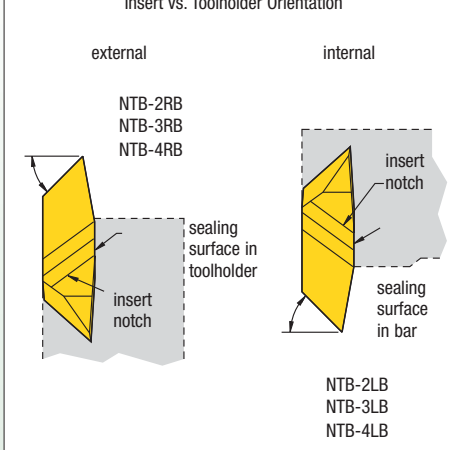
American Buttress (45° Clearance Flank Leading): NTB-B Inserts • PULL-type



Internal Buttress
45° clearance flank leading

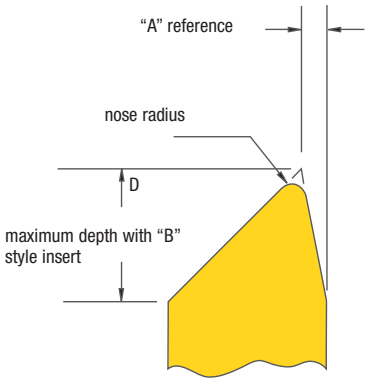


External Buttress
45° clearance flank leading

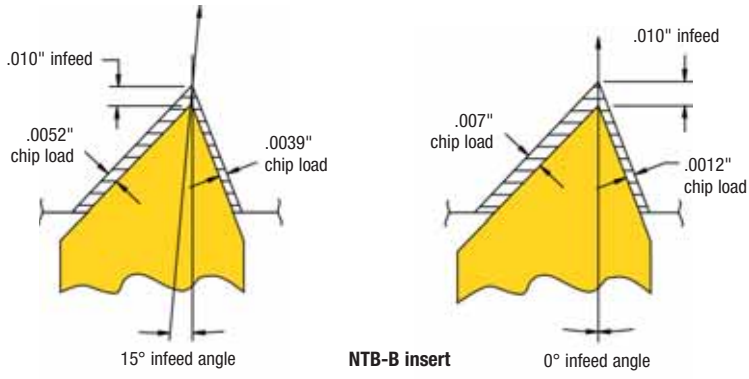


45° clearance flank leading

Reference Dimensions



Infeed Angle vs. Chip Load: 45° Clearance Flank Leading



insert	D (inch)	"A" reference (inch)	nose radius (inch)	pitch based on maximum radius
NTB-3B	.171	.031	.005–.004	8–16 TPI

NOTE: For balanced chip load, a reverse 15° infeed angle is suggested.

Internal Threading Limitations

internal threading limitations NTB-2B Buttress threading inserts		
TPI	**nominal thread size**	**minimum minor diameter (inch)**
8	1-3/4	1.600
10	1-5/8	1.505
12	1-1/2	1.400
16	1-1/4	1.175
20	1-1/16	1.002

internal threading limitations NTB-3 and NTB-4B Buttress threading inserts		
TPI	**nominal thread size**	**minimum minor diameter (inch)**
4*	2-7/8	2.575
5	2-3/4	2.510
6	2-3/8	2.175
8	2-1/8	1.975
10	1-7/8	1.755
12	1-5/8	1.525
16	1-1/2	1.407
20	1-7/16	1.378

*NTB-4B insert only.

WIN WITH WIDIA™

TopThread™ System

A superior choice for heavy-duty applications like machining Acme, Buttress, and API threads. The WIDIA™ TopThread system is the best solution for coarse pitch and multi-tooth threading applications. With unmatched tooling technology, you can trust WIDIA TopThread tools for all of your threading and grooving needs.

- Largest selection of insert geometries and grades in the industry.
- Rigid insert clamping design ensures the best tool life, surface finish, and workpiece quality.
- Minimizes built-up edges, reduces cutting forces, and precisely cuts most common materials.
- Ensures accurate, high-quality threads. Excellent for internal threading operations.

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

WIDIA™

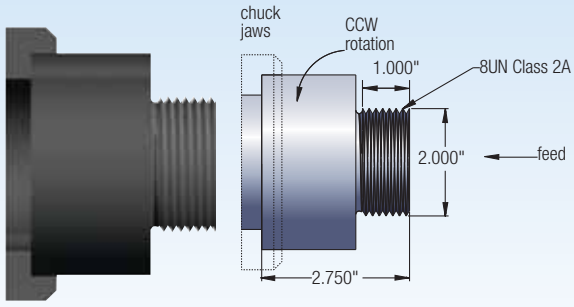
Required Information

From Part Drawing:

material: 316SS, 200 HB
thread form: 8UN Class 2A
operation: external threading
pitch diameter: 2.00" x 1.00" deep

From Machine Set-Up Data:

tooling: .750" x .750"
spindle rotation: counterclockwise
feed: toward chuck

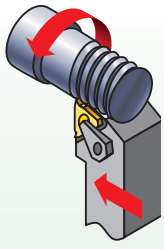


Steps for a Successful Threading Operation

Step 1 • Determine Threading Method

Need to Know:

- Operation (external).
- Spindle rotation (CCW).
  Counterclockwise rotation.
- Feed direction (toward chuck).
- Right-hand toolholder.
- Right-hand insert (ER).
- Standard helix method.



Step 2 • Select Insert

Need to Know:

- Thread form (8 UN Class 2A).
- Hand of insert (right hand — ER).

Choose the High-Performance Solution

catalog number	insert size	TN6025
3ER8UN	3"	●

High-Performance Selection

NOTE: Use insert with largest IC available.

insert: 3ER8UN
grade: TN6025
speed: 500 SFM

Step 3 • Select the Grade and Speed

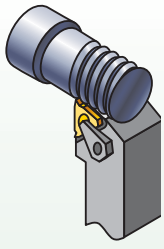
Need to Know:

- Workpiece material (316SS-200HB).
- Operation (external).

Options: Grade and Speed Selection Guidelines

threading operation	stainless steel
external	general purpose and high performance
	TN6025
	150–450 SFM

Step 4 • Select Toolholder



Need to Know:

- External or internal operation (external).
- Pitch diameter to determine minimum bore diameter (N/A).
- Type of tooling — toolholder, boring bar (toolholder).
- Hand of tool (right hand).
- Insert size (3/8").

Options:

catalog number	insert size	shim
LSASR-123	3"	SM-YE3

First choice: LSASR-123 holder

Step 5• Select Shim

Need to Know:

- Thread form — TPI or pitch (8 TPI).
- Pitch diameter (2").
- Helix method (standard).
  See Laydown Threading (LT) shim selection chart.

Select SM-YE3 shim

NOTE: The SM-YE3 shim is supplied with the selected toolholder.

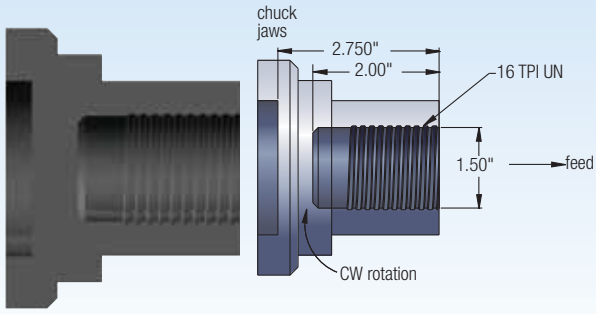
Required Information

From Part Drawing:

material: 4140 steel
thread form: 16 TPI UN
operation: internal threading
pitch diameter: 1.5" x 2" deep

From Machine Set-Up Data:

tooling: .075" boring bar
spindle rotation: clockwise
feed: away from chuck

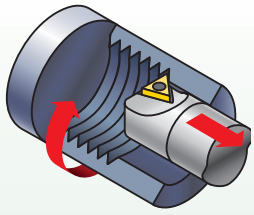


Steps for a Successful Threading Operation

Step 1 • Determine Threading Method

Need to Know:

- Operation (internal).
- Spindle rotation (CW).
  Clockwise rotation.
- Feed direction (away from chuck).
- Left-hand toolholder.
- Left-hand insert (NL).
- Reverse helix method.



Step 2 • Select Insert

Need to Know:

- Thread form (16UN Class 2A).
- Hand of insert (left hand — NL).

Choose the High-Performance Solution

catalog number	insert size	TN6025
2ILA60	2"	●
3ILA60	3"	●

High-Performance Selection

NOTE: Use insert with largest possible IC to go into the bore.

insert: 3ILA60
grade: TN6025
speed: 450 SFM

Step 3 • Select the Grade and Speed

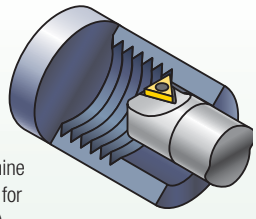
Need to Know:

- Workpiece material (4010 steel).
- Operation (internal).

Options: Grade and Speed Selection Guidelines

threading operation	steel
internal	general purpose and high performance
	TN6025
	100–550 SFM

Step 4 • Select Toolholder



Need to Know:

- External or internal operation (internal).
- Pitch diameter to determine minimum bore diameter for internal operations (1.5").
- Type of tooling — toolholder, boring bar (boring bar).
- Hand of tool (left hand).
- Insert size (3/8").

Options:

catalog number	insert size	minimum bore diameter	shim
S1212-LSEL3	3"	.90	SM-YE3
S0812-LSEL2	2"	.65	—

First choice: S1212-LSEL3 bar

Step 5 • Select Shim

Need to Know:

- Thread form — TPI or pitch (16 TPI).
- Pitch diameter (1.5").
- Helix method (reverse).
  See Laydown Threading (LT) shim selection chart.

Select SM-YE3-2N shim

NOTE: For this application, the standard shim supplied should be replaced with the recommended shim, SM-YE3-2N.

Laydown Threading Shim Selection Guidelines

The following questions must be answered before a successful threading operation can begin:

A — Select your method of thread cutting:
- machining toward the chuck (standard helix)
- machining away from the chuck (reverse helix)

B — Select lead angle and choose shim.

C — Select insert and toolholder size.

D — Select insert grade.

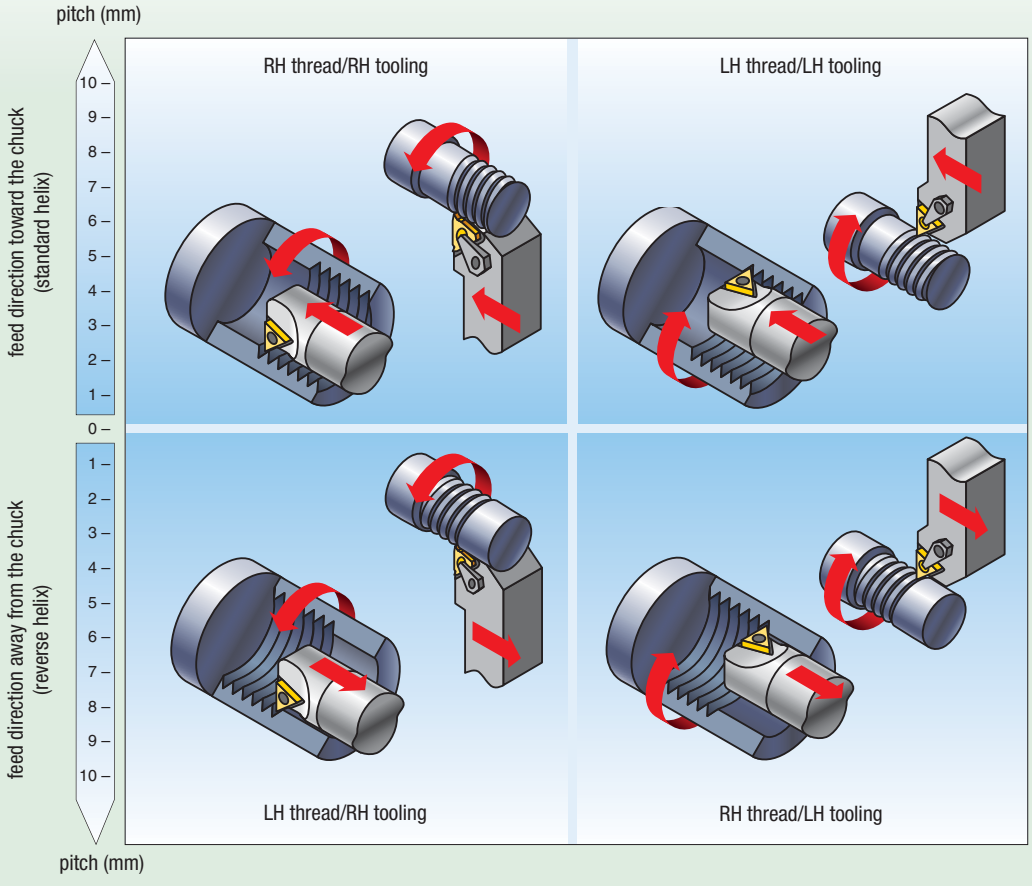
E — Select speed.

F — Select number of thread passes.

G — Select infeed method.

NOTE: When considering method of thread cutting, the part's shape and stability and the flow of chips are determining factors in your decision.

Laydown Selection Chart



NOTE: For multi-start threads, use the lead value instead of the pitch.

Diagram of Thread Lead Angles

To calculate the lead angle of a given thread, use this formula:

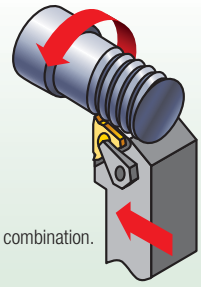
$$\beta = \text{Arctan} \frac{P \bullet S}{\pi D_e}$$

ß = thread lead angle
De = effective pitch diameter of thread wear
P = 1/TPI
TPI = threads per inch
S = number of starts
single-start, lead = pitch
multiple-start, lead = pitch (x) number of starts

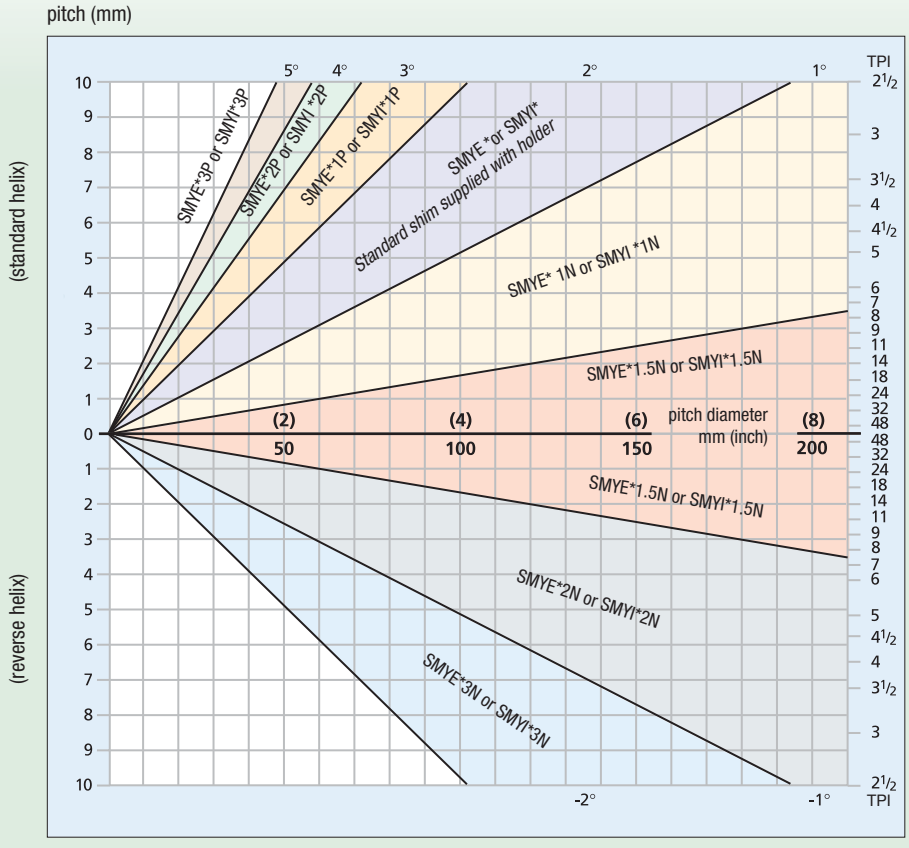
NOTE: Arctan equals Tan^{-1} (see chart below for approximate lead angles).

All toolholders are designed with an inclination angle = 1.5°. When turning standard threads with a lead angle of 1–2°, this guarantees adequate clearance at the flanks of the insert's thread tooth. The thread lead angle and the required inclination angle of the insert are given by ß.

Cutting edge height is constant at every shim and insert combination. All toolholders are supplied with 1-1/2° lead angle.

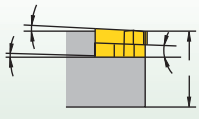


Laydown Selection Chart

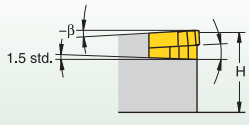


*denotes shim size: 3 = insert size 16 (3/8" D)
4 = insert size 22 (1/2" D)

standard helix method:
Used when RH thread is cut with RH tool or LH thread with LH tool.



reverse helix method:
Used when RH thread is cut with LH tool or when LH thread is cut with RH tool.



Laydown Threading Shim Selection Table • Inch

	toolholder		shim ordering code (inch)							
insert size	external	internal				standard				
3 (3/8")	RH	LH	SM–YE3–3P	SM–YE3–2P	SM–YE3–1P	SM–YE3	SM–YE3–1N	SM–YE3–1.5N	SM–YE3–2N	SM–YE3–3N
3 (3/8")	LH	RH	SM–YI3–3P	SM–YI3–2P	SM–YI3–1P	SM–YI3	SM–YI3–1N	SM–YI3–1.5N	SM–YI3–2N	SM–YI3–3N
4 (1/2")	RH	LH	SM–YE4–3P	SM–YE4–2P	SM–YE4–1P	SM–YE4	SM–YE4–1N	SM–YE4–1.5N	SM–YE4–2N	SM–YE4–3N
4 (1/2")	LH	RH	SM–YI4–3P	SM–YI4–2P	SM–YI4–1P	SM–YI4	SM–YI4–1N	SM–YI4–1.5N	SM–YI4–2N	SM–YI4–3N
TPI		pitch (mm)	pitch diameter (inch)							
72		–	–	–	–	0.12–0.31	0.32–0.84	>0.84	0.84–0.32	0.31–0.12
–		0,35	–	–	–	0.12–0.3	0.31–0.84	>0.84	0.84–0.31	0.3–0.12
64		–	–	–	–	0.14–0.35	0.36–0.95	>0.95	0.95–0.36	0.35–0.14
–		0,40	–	–	–	0.14–0.35	0.36–0.96	>0.96	0.96–0.36	0.35–0.14
56		0,45	–	–	–	0.16–0.4	0.41–1.09	>1.09	1.09–0.41	0.4–0.16
–		0,50	–	–	0.11–0.16	0.17–0.44	0.45–1.2	>1.20	1.2–0.45	0.44–0.17
48		–	–	–	0.12–0.17	0.18–0.46	0.47–1.27	>1.27	1.27–0.47	0.46–0.18
44		–	–	–	0.13–0.19	0.2–0.51	0.52–1.38	>1.38	1.38–0.52	0.51–0.2
–		0,60	–	0.1–0.12	0.13–0.2	0.21–0.53	0.54–1.44	>1.44	1.44–0.54	0.53–0.21
40		–	–	0.11–0.13	0.14–0.21	0.22–0.56	0.57–1.52	>1.52	1.52–0.57	0.56–0.22
–		0,70	–	0.12–0.15	0.16–0.23	0.24–0.62	0.63–1.68	>1.68	1.68–0.63	0.62–0.24
36		–	–	0.12–0.15	0.16–0.23	0.24–0.62	0.63–1.69	>1.69	1.69–0.63	0.62–0.24
–		0,75	0.11–0.12	0.13–0.16	0.17–0.25	0.26–0.66	0.67–1.8	>1.80	1.8–0.67	0.66–0.26
32		–	0.12–0.13	0.14–0.17	0.18–0.26	0.27–0.7	0.71–1.9	>1.90	1.9–0.71	0.7–0.27
–		0,80	0.12–0.13	0.14–0.17	0.18–0.26	0.27–0.71	0.72–1.91	>1.91	1.91–0.72	0.71–0.27
28		–	0.14–0.14	0.15–0.19	0.2–0.3	0.31–0.8	0.81–2.17	>2.17	2.17–0.81	0.8–0.31
27		–	0.14–0.15	0.16–0.2	0.21–0.31	0.32–0.83	0.84–2.25	>2.25	2.25–0.84	0.83–0.32
–		1,00	0.15–0.16	0.17–0.21	0.22–0.33	0.34–0.89	0.9–2.39	>2.39	2.39–0.9	0.89–0.34
24		–	0.16–0.17	0.18–0.23	0.24–0.35	0.36–0.94	0.95–2.53	>2.53	2.53–0.95	0.94–0.36
–		1,25	0.19–0.2	0.21–0.27	0.28–0.42	0.43–1.11	1.12–2.99	>2.99	2.99–1.12	1.11–0.43
20		–	0.19–0.21	0.22–0.27	0.28–0.42	0.43–1.13	1.14–3.04	>3.04	3.04–1.14	1.13–0.43
18		–	0.21–0.23	0.24–0.31	0.32–0.47	0.48–1.26	1.277–3.38	>3.38	3.38–1.27	1.26–0.48
–		1,50	0.22–0.25	0.26–0.33	0.34–0.5	0.51–1.34	1.35–3.59	>3.59	3.59–1.35	1.34–0.51
16		–	0.24–0.26	0.27–0.35	0.36–0.53	0.54–1.41	1.42–3.8	>3.80	3.8–1.42	1.41–0.54
–		1,75	0.26–0.29	0.3–0.38	0.39–0.59	0.6–1.56	1.57–4.19	>4.19	4.19–1.57	1.56–0.6
14		–	0.27–0.3	0.31–0.4	0.41–0.61	0.62–1.62	1.63–4.34	>4.34	4.34–1.63	1.62–0.62
13		–	0.29–0.32	0.33–0.43	0.44–0.66	0.67–1.74	1.75–4.68	>4.68	4.68–1.75	1.74–0.67
–		2,00	0.3–0.33	0.34–0.44	0.45–0.67	0.68–1.78	1.79–4.79	>4.79	4.79–1.79	1.78–0.68
12		–	0.32–0.35	0.36–0.46	0.47–0.71	0.72–1.89	1.9–5.07	>5.07	5.07–1.9	1.89–0.72
11.5		–	0.33–0.37	0.38–0.49	0.5–0.74	0.75–1.97	1.98–5.29	>5.29	5.29–1.98	1.97–0.75
11		–	0.34–0.38	0.39–0.51	0.52–0.78	0.79–2.06	2.07–5.53	>5.53	5.53–2.07	2.06–0.79
–		2,50	0.37–0.42	0.43–0.55	0.56–0.84	0.85–2.23	2.24–5.98	>5.98	5.98–2.24	2.23–0.85
10		–	0.38–0.42	0.43–0.56	0.57–0.86	0.87–2.27	2.28–6.08	>6.08	6.08–2.28	2.27–0.87
9		–	0.42–0.47	0.48–0.62	0.63–0.95	0.96–2.52	2.53–6.75	>6.75	6.75–2.53	2.52–0.96
–		3,00	0.45–0.5	0.51–0.66	0.67–1.02	1.03–2.68	2.69–7.18	>7.18	7.18–2.69	2.68–1.03
8		–	0.47–0.53	0.54–0.7	0.71–1.08	1.09–2.84	2.85–7.6	>7.60	7.6–2.85	2.84–1.09
–		3,50	0.52–0.59	0.6–0.77	0.78–1.19	1.2–3.13	3.14–8.38	>8.38	8.38–3.14	3.13–1.2
7		–	0.524–0.61	0.62–0.8	0.81–1.23	1.24–3.25	3.26–8.68	>8.68	8.68–3.26	3.25–1.24
–		4,00	0.6–0.67	0.68–0.89	0.9–1.36	1.37–3.58	3.59–9.57	>9.57	9.57–3.59	3.58–1.37
6		–	0.63–0.71	0.72–0.94	0.95–1.44	1.45–3.79	3.8–10.13	>10.13	10.13–3.8	3.79–1.45
–		5,00	0.75–0.84	0.85–1.11	1.12–1.7	1.71–4.48	4.49–11.97	>11.97	11.97–4.49	4.48–1.71
5		–	0.76–0.86	0.87–1.13	1.14–1.73	1.74–4.55	4.56–12.16	>12.16	12.16–4.56	4.55–1.74
4.5		–	0.84–0.95	0.96–1.26	1.27–1.92	1.93–5.06	5.07–13.51	>13.51	13.51–5.07	5.06–1.93
–		6,00	0.9–1.01	1.02–1.33	1.34–2.04	2.05–5.37	5.38–14.36	>14.36	14.36–5.38	5.37–2.05
4		–	0.95–1.07	1.08–1.41	1.42–2.16	2.17–5.69	5.7–15.2	>15.20	15.2–5.7	5.69–2.17
inclination angle			4.5	3.5	2.5	1.5	0.5	0.0	-0.5	-1.5
			standard helix (feed toward the chuck)						reverse helix (feed away from the chuck)	

1. Select TPI or pitch from the left-hand columns.

2. Follow row to specified pitch diameter and the correct feed direction.

3. Follow the column to the top for the required shim based on the toolholder and insert size.

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The specially engineered WIDIA Laydown Threading System ensures the highest accuracy and quality available to meet all modern production standards. With an extensive range of inserts and toolholders available, the Laydown Threading platform is ideal for all of your internal and external threading applications.

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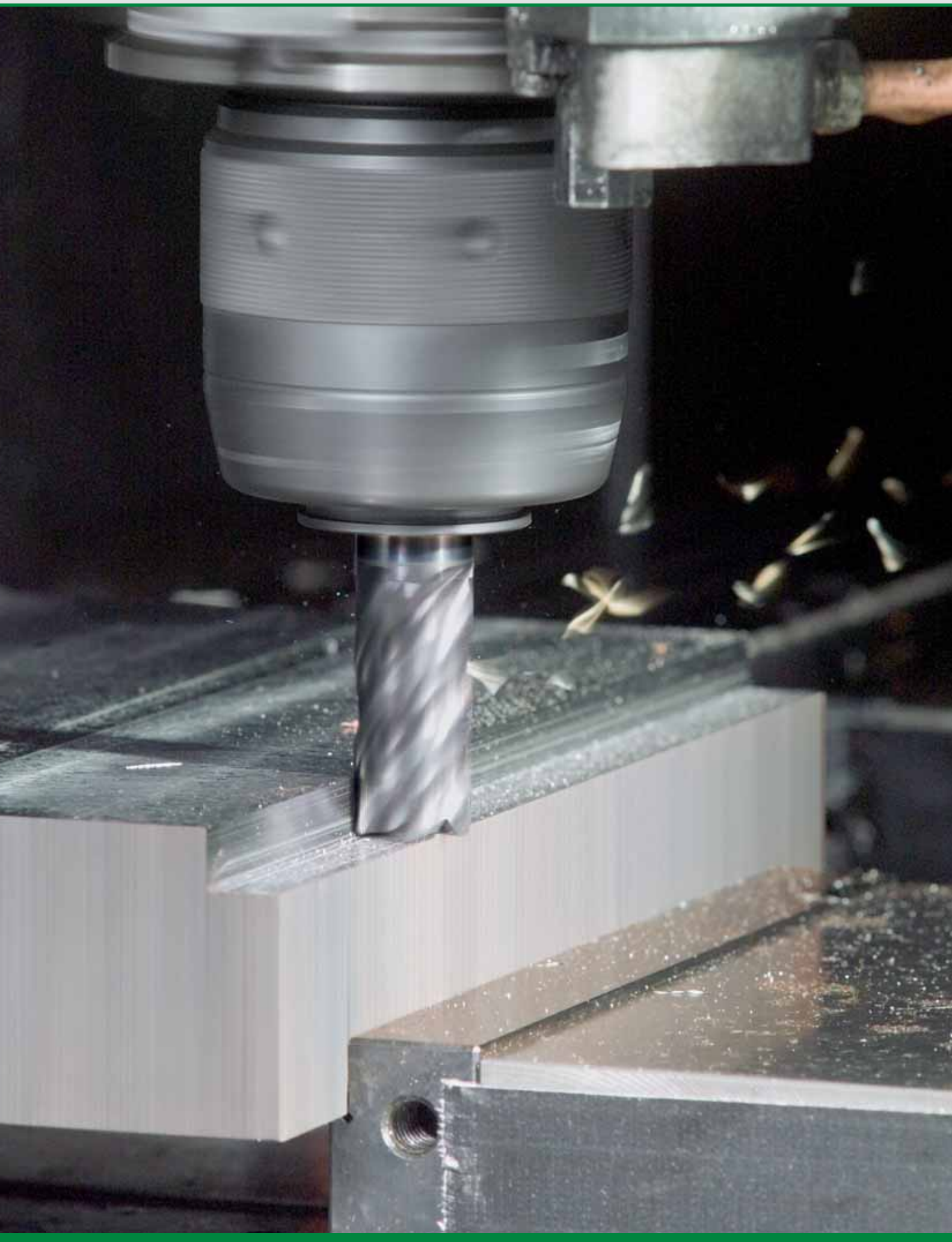


Solid End Milling

● First Choice
○ Alternate Choice

	Series	Range of Diameter Ø min–Ø max inch	Number of Flutes	Cutting Center	Uncoated	TiCN	AlTiN	TiAlN
High-Performance Solid Carbide End Mills • VariMill™								
VariMill I™								
	4V05	1/8"–1-1/4"	4	Yes				X
	4V05	1/8"–1-1/4"	4	Yes			X	
	4V0T	1/2"–1-1/4"	4	Yes			X	
	4VP5	1/4"–1"	4	Yes				X
	4VPT	1/2"–1"	4	Yes			X	
	4VN5	1/4"–1"	4	Yes				X
	4VP0	1/4"–1"	4	Yes				X
	4V00	1/8"–1-1/4"	4	Yes				X
VariMill II™								
	5V0S	3/16"–1"	5	No			X	
	5V0T	1/4"–1"	5	No			X	
	5VNS	1/4"–1"	5	No			X	
VariMill II™ Long								
	5W1S	1/4"–1"	5	No			X	
VariMill II™ ER								
	5V0E	3/8"–1"	5	Yes			X	
	5VNE	3/8"–1"	5	Yes			X	
High-Performance Solid Carbide End Mills • Hard Materials								
VisionPlus™								
	7S05	1/4"–1"	4/5/6	Yes			X	
	7S5F	1/8"–3/4"	4	Yes			X	
	7S7R	5/32"–1"	3/4/6	Yes			X	
VisionPlus™ X-Feed™								
	7FN6	1/4"–3/4"	6	No			X	
	7FN7	1/4"–3/4"	6	No			X	

P				M	K	N		S				H		Page References			
1 2 3	4	5	6	1 2 3	1 2 3	1 2 3 4 5	6	1	2	3	4	1 2	3 4	WIDIA Advances 2014 Catalog (A-13-03144EN_in)		WIDIA Solid End Mills & Holemaking Catalog (A-09-02077EN_in)	
Steel <35 HRC	Steel 36–48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Cast Iron	Non-Ferrous	Graphite	Iron Based	Nickel Based	Pure Titanium	Titanium Alloys	Hardened Steels H1 = <48 HRC H2 = 48 ~ 55	H3 = 56 ~ 60 HRC H4 = >60 HRC	Product Information	Cutting Data	Product Information	Cutting Data
High-Performance Solid Carbide End Mills • VariMill™ *(continued)*																	
VariMill I™ *(continued)*																	
●	●	○	○	●	○			●	○	○	○	●		B12–B15	B22–B23	A14–A18	A30–A31
○	●	●	●	●	○			○	●	●	●	●		B12–B15	B22–B23	A14–A18	A30–A31
●	○	●	●	●	○			○	●	●	●	●		B16	B23	A26	A37
●	●	○	○	●	○			●	○	○	○	●		B17	B24	A21	A32
○	○	●	●	●	○			○	●	●	●	●		B18	B24	A27	A37
●	●	○	○	●	○			●	○	○	○	●		B19	B25	A20	A32
●	●	●	●	●	○			●	●	●	●	●		B20	B25	A25	A36
●	●	○	○	●	○			●	○	○	○	●		B21	B26	A24	A35
VariMill II™ *(continued)*																	
●	●	●	●	●	○			●	○	○	○	●		B30–B31	B35	A22	A33
●	●	●	●	○	○			○	●	●	●	●		B32–B33	B35	A28	A37
●	○	●	●	○	○			○	●	●	●	●		B34	B36	A23	A34
VariMill II™ Long *(continued)*																	
●	●	●	●	●	○			○	●	●	●	●		B40	B41	—	—
VariMill II™ ER *(continued)*																	
●	○	●	●	●	○			●	●	●	●	●		B44	B46	—	—
●	○	●	●	●	○			●	●	●	●	●		B45	B46	—	—
High-Performance Solid Carbide End Mills • Hard Materials *(continued)*																	
VisionPlus™ *(continued)*																	
○	●											●	●	—	—	A40	A46
○	●											●	●	—	—	A41	A47
○	○	○	●	○	○	○		○	○	○	○	●	●	—	—	A44	A47
VisionPlus™ X-Feed™ *(continued)*																	
	●											●		—	—	A42	A50
												●	●	—	—	A43	A49

● First Choice
○ Alternate Choice

	Series	Range of Diameter Ø min–Ø max inch	Number of Flutes	Cutting Center	Uncoated	TiCN	AlTiN	TiAlN	
High-Performance Solid Carbide End Mills • Aluminum									
	4AN2	1/8"–1"	2	Yes	X				
	4AN3	3/8"–1"	3	Yes	X				
	4AP2	1/8"–1"	2	Yes	X				
	4AP3	3/8"–1"	3	Yes	X				
	4B02	1/4"–1"	2	Yes	X				
	4A01	1/8"–1"	2	Yes	X				
	4AN1	1/4"–1"	2	Yes	X				
	4A0R	1/4"–1"	3	Yes	X				
	4A0B	1/4"–3/4"	3	Yes	X				
ArCut™									
	4K02	1/8–1"	2	Yes	X				
	4K03	1/4–1"	3	Yes	X				
AluSurf™									
	5A02	1/4–1"	2	Yes	X				
	5A03	1/4–1"	3	Yes	X				
	5AN2	1/8–1"	2	Yes	X				
	5AN3	1/8–1"	3	Yes	X				

P				M	K	N		S				H		Page References			
1 2 3	4	5	6	1 2 3	1 2 3	1 2 3 4 5	6	1	2	3	4	1 2	3 4	WIDIA Advances 2014 Catalog (A-13-03144EN_in)		WIDIA Solid End Mills & Holemaking Catalog (A-09-02077EN_in)	
Steel <35 HRC	Steel 36–48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Cast Iron	Non-Ferrous	Graphite	Iron Based	Nickel Based	Pure Titanium	Titanium Alloys	Hardened Steels H1 = <48 HRC H2 = 48 ~ 55	H3 = 56 ~ 60 HRC H4 = >60 HRC	Product Information	Cutting Data	Product Information	Cutting Data
High-Performance Solid Carbide End Mills • Aluminum *(continued)*																	
						●								—	—	A66–A67	A79
						●								—	—	A68	A79
						●								—	—	A70	A79
						●								—	—	A71	A79
						●								—	—	A76	A80
						●	○							—	—	A72	A80
						●	○							—	—	A73	A81
						●								—	—	A74	A81
						●								—	—	A75	A82
ArCut™ *(continued)*																	
						●								—	—	A60–A61	A79
						●								—	—	A63–A65	A79
AluSurf™ *(continued)*																	
						●								—	—	A54	A78
						●								—	—	A55	A78
						●								—	—	A56–A57	A78
						●								—	—	A58–A59	A78

● First Choice
○ Alternate Choice

	Series	Range of Diameter Ø min–Ø max inch	Number of Flutes	Cutting Center	Uncoated	TiCN	AlTiN	TiAlN
High-Performance Solid Carbide End Mills • Finishing								
	4C03	1/8"–1"	3	Yes		X		X
	4C05	1/8"–1"	5	Yes		X		X
	4S05/4S07	3/16"–1"	4/6	Yes		X		X
	4S0F	1/4"–1"	6/8/10	Yes				X
High-Performance Solid Carbide End Mills • Roughing								
	4Q03/4Q05	3/16–1"	3/4	Yes				X
	4QN3	1/4–3/4"	3	Yes				X
	4M0R	1/4–1"	3/4/6	Yes			X	
High-Performance HSS-E-PM End Mlls • Finishing								
	3K03	3/8"–2"	3	Yes	X			
	3405/3407	3/8"–2"	4/6	Yes	X			X
	3K05/3K07	1/2"–2"	4/6	Yes				X
High-Performance HSS-E-PM End Mlls • Roughing								
	6A0R	1/2"–1 1/4"	3	Yes		X		
	6ANR	1/2"–1-1/4"	3	Yes		X		
	6T0R	1/2"–1-1/4"	4/5/6	Yes				X
	6TNR	5/8"–1-1/4"	4/5/6	Yes				X
	6K06	3/8"–1 1/4"	4/5/6	Yes				X
	6K04	1/4"–1 1/4"	4/5/6	Yes				X
WavCut™								
	620W	3/4"–2"	4/6	Yes	X			
	620V	3/4"–2"	4/6/8	Yes	X			X
HSS-E ER Rougher								
	620E/621E/623E/625E	1-1/4–2"	6	Yes	X			

P				M	K	N		S				H		Page References			
1 2 3	4	5	6	1 2 3	1 2 3	1 2 3 4 5	6	1	2	3	4	1 2	3 4	WIDIA Advances 2014 Catalog (A-13-03144EN_in)		WIDIA Solid End Mills & Holemaking Catalog (A-09-02077EN_in)	
Steel <35 HRC	Steel 36–48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Cast Iron	Non-Ferrous	Graphite	Iron Based	Nickel Based	Pure Titanium	Titanium Alloys	Hardened Steels H1 = <48 HRC H2 = 48 ~ 55	H3 = 56 ~ 60 HRC H4 = >60 HRC	Product Information	Cutting Data	Product Information	Cutting Data
High-Performance Solid Carbide End Mills • Finishing *(continued)*																	
●	○	○	○	○	○			○	○	○	●	○		—	—	A86	A91
●	○	○	○	○	○			○	○	○	○	○		—	—	A87	A92
●	●	●	●	●	●			○	○	●	●	○		—	—	A88	A93
●	○	○	○	●	○			○	○	●	○	○		—	—	A89	A94
High-Performance Solid Carbide End Mills • Roughing *(continued)*																	
●	○	○	○	○	○			○	○	○	●	○		—	—	A98	A101
●	○	○	○	○	○			○	○	○	●	○		—	—	A99	A102
○	○	●	●	●	○			○	○	○	●	●	●	—	—	A100	A103
High-Performance HSS-E-PM End Mlls • Finishing *(continued)*																	
						●								—	—	A106–A107	A114
										○	●			—	—	A108	A114
										○	●			—	—	A110–A111	A115
High-Performance HSS-E-PM End Mlls • Roughing *(continued)*																	
						●								—	—	A124	A133
						●								—	—	A125	A133
										○	●			—	—	A126	A134
										○	●			—	—	A127	A134
○		○		○	○			○	○	●	○			—	—	A130	A135
○		○		○	○			○	○	●	●			—	—	A131	A136
WavCut™ *(continued)*																	
		○		○							○			—	—	A120–A121	A132
		○		○							○			—	—	A122–A123	A132
HSS-E ER Rougher *(continued)*																	
				○							●			B50	B51	—	—

● First Choice
○ Alternate Choice

	Series	Range of Diameter Ø min–Ø max inch	Number of Flutes	Cutting Center	Uncoated	TiCN	AlTiN	TiAlN
General Purpose+ Solid Carbide End Mills • Roughing/Finishing								
	4202	1/32"–1"	2	Yes	X			X
	4201	1/16"–3/4"	2	Yes	X	X		X
	4203	1/16"–1"	3	Yes		X		
	4205	3/64"–1"	4	Yes	X	X		X
	4200	1/16"–12	4	Yes	X	X		X
	4207	1/4"–1"	6	Yes		X		
	4S0B	1/4"–1"	3/4	Yes				X
	4S0R	1/4"–1"	3/4/5	Yes		X		X
General Purpose + HSS-E End Mills • Roughing/Finishing								
	1205/1207	1/8"–2"	4/6	Yes	X	X		
	1200	1/4"–1 1/4"	4/6	Yes	X			
	6209	1/4"–2"	3	Yes	X	X		
	6206	3/16"–2"	4/5/6	Yes	X	X		X
	6205	5/8"–2"	4/5/6/8	No	X	X		X
	6208	5/32"–2"	4/5/6	Yes	X	X		X
	6207	5/8"–2"	4/5/6/8	No	X	X		
	6306	3/8"–2"	4/5/6	Yes				X
	6308	3/8"–1 1/4"	4/5/6	Yes		X		

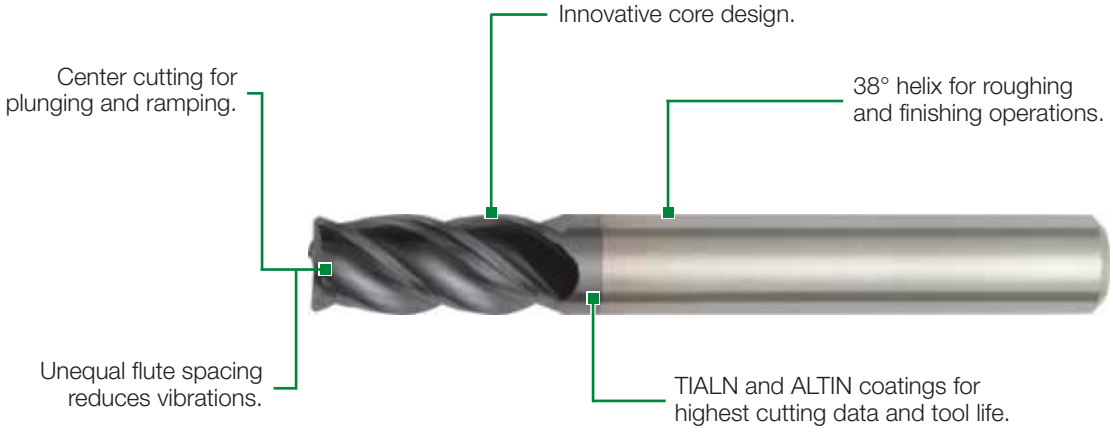
P				M	K	N		S				H		Page References			
1 2 3	4	5	6	1 2 3	1 2 3	1 2 3 4 5	6	1	2	3	4	1 2	3 4	WIDIA Advances 2014 Catalog (A-13-03144EN_in)		WIDIA Solid End Mills & Holemaking Catalog (A-09-02077EN_in)	
Steel <35 HRC	Steel 36–48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Cast Iron	Non-Ferrous	Graphite	Iron Based	Nickel Based	Pure Titanium	Titanium Alloys	Hardened Steels H1 = <48 HRC H2 = 48 ~ 55	H3 = 56 ~ 60 HRC H4 = >60 HRC	Product Information	Cutting Data	Product Information	Cutting Data
General Purpose+ Solid Carbide End Mills • Roughing/Finishing *(continued)*																	
○	○			○	○	○	○							—	—	A140–A141	A151
○	○			○	○	○	○							—	—	A142	A151
○	○			○	○	○	○							—	—	A143	A152
○	○			○	○		○							—	—	A144–A145	A152
○	○			○	○	○	○							—	—	A146	A153
○	○			○	○									—	—	A148	A153
○	○	○		○	○			○		○		○		—	—	A149	A154
○	○	○		○	○			○		○		○		—	—	A150	A155
General Purpose HSS-E End Mills • Roughing/Finishing *(continued)*																	
○		○		○	○	○		○	○	○	○			—	—	A164–A167	A186
														—	—	A168	A187
					○									—	—	A170–A171	A187
○		○		○	○			○	○	○	○			—	—	A172–A173	A188
○		○		○	○			○	○	○	○			—	—	A174–A175	A189
○		○		○	○	○		○	○	○	○			—	—	A176–A177	A188
○		○		○	○	○		○	○	○	○			—	—	A178–A179	A189
○		○		○	○			○	○	○	○			—	—	A180	A190
○		○		○	○	○		○	○	○	○			—	—	A181	A190

High-Performance Solid Carbide End Mills • **VariMill I™**

VariMill I offers plunging, slotting, and profiling at the highest possible feed rates for a wide range of materials. They are designed to provide maximum Metal Removal Rates (MRR) and to achieve superior surface conditions. A wide range of diameters and corner configurations, such as chamfer, radii, and sharp edges, are available from stock.

VariMill I

- High-performance universal tools for almost all cutting materials.
- Roughing and finishing with one tool.
- Various length of cut, long reach and necked versions, ball nose, corner chamfer, and corner radius available.



VariMill I™ Series

- Increase your output with less tool changes and increased Metal Removal Rates (MRR).
- No specific tools for roughing and finishing necessary.
- Less passes due to 1 x D slotting capability.

4V05 Series

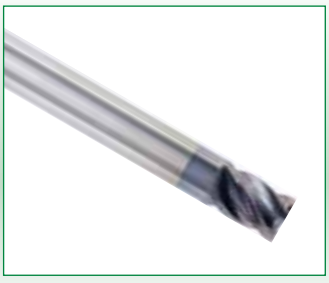
- High metal removal rates and tool life in:
  - — Stainless steels, steels, and alloyed steels
  - — High-temperature alloys and titanium
- Radii, sharp, and corner chamfer configuration.

4V0T

- Titanium geometry design.
- Sharp and corner chamfer configuration.

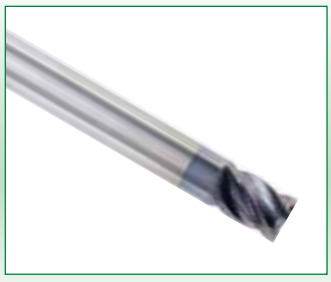
4VP5 Series

- Stainless steel and steel geometry design.
- Sharp and corner chamfer configuration.
- Benefit from long reach design for deep cavities.



4VPT Series

- Titanium geometry design.
- Sharp and corner chamfer configuration.
- Benefit from long reach design for deep cavities.



4VN5 Series

- Stainless steel and steel geometry design.
- Sharp and corner chamfer configuration.
- Benefit from long reach and neck design for deep cavities.

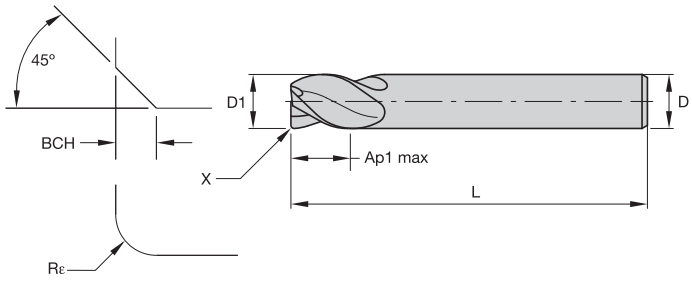
4VP0 Series

- Center cutting ball nose series.
- Benefit from long reach design for deep cavities.

4V00 Series

- Center cutting ball nose series.
- Benefit from long length of cut.

- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-.002	≤ 1/8"	0/.00024
		> 1/8"–1/4"	0/.00031
		> 1/4"–3/8"	0/.00035
		> 3/8"–23/32"	0/.00043
		> 23/32"–1 3/16"	0/.00051

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
TIALN	●	●	●	●	○	○	●	●	●	○	○	○	●	○	○	○	●
ALTIN	○	○	●	●	●	●	●	●	●	○	○	○	○	●	●	●	●

P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

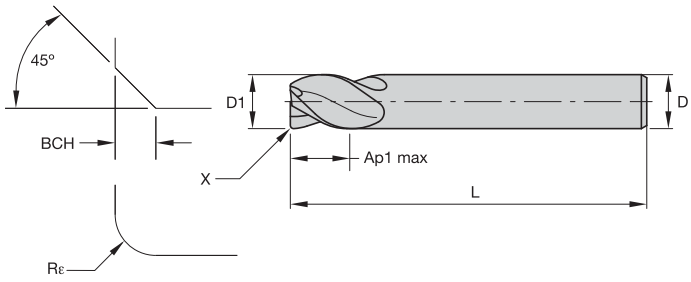
For application data, see page B22–B23.

Series 4V05 • VariMill I™ • Lists 4V05 4V15 4V25 4V45 4V65

TIALN-LT	ALTIN-MT	TIALN-LW	ALTIN-MW	D1	D	length of cut Ap1 max	length L	Rε	BCH
TF4V4503001	–	–	–	1/8	1/8	1/4	1 1/2	–	.010
TF4V4503001S	–	–	–	1/8	1/8	1/4	1 1/2	–	–
TF4V0503001A	–	–	–	1/8	1/8	1/2	2	.015	–
TF4V0503001	–	–	–	1/8	1/8	1/2	2	–	.010
TF4V0503001S	–	–	–	1/8	1/8	1/2	2	–	–
TF4V4505000	–	–	–	3/16	3/16	5/16	1 1/2	–	.010
TF4V4505000S	–	–	–	3/16	3/16	5/16	1 1/2	–	–
TF4V0505000A	–	–	–	3/16	3/16	5/8	2 1/4	.015	–
TF4V0505000B	–	–	–	3/16	3/16	5/8	2 1/4	.030	–
TF4V0505000	–	–	–	3/16	3/16	5/8	2 1/4	–	.010
TF4V0505000S	–	–	–	3/16	3/16	5/8	2 1/4	–	–
TF4V4507002B	–	–	–	1/4	1/4	3/8	2	.030	–
TF4V4507002	TM4V4507002	–	–	1/4	1/4	3/8	2	–	.016
TF4V4507002S	TM4V4507002S	–	–	1/4	1/4	3/8	2	–	–
TF4V0507002A	–	–	–	1/4	1/4	3/4	2 1/2	.015	–
TF4V0507002B	–	–	–	1/4	1/4	3/4	2 1/2	.030	–
TF4V0507002C	–	–	–	1/4	1/4	3/4	2 1/2	.060	–
TF4V0507002	TM4V0507002	–	–	1/4	1/4	3/4	2 1/2	–	.016
TF4V0507002S	TM4V0507002S	–	–	1/4	1/4	3/4	2 1/2	–	–
TF4V1507002A	–	–	–	1/4	1/4	1 1/4	3 1/4	.015	–
TF4V1507002B	–	–	–	1/4	1/4	1 1/4	3 1/4	.030	–
TF4V1507002S	–	–	–	1/4	1/4	1 1/4	3 1/4	–	–
TF4V2507002A	–	–	–	1/4	1/4	1 3/4	4	.015	–
TF4V2507002B	–	–	–	1/4	1/4	1 3/4	4	.030	–
TF4V2507002S	–	–	–	1/4	1/4	1 3/4	4	–	–
TF4V4508003B	–	–	–	5/16	5/16	1/2	2	.030	–
TF4V4508003	–	–	–	5/16	5/16	1/2	2	–	.016
TF4V4508003S	–	–	–	5/16	5/16	1/2	2	–	–
TF4V0508003A	–	–	–	5/16	5/16	3/4	2 1/2	.015	–
TF4V0508003B	–	–	–	5/16	5/16	3/4	2 1/2	.030	–

(continued)

(Series 4V05 • VariMill I continued)



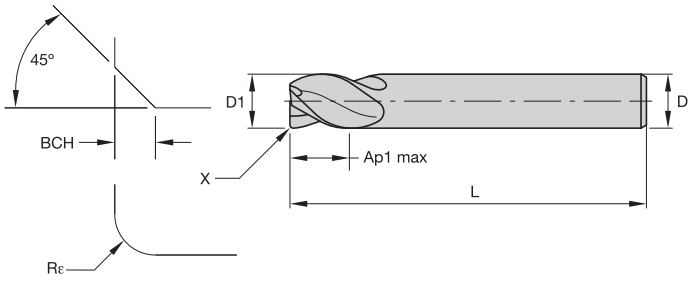
	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
TIALN	●	●	●	●	○	○	●	●	●	○	○	○	●	○	○	○	●
ALTIN	○	○	●	●	●	●	●	●	●	○	○	○	○	●	●	●	●

P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

For application data, see page B22–B23.

TIALN-LT	ALTIN-MT	TIALN-LW	ALTIN-MW	D1	D	length of cut Ap1 max	length L	Rε	BCH
TF4V0508003C	–	–	–	5/16	5/16	3/4	2 1/2	.060	–
TF4V0508003	–	–	–	5/16	5/16	3/4	2 1/2	–	.016
TF4V0508003S	–	–	–	5/16	5/16	3/4	2 1/2	–	–
TF4V1508003B	–	–	–	5/16	5/16	1 1/4	3 1/4	.030	–
TF4V1508003S	–	–	–	5/16	5/16	1 1/4	3 1/4	–	–
TF4V2508003S	–	–	–	5/16	5/16	1 5/8	4	–	–
TF4V4510004B	–	–	–	3/8	3/8	1/2	2	.030	–
TF4V4510004	TM4V4510004	–	–	3/8	3/8	1/2	2	–	.020
TF4V4510004S	TM4V4510004S	–	–	3/8	3/8	1/2	2	–	–
TF4V0510004A	–	–	–	3/8	3/8	7/8	2 1/2	.015	–
TF4V0510004B	TM4V0510004B	–	–	3/8	3/8	7/8	2 1/2	.030	–
TF4V0510004C	–	–	–	3/8	3/8	7/8	2 1/2	.060	–
TF4V0510004D	–	–	–	3/8	3/8	7/8	2 1/2	.090	–
TF4V0510004	TM4V0510004	–	–	3/8	3/8	7/8	2 1/2	–	.020
TF4V0510004S	TM4V0510004S	–	–	3/8	3/8	7/8	2 1/2	–	–
TF4V1510004B	–	–	–	3/8	3/8	1 1/2	4	.030	–
TF4V1510004C	–	–	–	3/8	3/8	1 1/2	4	.060	–
TF4V1510004S	TM4V1510004S	–	–	3/8	3/8	1 1/2	4	–	–
TF4V2510004B	–	–	–	3/8	3/8	2 1/2	4	.030	–
TF4V2510004C	–	–	–	3/8	3/8	2 1/2	4	.060	–
TF4V2510004	–	–	–	3/8	3/8	2 1/2	4	–	–
TF4V2510004S	–	–	–	3/8	3/8	2 1/2	4	–	–
TF4V451101A	–	–	–	7/16	7/16	5/8	2 1/2	–	.020
TF4V451101AS	–	–	–	7/16	7/16	5/8	2 1/2	–	–
TF4V051101A	–	–	–	7/16	7/16	7/8	2 1/2	–	.020
TF4V051101AS	–	–	–	7/16	7/16	7/8	2 1/2	–	–
TF4V151100AS	–	–	–	7/16	7/16	2	4	–	–
TF4V251100AS	–	–	–	7/16	7/16	3	5	–	–
–	–	TF4V4513005B	–	1/2	1/2	5/8	2 1/2	.030	–
–	–	TF4V4513005C	–	1/2	1/2	5/8	2 1/2	.060	–
–	–	TF4V4513005	TM4V4513005	1/2	1/2	5/8	2 1/2	–	.020
–	–	TF4V4513005S	TM4V4513005S	1/2	1/2	5/8	2 1/2	–	–
–	–	TF4V0513005	TM4V0513005	1/2	1/2	1	3	–	.020
–	–	TF4V0513005S	TM4V0513005S	1/2	1/2	1	3	–	–
–	–	TF4V0513015A	–	1/2	1/2	1 1/4	3	.015	–
–	–	TF4V0513015B	TM4V0513015B	1/2	1/2	1 1/4	3	.030	–
–	–	TF4V0513015C	–	1/2	1/2	1 1/4	3	.060	–
–	–	TF4V0513015D	–	1/2	1/2	1 1/4	3	.090	–
–	–	TF4V0513015E	–	1/2	1/2	1 1/4	3	.120	–
–	–	TF4V0513015	TM4V0513015	1/2	1/2	1 1/4	3	–	.020
–	–	TF4V0513015S	TM4V0513015S	1/2	1/2	1 1/4	3	–	–
–	–	TF4V6513015B	–	1/2	1/2	1 1/2	4	.030	–
–	–	TF4V6513015C	TM4V6513015S	1/2	1/2	1 1/2	4	.060	–

(continued)



	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
TIALN	●	●	●	●	○	○	●	●	●	○	○	○	●	○	○	○	●
ALTIN	○	○	●	●	●	●	●	●	●	○	○	○	○	●	●	●	●

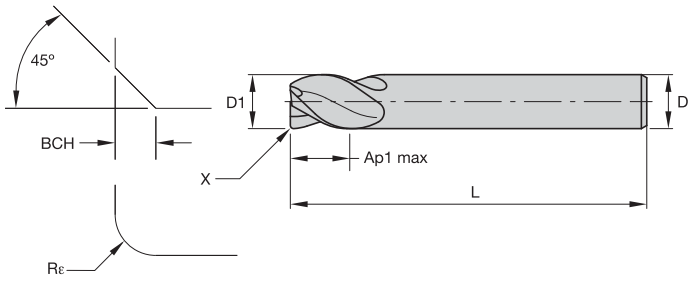
P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

For application data, see page B22–B23.

TIALN-LT	ALTIN-MT	TIALN-LW	ALTIN-MW	D1	D	length of cut Ap1 max	length L	Rε	BCH
–	–	TF4V6513015	TM4V6513015	1/2	1/2	1 1/2	4	–	.020
–	–	TF4V6513015S	–	1/2	1/2	1 1/2	4	–	–
–	–	TF4V1513005B	–	1/2	1/2	2	4	.030	–
–	–	TF4V1513005C	–	1/2	1/2	2	4	.060	–
–	–	TF4V1513005S	TM4V1513005S	1/2	1/2	2	4	–	–
–	–	TF4V6513025B	–	1/2	1/2	2 1/2	4 1/2	.030	–
–	–	TF4V6513025C	–	1/2	1/2	2 1/2	4 1/2	.060	–
–	–	TF4V6513025S	–	1/2	1/2	2 1/2	4 1/2	–	–
–	–	TF4V2513005B	–	1/2	1/2	3	5	.030	–
–	–	TF4V2513005C	–	1/2	1/2	3	5	.060	–
–	–	TF4V2513005S	–	1/2	1/2	3	5	–	–
–	–	TF4V4516006C	–	5/8	5/8	3/4	3	.060	–
–	–	TF4V4516006E	–	5/8	5/8	3/4	3	.120	–
–	–	TF4V4516006	–	5/8	5/8	3/4	3	–	.020
–	–	TF4V4516006S	–	5/8	5/8	3/4	3	–	–
–	–	TF4V0516006B	TM4V0516006B	5/8	5/8	1 1/4	3 1/2	.030	–
–	–	TF4V0516006C	–	5/8	5/8	1 1/4	3 1/2	.060	–
–	–	TF4V0516006D	–	5/8	5/8	1 1/4	3 1/2	.090	–
–	–	TF4V0516006E	–	5/8	5/8	1 1/4	3 1/2	.120	–
–	–	TF4V0516006	TM4V0516006	5/8	5/8	1 1/4	3 1/2	–	.020
–	–	TF4V0516006S	–	5/8	5/8	1 1/4	3 1/2	–	–
–	–	TF4V6516016C	–	5/8	5/8	1 5/8	4 1/8	.060	–
–	–	TF4V6516016	–	5/8	5/8	1 5/8	4 1/8	–	.020
–	–	TF4V6516016S	–	5/8	5/8	1 5/8	4 1/8	–	–
–	–	TF4V1516006C	–	5/8	5/8	2 1/4	5	.060	–
–	–	TF4V1516006S	–	5/8	5/8	2 1/4	5	–	–
–	–	TF4V2516006S	–	5/8	5/8	3	5 1/4	–	–
–	–	TF4V4519007B	–	3/4	3/4	7/8	3 1/2	.030	–
–	–	TF4V4519007C	–	3/4	3/4	7/8	3 1/2	.060	–
–	–	TF4V4519007E	–	3/4	3/4	7/8	3 1/2	.120	–
–	–	TF4V4519007	TM4V4519007	3/4	3/4	7/8	3 1/2	–	.020
–	–	TF4V4519007S	TM4V4519007S	3/4	3/4	7/8	3 1/2	–	–
–	–	TF4V0519007B	TM4V0519007B	3/4	3/4	1 1/2	4	.030	–
–	–	TF4V0519007C	TM4V0519007C	3/4	3/4	1 1/2	4	.060	–
–	–	TF4V0519007D	TM4V0519007D	3/4	3/4	1 1/2	4	.090	–
–	–	TF4V0519007E	TM4V0519007E	3/4	3/4	1 1/2	4	.120	–
–	–	TF4V0519007	TM4V0519007	3/4	3/4	1 1/2	4	–	.020
–	–	TF4V0519007S	TM4V0519007S	3/4	3/4	1 1/2	4	–	–

(continued)

(Series 4V05 • VariMill I continued)



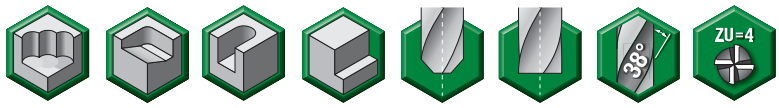
	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
TIALN	●	●	●	●	○	○	●	●	●	○	○	○	●	○	○	○	●
ALTIN	○	○	●	●	●	●	●	●	●	○	○	○	○	●	●	●	●

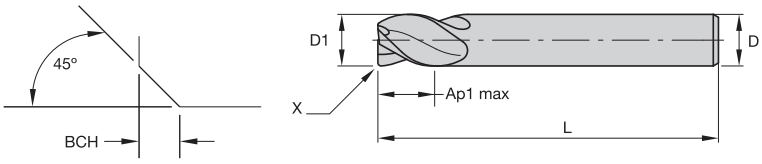
P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

For application data, see page B22–B23.

TIALN-LT	ALTIN-MT	TIALN-LW	ALTIN-MW	D1	D	length of cut Ap1 max	length L	Rε	BCH
–	–	TF4V6519017	–	3/4	3/4	1 5/8	4	–	.020
–	–	TF4V6519017S	–	3/4	3/4	1 5/8	4	–	–
–	–	TF4V1519007B	–	3/4	3/4	2 1/4	5	.030	–
–	–	TF4V1519007C	–	3/4	3/4	2 1/4	5	.060	–
–	–	TF4V1519007	TM4V1519007	3/4	3/4	2 1/4	5	–	.020
–	–	TF4V1519007S	TM4V1519007S	3/4	3/4	2 1/4	5	–	–
–	–	TF4V6519007B	–	3/4	3/4	3	6	.030	–
–	–	TF4V6519007C	–	3/4	3/4	3	6	.060	–
–	–	TF4V6519007		3/4	3/4	3	6	–	.020
–	–	TF4V6519007S	TM4V6519007S	3/4	3/4	3	6	–	–
–	–	TF4V2519007B	–	3/4	3/4	4	6 1/4	.030	–
–	–	TF4V2519007C	–	3/4	3/4	4	6 1/4	.060	–
–	–	TF4V2519007S	–	3/4	3/4	4	6 1/4	–	–
–	–	TF4V0525008B	TM4V0525008B	1	1	1 1/2	4	.030	–
–	–	TF4V0525008C	TM4V0525008C	1	1	1 1/2	4	.060	–
–	–	TF4V0525008D	TM4V0525008D	1	1	1 1/2	4	.090	–
–	–	TF4V0525008E	TM4V0525008E	1	1	1 1/2	4	.120	–
–	–	TF4V0525008F	–	1	1	1 1/2	4	.250	–
–	–	TF4V0525008	TM4V0525008	1	1	1 1/2	4	–	.020
–	–	TF4V0525008S	TM4V0525008S	1	1	1 1/2	4	–	–
–	–	TF4V6525018	–	1	1	2	5	–	.020
–	–	TF4V6525018S	–	1	1	2	5	–	–
–	–	TF4V1525008B	–	1	1	2 1/4	5	.030	–
–	–	TF4V1525008C	–	1	1	2 1/4	5	.060	–
–	–	TF4V1525008	–	1	1	2 1/4	5	–	.020
–	–	TF4V1525008S	TM4V1525008S	1	1	2 1/4	5	–	–
–	–	TF4V2525008B	–	1	1	3	6	.030	–
–	–	TF4V2525008C	–	1	1	3	6	.060	–
–	–	TF4V2525008	–	1	1	3	6	–	.020
–	–	TF4V2525008S	–	1	1	3	6	–	–
–	–	TF4V6525028B	–	1	1	4	7	.030	–
–	–	TF4V6525028C	–	1	1	4	7	.060	–
–	–	TF4V6525028	–	1	1	4	7	–	.020
–	–	TF4V6525028S	TM4V6525028S	1	1	4	7	–	–
–	–	TF4V0532009B	–	1 1/4	1 1/4	2 1/4	5	.030	–
–	–	TF4V0532009E	–	1 1/4	1 1/4	2 1/4	5	.120	–
–	–	TF4V0532009	–	1 1/4	1 1/4	2 1/4	5	–	.020
–	–	TF4V0532009S	–	1 1/4	1 1/4	2 1/4	5	–	–

- Unequal flute spacing.
- Center cutting.
- Optimized geometry for titanium machining.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.





End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-.002	≤ 1/8"	0/.00024
		> 1/8"–1/4"	0/.00031
		> 1/4"–3/8"	0/.00035
		> 3/8"–23/32"	0/.00043
		> 23/32"–1 3/16"	0/.00051

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
ALTIN	●	●	○	○	●	●	●	●	●	○	○	○	○	●	●	●	●

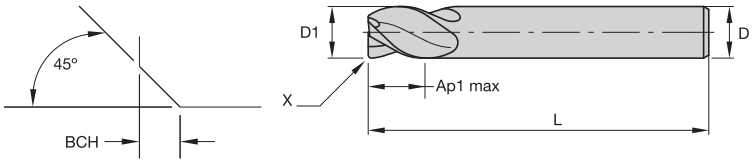
P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

For application data, see page B23.

Series 4V0T • VariMill I

ALTIN-MW	D1	D	length of cut Ap1 max	length L	BCH
TM4V4T13005	1/2	1/2	5/8	2 1/2	.020
TM4V4T13005S	1/2	1/2	5/8	2 1/2	–
TM4V0T13015	1/2	1/2	1 1/4	3	.020
TM4V0T13015S	1/2	1/2	1 1/4	3	–
TM4V4T16006	5/8	5/8	3/4	3	.020
TM4V4T16006S	5/8	5/8	3/4	3	–
TM4V0T16006	5/8	5/8	1 1/4	3 1/2	.020
TM4V0T16006S	5/8	5/8	1 1/4	3 1/2	–
TM4V4T19007	3/4	3/4	7/8	3 1/2	.020
TM4V4T19007S	3/4	3/4	7/8	3 1/2	–
TM4V0T19007	3/4	3/4	1 1/2	4	.020
TM4V0T19007S	3/4	3/4	1 1/2	4	–
TM4V0T25008	1	1	1 1/2	4	.020
TM4V0T25008S	1	1	1 1/2	4	–
TM4V0T32009	1 1/4	1 1/4	2 1/4	5	.020
TM4V0T32009S	1 1/4	1 1/4	2 1/4	5	–

- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-.002	≤ 1/8"	0/.00024
		> 1/8"–1/4"	0/.00031
		> 1/4"–3/8"	0/.00035
		> 3/8"–23/32"	0/.00043
		> 23/32"–1 3/16"	0/.00051

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
TIALN	●	●	●	●	○	○	●	●	●	○	○	○	●	○	○	○	●

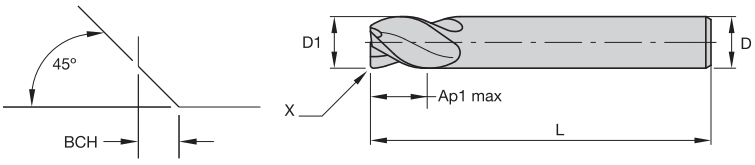
P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

For application data, see page B24.

Series 4VP5 • VariMill I • Extended Reach

TIALN-LT	D1	D	length of cut Ap1 max	length L	BCH
TF4VP507012S	1/4	1/4	3/8	4	–
TF4VP507012	1/4	1/4	3/8	4	.016
TF4VP510014S	3/8	3/8	1/2	4	–
TF4VP510014	3/8	3/8	1/2	4	.020
TF4VP513005S	1/2	1/2	5/8	5	–
TF4VP513005	1/2	1/2	5/8	5	.020
TF4VP513015S	1/2	1/2	5/8	6	–
TF4VP513015	1/2	1/2	5/8	6	.020
TF4VP516006S	5/8	5/8	3/4	5	–
TF4VP516006	5/8	5/8	3/4	5	.020
TF4VP516016S	5/8	5/8	3/4	6	–
TF4VP516016	5/8	5/8	3/4	6	.020
TF4VP516026S	5/8	5/8	3/4	7	–
TF4VP516026	5/8	5/8	3/4	7	.020
TF4VP519007S	3/4	3/4	1	5	–
TF4VP519007	3/4	3/4	1	5	.020
TF4VP519017S	3/4	3/4	1	6	–
TF4VP519017	3/4	3/4	1	6	.020
TF4VP519027S	3/4	3/4	1	7	–
TF4VP519027	3/4	3/4	1	7	.020
TF4VP525008S	1	1	1 1/8	5	–
TF4VP525008	1	1	1 1/8	5	.020
TF4VP525018S	1	1	1 1/8	6	–
TF4VP525018	1	1	1 1/8	6	.020
TF4VP525028S	1	1	1 1/8	7	–
TF4VP525028	1	1	1 1/8	7	.020

- Unequal flute spacing.
- Center cutting.
- Optimized geometry for titanium machining.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-.002	≤ 1/8"	0/.00024
		> 1/8"–1/4"	0/.00031
		> 1/4"–3/8"	0/.00035
		> 3/8"–23/32"	0/.00043
		> 23/32"–1 3/16"	0/.00051

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
ALTIN	○	○	○	○	●	●	●	●	●	○	○	○	○	●	●	●	●

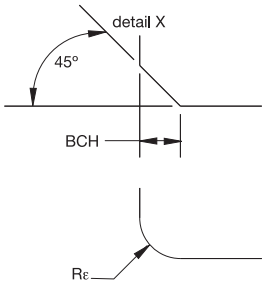
P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

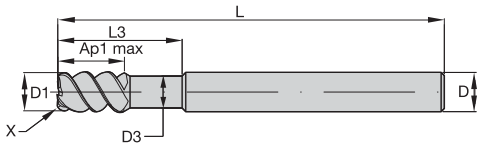
For application data, see page B24.

Series 4VPT • VariMill I • Extended Reach

ALTIN-MT	D1	D	length of cut Ap1 max	length L	BCH
TM4VPT13005	1/2	1/2	5/8	5	.020
TM4VPT13005S	1/2	1/2	5/8	5	—
TM4VPT13015	1/2	1/2	5/8	6	.020
TM4VPT13015S	1/2	1/2	5/8	6	—
TM4VPT16006	5/8	5/8	3/4	5	.020
TM4VPT16006S	5/8	5/8	3/4	5	—
TM4VPT16016	5/8	5/8	3/4	6	.020
TM4VPT16016S	5/8	5/8	3/4	6	—
TM4VPT16026	5/8	5/8	3/4	7	.020
TM4VPT16026S	5/8	5/8	3/4	7	—
TM4VPT19007	3/4	3/4	1	5	.020
TM4VPT19007S	3/4	3/4	1	5	—
TM4VPT19017	3/4	3/4	1	6	.020
TM4VPT19017S	3/4	3/4	1	6	—
TM4VPT19027	3/4	3/4	1	7	.020
TM4VPT19027S	3/4	3/4	1	7	—
TM4VPT25008	1	1	1 1/8	5	.020
TM4VPT25008S	1	1	1 1/8	5	—
TM4VPT25018	1	1	1 1/8	6	.020
TM4VPT25018S	1	1	1 1/8	6	—
TM4VPT25028	1	1	1 1/8	7	.020
TM4VPT25028S	1	1	1 1/8	7	—

- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.





End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-.002	≤ 1/8"	0/.00024
		> 1/8"–1/4"	0/.00031
		> 1/4"–3/8"	0/.00035
		> 3/8"–23/32"	0/.00043
		> 23/32"–1 3/16"	0/.00051

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
TIALN	●	●	●	●	○	○	●	●	●	○	○	○	●	○	○	○	●

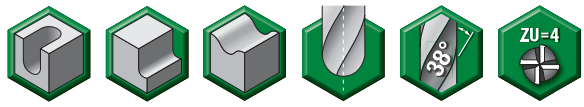
P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

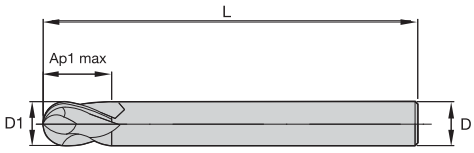
For application data, see page B25.

Series 4VN5 • VariMill I • Extended Reach and Neck

TIALN-LT	TIALN-LW	D1	D	D3	length of cut Ap1 max	length L3	length L	Rε	BCH
TF4VN507012	–	1/4	1/4	.235	3/8	1 1/4	4	–	.016
TF4VN507012A	–	1/4	1/4	.235	3/8	1 1/4	4	.015	–
TF4VN507012B	–	1/4	1/4	.235	3/8	1 1/4	4	.030	–
TF4VN510014	–	3/8	3/8	.353	1/2	1 7/8	4	–	.020
TF4VN510014B	–	3/8	3/8	.353	1/2	1 7/8	4	.030	–
TF4VN510014C	–	3/8	3/8	.353	1/2	1 7/8	4	.060	–
–	TF4VN513005	1/2	1/2	.470	5/8	2 1/4	4	–	.020
–	TF4VN513005B	1/2	1/2	.470	5/8	2 1/4	4	.030	–
–	TF4VN513005C	1/2	1/2	.470	5/8	2 1/4	4	.060	–
–	TF4VN513005E	1/2	1/2	.470	5/8	2 1/4	4	.120	–
–	TF4VN516006	5/8	5/8	.588	3/4	2 1/4	4 1/8	–	.020
–	TF4VN516006C	5/8	5/8	.588	3/4	2 1/4	4 1/8	.060	–
–	TF4VN516006E	5/8	5/8	.588	3/4	2 1/4	4 1/8	.120	–
–	TF4VN516016	5/8	5/8	.588	3/4	3 1/8	5	–	.020
–	TF4VN519007	3/4	3/4	.705	1	2 1/4	4 1/4	–	.020
–	TF4VN519017	3/4	3/4	.705	1	3 1/4	5 1/4	–	.020
–	TF4VN519017B	3/4	3/4	.705	1	3 1/4	5 1/4	.030	–
–	TF4VN519017C	3/4	3/4	.705	1	3 1/4	5 1/4	.060	–
–	TF4VN519017E	3/4	3/4	.705	1	3 1/4	5 1/4	.120	–
–	TF4VN525008	1	1	.940	1 1/8	2 1/4	4 1/2	–	.020
–	TF4VN525018	1	1	.940	1 1/8	3 1/4	5 1/2	–	.020
–	TF4VN525018B	1	1	.940	1 1/8	3 1/4	5 1/2	.030	–
–	TF4VN525018C	1	1	.940	1 1/8	3 1/4	5 1/2	.060	–
–	TF4VN525018E	1	1	.940	1 1/8	3 1/4	5 1/2	.120	–
–	TF4VN525028	1	1	.940	1 1/8	4 1/4	6 1/2	–	.020

- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.





End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-.002	≤ 1/8"	0/.00024
		> 1/8"–1/4"	0/.00031
		> 1/4"–3/8"	0/.00035
		> 3/8"–23/32"	0/.00043
		> 23/32"–1 3/16"	0/.00051

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
TIALN	●	●	●	●	●	●	●	●	●	○	○	○	●	●	●	●	●

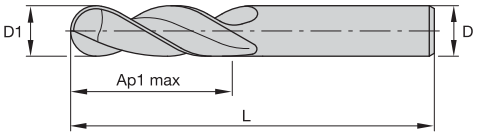
P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

For application data, see page B25.

Series 4VP0 • VariMill I • Extended Reach • Ball Nose

TIALN-LT	D1	D	length of cut Ap1 max	length L
TF4VP007012	1/4	1/4	3/8	4
TF4VP010014	3/8	3/8	1/2	4
TF4VP013005	1/2	1/2	5/8	5
TF4VP016016	5/8	5/8	3/4	6
TF4VP019017	3/4	3/4	1	6
TF4VP025018	1	1	1 1/8	6

- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-.002	≤ 1/8"	0/.00024
		> 1/8"–1/4"	0/.00031
		> 1/4"–3/8"	0/.00035
		> 3/8"–23/32"	0/.00043
		> 23/32"–1 3/16"	0/.00051

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
TIALN	●	●	●	●	○	○	●	●	●	○	○	○	●	○	○	○	●

P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

For application data, see page B26.

Series 4V00 • VariMill I • Extended Length of Cut • Ball Nose

TIALN-LT	TIALN-LW	D1	D	length of cut Ap1 max	length L
TF4V0003001	–	1/8	1/8	1/2	2
TF4V0005000	–	3/16	3/16	5/8	2 1/4
TF4V0007002	–	1/4	1/4	3/4	2 1/2
TF4V0008003	–	5/16	5/16	3/4	2 1/2
TF4V0010004	–	3/8	3/8	7/8	2 1/2
TF4V001101A	–	7/16	7/16	7/8	2 1/2
–	**TF4V0013005**	1/2	1/2	1	3
–	**TF4V0013015**	1/2	1/2	1 1/4	3
–	**TF4V0016006**	5/8	5/8	1 1/4	3 1/2
–	**TF4V0019007**	3/4	3/4	1 1/2	4
–	**TF4V0025008**	1	1	1 1/2	4
–	**TF4V0032009**	1 1/4	1 1/4	2 1/4	5

Series 4V05 • Lists 4V05 4V45

Material Group		A ap	A ae	B ap	TIALN Cutting Speed – vc SFM min		TIALN max	ALTIN min		ALTIN max	Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. D1 — Diameter frac.	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1	1-1/4
											dec.	.1250	.1880	.2500	.3130	.3750	.4380	.5000	.6250	.7500	1.000	1.250
P	1	1.25 x D	0.5 x D	1 x D	490	–	660	490	–	660	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	2	1.25 x D	0.5 x D	1 x D	460	–	620	460	–	620	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	3	1.25 x D	0.5 x D	1 x D	390	–	520	390	–	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	4	1.25 x D	0.5 x D	0.75 x D	300	–	490	300	–	490	IPT	.0007	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039	.0049
	5	1.25 x D	0.5 x D	1 x D	200	–	330	200	–	330	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	6	1.25 x D	0.5 x D	0.75 x D	160	–	250	160	–	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028	.0036
M	1	1.25 x D	0.5 x D	1 x D	260	–	330	260	–	330	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	2	1.25 x D	0.5 x D	1 x D	200	–	260	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	3	1.25 x D	0.5 x D	1 x D	200	–	260	200	–	260	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028	.0036
K	1	1.25 x D	0.5 x D	1 x D	390	–	520	390	–	520	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	2	1.25 x D	0.5 x D	1 x D	360	–	460	360	–	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	3	1.25 x D	0.5 x D	1 x D	330	–	430	330	–	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
S	1	1.0 x D	0.3 x D	0.3 x D	160	–	300	160	–	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	2	1.0 x D	0.3 x D	0.3 x D	70	–	130	70	–	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0018	.0020	.0025	.0031
	3	1.25 x D	0.5 x D	1 x D	160	–	260	160	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	4	1.25 x D	0.5 x D	1 x D	150	–	210	150	–	210	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0022	.0025	.0028	.0033	.0042
H	1	1.25 x D	0.5 x D	0.75 x D	260	–	460	260	–	460	IPT	.0007	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039	.0049

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group. Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group. Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 4V05 • Lists 4V15 4V65

Material Group		A ap	A ae	B ap	TIALN Cutting Speed — vc SFM min		TIALN max	ALTIN min		ALTIN max	Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. D1 — Diameter frac.	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1	1-1/4
											dec.	.1250	.1880	.2500	.3130	.3750	.4380	.5000	.6250	.7500	1.000	1.250
P	1	2 x D	0.25 x D	0.5 x D	490	–	660	490	–	660	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	2	2 x D	0.25 x D	0.5 x D	460	–	620	460	–	620	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	3	2 x D	0.25 x D	0.5 x D	390	–	520	390	–	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	4	2 x D	0.25 x D	0.4 x D	300	–	490	300	–	490	IPT	.0007	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039	.0049
	5	2 x D	0.25 x D	0.5 x D	200	–	330	200	–	330	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	6	2 x D	0.25 x D	0.4 x D	160	–	250	160	–	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028	.0036
M	1	2 x D	0.25 x D	0.5 x D	260	–	330	260	–	330	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	2	2 x D	0.25 x D	0.5 x D	200	–	260	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	3	2 x D	0.25 x D	0.5 x D	200	–	260	200	–	260	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028	.0036
K	1	2 x D	0.25 x D	0.5 x D	390	–	520	390	–	520	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	2	2 x D	0.25 x D	0.5 x D	360	–	460	360	–	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	3	2 x D	0.25 x D	0.5 x D	330	–	430	330	–	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
S	1	2 x D	0.15 x D	0.2 x D	160	–	300	160	–	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	2	2 x D	0.15 x D	0.2 x D	70	–	130	70	–	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0018	.0020	.0025	.0031
	3	2 x D	0.25 x D	0.5 x D	160	–	260	160	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	4	2 x D	0.25 x D	0.5 x D	150	–	210	150	–	210	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0022	.0025	.0028	.0033	.0042
H	1	2 x D	0.25 x D	0.4 x D	260	–	460	260	–	460	IPT	.0007	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039	.0049

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group. Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group. Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 4V05 • Lists 4V25 4V65

Material Group		A		TIALN			ALTIN			Recommended feed per tooth (IPT=inch/th) for side milling (A).												
				Cutting Speed — vc SFM			Cutting Speed — vc SFM			D1 — Diameter												
										frac.	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1	1-1/4
		ap	ae	min		max	min		max	dec.	.1250	.1880	.2500	.3130	.3750	.4380	.5000	.6250	.7500	1.000	1.250
P	1	2.5 x D	0.1 x D	490	–	660	490	–	660	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	2	2.5 x D	0.1 x D	460	–	620	460	–	620	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	3	2.5 x D	0.1 x D	390	–	520	390	–	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	4	2.5 x D	0.1 x D	300	–	490	300	–	490	IPT	.0007	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039	.0049
	5	2.5 x D	0.1 x D	200	–	330	200	–	330	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	6	2.5 x D	0.1 x D	160	–	250	160	–	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028	.0036
M	1	2.5 x D	0.1 x D	260	–	330	260	–	330	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	2	2.5 x D	0.1 x D	200	–	260	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	3	2.5 x D	0.1 x D	200	–	260	200	–	260	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028	.0036
K	1	2.5 x D	0.1 x D	390	–	520	390	–	520	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	2	2.5 x D	0.1 x D	360	–	460	360	–	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	3	2.5 x D	0.1 x D	330	–	430	330	–	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
S	1	2.5 x D	0.06 x D	160	–	300	160	–	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	2	2.5 x D	0.06 x D	70	–	130	70	–	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0018	.0020	.0025	.0031
	3	2.5 x D	0.1 x D	160	–	260	160	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	4	2.5 x D	0.1 x D	150	–	210	150	–	210	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0022	.0025	.0028	.0033	.0042
H	1	2.5 x D	0.1 x D	260	–	460	260	–	460	IPT	.0007	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039	.0049

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 4V0T

Material Group		A		B	ALTIN			Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.					
					Cutting Speed — vc SFM			D1 — Diameter					
								frac.	1/2	5/8	3/4	1	1-1/4
		ap	ae	ap	min		max	dec.	.5000	.6250	.7500	1.000	1.250
P	1	1.25 x D	0.5 x D	1 x D	490	–	660	IPT	.0035	.0039	.0043	.0050	.0062
	2	1.25 x D	0.5 x D	1 x D	460	–	620	IPT	.0035	.0039	.0043	.0050	.0062
	3	1.25 x D	0.5 x D	1 x D	390	–	520	IPT	.0029	.0034	.0038	.0046	.0057
	4	1.25 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0026	.0030	.0033	.0039	.0049
	5	1.25 x D	0.5 x D	1 x D	200	–	330	IPT	.0023	.0027	.0030	.0036	.0046
	6	1.25 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0019	.0022	.0024	.0028	.0036
M	1	1.25 x D	0.5 x D	1 x D	260	–	330	IPT	.0029	.0034	.0038	.0046	.0057
	2	1.25 x D	0.5 x D	1 x D	200	–	260	IPT	.0023	.0027	.0030	.0036	.0046
	3	1.25 x D	0.5 x D	1 x D	200	–	260	IPT	.0019	.0022	.0024	.0028	.0036
K	1	1.25 x D	0.5 x D	1 x D	390	–	520	IPT	.0035	.0039	.0043	.0050	.0062
	2	1.25 x D	0.5 x D	1 x D	360	–	460	IPT	.0029	.0034	.0038	.0046	.0057
	3	1.25 x D	0.5 x D	1 x D	330	–	430	IPT	.0023	.0027	.0030	.0036	.0046
S	1	1.0 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0029	.0034	.0038	.0046	.0057
	2	1.0 x D	0.3 x D	0.3 x D	70	–	130	IPT	.0016	.0018	.0020	.0025	.0031
	3	1.25 x D	0.5 x D	1 x D	160	–	260	IPT	.0023	.0027	.0030	.0036	.0046
	4	1.25 x D	0.5 x D	1 x D	150	–	210	IPT	.0022	.0025	.0028	.0033	.0042
H	1	1.25 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0026	.0030	.0033	.0039	.0049

NOTE: Side milling applications — for longest reach (L3) tools, reduce ae by 30%.
Slot milling applications — for longest reach (L3) tools, reduce ap by 30%.
Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 4VP5 • Lists 4V15 4V65

Material Group		A ap	A ae	B ap	TIALN Cutting Speed — vc SFM min		TIALN Cutting Speed — vc SFM max	Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. D1 — Diameter dec.	frac. 1/4	3/8	1/2	5/8	3/4	1
									dec. .2500	.3750	.5000	.6250	.7500	1.000
P	1	0.75 x D	0.5 x D	0.75 x D	500	–	650	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	450	–	625	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	3	0.75 x D	0.5 x D	0.75 x D	400	–	525	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	4	0.75 x D	0.5 x D	0.5 x D	300	–	475	IPT	.0014	.0020	.0026	.0030	.0033	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	–	325	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	6	0.75 x D	0.5 x D	0.5 x D	150	–	225	IPT	.0010	.0015	.0019	.0022	.0024	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	260	–	330	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0010	.0015	.0019	.0022	.0024	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	3	0.75 x D	0.5 x D	0.75 x D	330	–	430	IPT	.0012	.0018	.0023	.0027	.0030	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	150	–	275	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.3 x D	0.3 x D	70	–	130	IPT	.0008	.0012	.0016	.0018	.0020	.0025
	3	0.75 x D	0.5 x D	0.75 x D	160	–	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	4	0.75 x D	0.5 x D	0.75 x D	150	–	210	IPT	.0011	.0017	.0022	.0025	.0028	.0033
H	1	0.75 x D	0.5 x D	0.5 x D	260	–	450	IPT	.0014	.0020	.0026	.0030	.0033	.0039

NOTE: Side milling applications — for longest reach (L3) tools, reduce ae by 30%.
Slot milling applications — for longest reach (L3) tools, reduce ap by 30%.
Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 4VPT

Material Group		A ap	A ae	B ap	ALTIN Cutting Speed — vc SFM min		ALTIN Cutting Speed — vc SFM max	Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. D1 — Diameter dec.	frac. 1/2	5/8	3/4	1
									dec. .5000	.6250	.7500	1.000
P	1	0.75 x D	0.5 x D	0.75 x D	500	–	650	IPT	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	450	–	625	IPT	.0035	.0039	.0043	.0050
	3	0.75 x D	0.5 x D	0.75 x D	400	–	525	IPT	.0029	.0034	.0038	.0046
	4	0.75 x D	0.5 x D	0.5 x D	300	–	475	IPT	.0026	.0030	.0033	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	–	325	IPT	.0023	.0027	.0030	.0036
	6	0.75 x D	0.5 x D	0.5 x D	150	–	225	IPT	.0019	.0022	.0024	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	260	–	330	IPT	.0029	.0034	.0038	.0046
	2	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0023	.0027	.0030	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0019	.0022	.0024	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0029	.0034	.0038	.0046
	3	0.75 x D	0.5 x D	0.75 x D	330	–	430	IPT	.0023	.0027	.0030	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	150	–	275	IPT	.0029	.0034	.0038	.0046
	2	0.75 x D	0.3 x D	0.3 x D	70	–	130	IPT	.0016	.0018	.0020	.0025
	3	0.75 x D	0.5 x D	0.75 x D	160	–	260	IPT	.0023	.0027	.0030	.0036
	4	0.75 x D	0.5 x D	0.75 x D	150	–	210	IPT	.0022	.0025	.0028	.0033
H	1	0.75 x D	0.5 x D	0.5 x D	260	–	450	IPT	.0026	.0030	.0033	.0039

NOTE: Side milling applications — for longest reach (L3) tools, reduce ae by 30%.
Slot milling applications — for longest reach (L3) tools, reduce ap by 30%.
Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 4VN5 • Lists 4V15 4V65

Material Group		A ap	A ae	B ap	TIALN Cutting Speed — vc SFM min		TIALN Cutting Speed — vc SFM max	Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. D1 — Diameter frac.	1/4	3/8	1/2	5/8	3/4	1
								dec.	.2500	.3750	.5000	.6250	.7500	1.000
P	1	0.75 x D	0.5 x D	0.75 x D	500	–	650	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	450	–	625	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	3	0.75 x D	0.5 x D	0.75 x D	400	–	525	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	4	0.75 x D	0.5 x D	0.5 x D	300	–	475	IPT	.0014	.0020	.0026	.0030	.0033	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	–	325	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	6	0.75 x D	0.5 x D	0.5 x D	150	–	225	IPT	.0010	.0015	.0019	.0022	.0024	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	260	–	330	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0010	.0015	.0019	.0022	.0024	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	3	0.75 x D	0.5 x D	0.75 x D	330	–	430	IPT	.0012	.0018	.0023	.0027	.0030	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	150	–	275	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.3 x D	0.3 x D	70	–	130	IPT	.0008	.0012	.0016	.0018	.0020	.0025
	3	0.75 x D	0.5 x D	0.75 x D	160	–	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	4	0.75 x D	0.5 x D	0.75 x D	150	–	210	IPT	.0011	.0017	.0022	.0025	.0028	.0033
H	1	0.75 x D	0.5 x D	0.5 x D	260	–	450	IPT	.0014	.0020	.0026	.0030	.0033	.0039

NOTE: Side milling applications — for longest reach (L3) tools, reduce ae by 30%.
Slot milling applications — for longest reach (L3) tools, reduce ap by 30%.
Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 4VP0

Material Group		A ap	A ae	B ap	TIALN Cutting Speed — vc SFM min		TIALN Cutting Speed — vc SFM max	Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. D1 — Diameter frac.	1/4	3/8	1/2	5/8	3/4	1
								dec.	.2500	.3750	.5000	.6250	.7500	1.000
P	1	0.75 x D	0.5 x D	0.75 x D	490	–	660	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	460	–	620	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	3	0.75 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	4	0.75 x D	0.5 x D	0.5 x D	300	–	490	IPT	.0014	.0020	.0026	.0030	.0033	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	–	330	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	6	0.75 x D	0.5 x D	0.5 x D	160	–	250	IPT	.0010	.0015	.0019	.0022	.0024	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	260	–	330	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0010	.0015	.0019	.0022	.0024	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	3	0.75 x D	0.5 x D	0.75 x D	330	–	430	IPT	.0012	.0018	.0023	.0027	.0030	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.3 x D	0.3 x D	70	–	130	IPT	.0008	.0012	.0016	.0018	.0020	.0025
	3	0.75 x D	0.5 x D	0.75 x D	160	–	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	4	0.75 x D	0.5 x D	0.75 x D	150	–	210	IPT	.0011	.0017	.0022	.0025	.0028	.0033
H	1	0.75 x D	0.5 x D	0.5 x D	260	–	460	IPT	.0014	.0020	.0026	.0030	.0033	.0039

NOTE: Side milling applications — for longest reach (L3) tools, reduce ae by 30%.
Slot milling applications — for longest reach (L3) tools, reduce ap by 30%.
Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 4V00

Material Group		A		B	TIALN Cutting Speed — vc SFM			Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. D1 — Diameter											
								frac.	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1	1-1/4
		ap	ae	ap	min		max	dec.	.1250	.1880	.2500	.3130	.3750	.4380	.5000	.6250	.7500	1.000	1.250
P	1	1.25 x D	0.5 x D	1 x D	490	–	660	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	2	1.25 x D	0.5 x D	1 x D	460	–	620	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	3	1.25 x D	0.5 x D	1 x D	390	–	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	4	1.25 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0007	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039	.0049
	5	1.25 x D	0.5 x D	1 x D	200	–	330	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	6	1.25 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028	.0036
M	1	1.25 x D	0.5 x D	1 x D	260	–	330	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	2	1.25 x D	0.5 x D	1 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	3	1.25 x D	0.5 x D	1 x D	200	–	260	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028	.0036
K	1	1.25 x D	0.5 x D	1 x D	390	–	520	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	2	1.25 x D	0.5 x D	1 x D	360	–	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	3	1.25 x D	0.5 x D	1 x D	330	–	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
S	1	1.0 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	2	1.0 x D	0.3 x D	0.3 x D	70	–	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0018	.0020	.0025	.0031
	3	1.25 x D	0.5 x D	1 x D	160	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	4	1.25 x D	0.5 x D	1 x D	150	–	210	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0022	.0025	.0028	.0033	.0042
H	1	1.25 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0007	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039	.0049

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Our complete portfolio.
Your complete satisfaction.

From turning, holemaking, and indexable milling to solid carbide end milling, solid carbide drilling, and tapping, the most powerful tools in the business now proudly wear WIDIA™ brands. When you buy WIDIA products, you're not just purchasing speed, power, and precision, you're investing in quality and complete satisfaction.

Match the most expansive portfolio of precision-engineered products and engineered solution services available today with a global, specialized network of Authorized Distributor partners, and you have the tools you need — and the power that only comes from WIDIA brands. For product information, or to schedule an onsite demonstration, visit www.widia.com.

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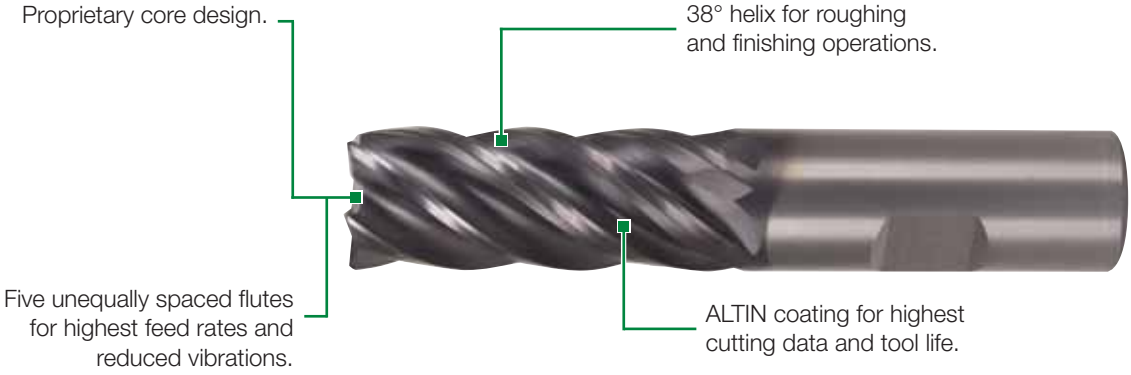
WIDIA™

High-Performance Solid Carbide End Mills • **VariMill II**™

VariMill II end mills are the proven leader in the field of high-performance, chatter-free machining. They are designed to provide maximum metal removal rates and to achieve supreme surface conditions. Utilizing an innovative and proprietary design with unequal flute spacing, VariMill II carbide end mills provide users with the most versatile technology available, capable of outperforming most other high-performance tools.

VariMill II

- 1 x D slotting in titanium and stainless steels with five unequally spaced flutes.
- Roughing and finishing with one tool.
- Various lengths of cut; necked and corner radius versions available.



*To learn more, **scan here**.*
For instructions on how to scan, please see page xvii.

VariMill II™ Series

- Five unequally spaced flutes boost your output with higher feed rates.
- Roughing and finishing with one tool.
- Less passes due to 1 x D slotting capability on almost all materials, including titanium.
- Ramping up to 3°.

5V0S Series

- Highest Metal Removal Rates and tool life in:
  - — Stainless steels, steels, and alloyed steels
  - — Cast iron
  - — High-temperature alloys and titanium
- Corner radii and sharp edges.

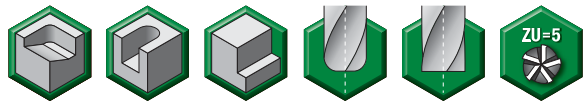
5V0T Series

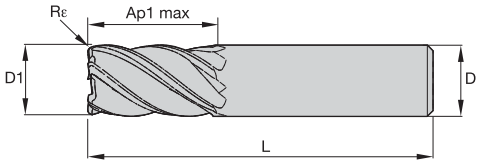
- Titanium and stainless steel geometry design.
- Corner radii and sharp edges.

5VNS Series

- Titanium and stainless steel geometry design.
- Radii corner and neck design for depths requiring additional passes.

- Unequal flute spacing.
- Non-center cutting.
- Maximum ramp angle = 3°.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Slotting up to 1 x D.





End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-.002	≤ 1/8"	0/.00024
		> 1/8"–1/4"	0/.00031
		> 1/4"–3/8"	0/.00035
		> 3/8"–23/32"	0/.00043
		> 23/32"–1 3/16"	0/.00051

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
ALTIN	●	●	●	●	●	●	●	●	●	○	○	○	●	○	○	○	●

P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

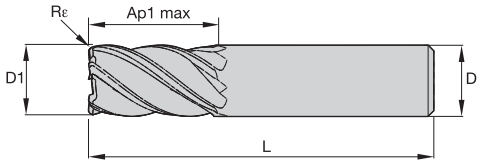
For application data, see page B35.

Series 5V0S • VariMill II

ALTIN-MT	ALTIN-MW	D1	D	length of cut Ap1 max	length L	Rε
TM5V0S05000A	–	3/16	3/16	5/8	2 1/4	.015
TM5V0S05000B	–	3/16	3/16	5/8	2 1/4	.030
TM5V0S05000S	–	3/16	3/16	5/8	2 1/4	–
TM5V0S07002A	–	1/4	1/4	3/4	2 1/2	.015
TM5V0S07002B	–	1/4	1/4	3/4	2 1/2	.030
TM5V0S07002C	–	1/4	1/4	3/4	2 1/2	.060
TM5V0S07002S	–	1/4	1/4	3/4	2 1/2	–
TM5V0S08003A	–	5/16	5/16	3/4	2 1/2	.015
TM5V0S08003B	–	5/16	5/16	3/4	2 1/2	.030
TM5V0S08003C	–	5/16	5/16	3/4	2 1/2	.060
TM5V0S08003S	–	5/16	5/16	3/4	2 1/2	–
TM5V0S10004A	–	3/8	3/8	7/8	2 1/2	.015
TM5V0S10004B	–	3/8	3/8	7/8	2 1/2	.030
TM5V0S10004C	–	3/8	3/8	7/8	2 1/2	.060
TM5V0S10004S	–	3/8	3/8	7/8	2 1/2	–
TM5V0S13015A	TM5V0S13015AW	1/2	1/2	1 1/4	3	.015
TM5V0S13015B	TM5V0S13015BW	1/2	1/2	1 1/4	3	.030
TM5V0S13015C	TM5V0S13015CW	1/2	1/2	1 1/4	3	.060
TM5V0S13015D	TM5V0S13015DW	1/2	1/2	1 1/4	3	.090
TM5V0S13015E	TM5V0S13015EW	1/2	1/2	1 1/4	3	.120
TM5V0S13015S	TM5V0S13015SW	1/2	1/2	1 1/4	3	–
TM5V0S16006B	TM5V0S16006BW	5/8	5/8	1 1/4	3 1/2	.030

(continued)

(Series 5V05 • VariMill II continued)



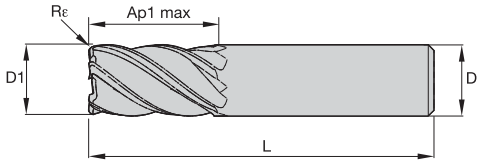
	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
ALTIN	●	●	●	●	●	●	●	●	●	○	○	○	●	○	○	○	●

P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

For application data, see page B35.

ALTIN-MT	ALTIN-MW	D1	D	length of cut Ap1 max	length L	Rε
TM5V0S16006C	TM5V0S16006CW	5/8	5/8	1 1/4	3 1/2	.060
TM5V0S16006D	TM5V0S16006DW	5/8	5/8	1 1/4	3 1/2	.090
TM5V0S16006S	TM5V0S16006SW	5/8	5/8	1 1/4	3 1/2	—
TM5V0S19007B	TM5V0S19007BW	3/4	3/4	1 1/2	4	.030
TM5V0S19007C	TM5V0S19007CW	3/4	3/4	1 1/2	4	.060
TM5V0S19007D	TM5V0S19007DW	3/4	3/4	1 1/2	4	.090
TM5V0S19007E	TM5V0S19007EW	3/4	3/4	1 1/2	4	.120
TM5V0S19007S	TM5V0S19007SW	3/4	3/4	1 1/2	4	—
TM5V0S25008B	TM5V0S25008BW	1	1	1 3/4	4 1/2	.030
TM5V0S25008C	TM5V0S25008CW	1	1	1 3/4	4 1/2	.060
TM5V0S25008D	TM5V0S25008DW	1	1	1 3/4	4 1/2	.090
TM5V0S25008E	TM5V0S25008EW	1	1	1 3/4	4 1/2	.120
TM5V0S25008S	TM5V0S25008SW	1	1	1 3/4	4 1/2	—

- Unequal flute spacing.
- Non-center cutting.
- Maximum ramp angle = 3°.
- Optimized geometry for titanium machining.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Slotting up to 1 x D.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-.002	≤ 1/8"	0/.00024
		> 1/8"–1/4"	0/.00031
		> 1/4"–3/8"	0/.00035
		> 3/8"–23/32"	0/.00043
		> 23/32"–1 3/16"	0/.00051

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
ALTIN	●	●	●	●	●	●	○	○	○	○	○	○	○	●	●	●	●

P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

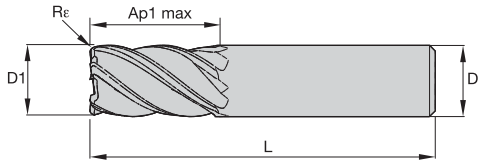
For application data, see page B35.

Series 5V0T • VariMill II

ALTIN-MT	ALTIN-MW	D1	D	length of cut Ap1 max	length L	Rε
TM5V0T07002A	–	1/4	1/4	3/4	2 1/2	.015
TM5V0T07002B	–	1/4	1/4	3/4	2 1/2	.030
TM5V0T07002C	–	1/4	1/4	3/4	2 1/2	.060
TM5V0T07002S	–	1/4	1/4	3/4	2 1/2	–
TM5V0T08003A	–	5/16	5/16	3/4	2 1/2	.015
TM5V0T08003B	–	5/16	5/16	3/4	2 1/2	.030
TM5V0T08003C	–	5/16	5/16	3/4	2 1/2	.060
TM5V0T08003S	–	5/16	5/16	3/4	2 1/2	–
TM5V0T10004A	–	3/8	3/8	7/8	2 1/2	.015
TM5V0T10004B	–	3/8	3/8	7/8	2 1/2	.030
TM5V0T10004C	–	3/8	3/8	7/8	2 1/2	.060
TM5V0T10004S	–	3/8	3/8	7/8	2 1/2	–
TM5V0T13015A	TM5V0T13015AW	1/2	1/2	1 1/4	3	.015
TM5V0T13015B	TM5V0T13015BW	1/2	1/2	1 1/4	3	.030
TM5V0T13015C	TM5V0T13015CW	1/2	1/2	1 1/4	3	.060
TM5V0T13015D	TM5V0T13015DW	1/2	1/2	1 1/4	3	.090
TM5V0T13015E	TM5V0T13015EW	1/2	1/2	1 1/4	3	.120
TM5V0T13015S	TM5V0T13015SW	1/2	1/2	1 1/4	3	–

(continued)

(Series 5V0T • VariMill II continued)



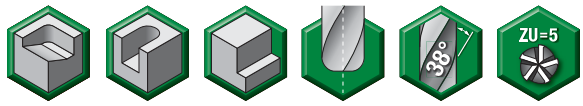
	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
ALTIN	●	●	●	●	●	●	○	○	○	○	○	○	○	●	●	●	●

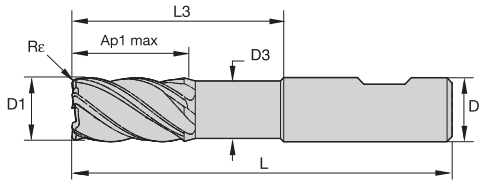
P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

For application data, see page B35.

ALTIN-MT	ALTIN-MW	D1	D	length of cut Ap1 max	length L	Rε
TM5V0T16006B	**TM5V0T16006BW**	5/8	5/8	1 1/4	3 1/2	.030
TM5V0T16006C	**TM5V0T16006CW**	5/8	5/8	1 1/4	3 1/2	.060
TM5V0T16006D	**TM5V0T16006DW**	5/8	5/8	1 1/4	3 1/2	.090
TM5V0T16006S	**TM5V0T16006SW**	5/8	5/8	1 1/4	3 1/2	—
TM5V0T19007B	**TM5V0T19007BW**	3/4	3/4	1 1/2	4	.030
TM5V0T19007C	**TM5V0T19007CW**	3/4	3/4	1 1/2	4	.060
TM5V0T19007D	**TM5V0T19007DW**	3/4	3/4	1 1/2	4	.090
TM5V0T19007E	**TM5V0T19007EW**	3/4	3/4	1 1/2	4	.120
TM5V0T19007S	**TM5V0T19007SW**	3/4	3/4	1 1/2	4	—
TM5V0T25008B	**TM5V0T25008BW**	1	1	1 3/4	4 1/2	.030
TM5V0T25008C	**TM5V0T25008CW**	1	1	1 3/4	4 1/2	.060
TM5V0T25008D	**TM5V0T25008DW**	1	1	1 3/4	4 1/2	.090
TM5V0T25008E	**TM5V0T25008EW**	1	1	1 3/4	4 1/2	.120
TM5V0T25008S	**TM5V0T25008SW**	1	1	1 3/4	4 1/2	—

- Unequal flute spacing.
- Non-center cutting.
- Maximum ramp angle = 3°.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Slotting up to 1 x D.
- Standard items listed. Additional styles and coatings made to order.





End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-.002	≤ 1/8"	0/.00024
		> 1/8"–1/4"	0/.00031
		> 1/4"–3/8"	0/.00035
		> 3/8"–23/32"	0/.00043
		> 23/32"–1 3/16"	0/.00051

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
ALTIN	●	●	○	○	●	●	○	○	○	○	○	○	○	●	●	●	●

P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

For application data, see page B36.

Series 5VNS • VariMill II • With Neck

ALTIN-MT	ALTIN-MW	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
TM5VNS07012A	–	1/4	1/4	.235	1/2	1 1/4	4	.015
TM5VNS10014A	–	3/8	3/8	.353	7/8	1 7/8	4	.015
TM5VNS13005B	TM5VNS13005BW	1/2	1/2	.470	1 1/4	2 1/4	4	.030
TM5VNS16006B	TM5VNS16006BW	5/8	5/8	.590	1 1/4	2 1/4	4	.030
TM5VNS19017B	TM5VNS19017BW	3/4	3/4	.705	1 1/2	3 1/4	5 1/2	.030
TM5VNS25018B	TM5VNS25018BW	1	1	.940	1 3/4	3 1/4	5 1/2	.030

Series 5V0S

Material Group		A ap	A ae	B ap	ALTIN Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. D1 — Diameter frac.	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1
								dec.	.1880	.2500	.3130	.3750	.4380	.5000	.6250	.7500	1.000
P	1	1.25 x D	0.5 x D	1 x D	490	–	660	IPT	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050
	2	1.25 x D	0.5 x D	1 x D	460	–	620	IPT	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050
	3	1.25 x D	0.5 x D	1 x D	390	–	520	IPT	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	4	1.25 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039
	5	1.25 x D	0.5 x D	1 x D	200	–	330	IPT	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
	6	1.25 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028
M	1	1.25 x D	0.5 x D	1 x D	260	–	330	IPT	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	2	1.25 x D	0.5 x D	1 x D	200	–	260	IPT	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
	3	1.25 x D	0.5 x D	1 x D	200	–	260	IPT	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028
K	1	1.25 x D	0.5 x D	1 x D	390	–	520	IPT	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050
	2	1.25 x D	0.5 x D	1 x D	360	–	460	IPT	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	3	1.25 x D	0.5 x D	1 x D	330	–	430	IPT	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
S	1	1.0 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	2	1.0 x D	0.3 x D	0.3 x D	70	–	130	IPT	.0006	.0008	.0010	.0012	.0014	.0016	.0018	.0020	.0025
	3	1.25 x D	0.5 x D	1 x D	160	–	260	IPT	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
	4	1.25 x D	0.5 x D	1 x D	150	–	210	IPT	.0008	.0011	.0014	.0017	.0019	.0022	.0025	.0028	.0033
H	1	1.25 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group. Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group. Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 5V0T

Material Group		A ap	A ae	B ap	ALTIN Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. D1 — Diameter frac.	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1
								dec.	.2500	.3130	.3750	.4380	.5000	.6250	.7500	1.000
P	1	1.25 x D	0.5 x D	1 x D	490	–	660	IPT	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050
	2	1.25 x D	0.5 x D	1 x D	460	–	620	IPT	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050
	3	1.25 x D	0.5 x D	1 x D	390	–	520	IPT	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	4	1.25 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039
	5	1.25 x D	0.5 x D	1 x D	200	–	330	IPT	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
	6	1.25 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028
M	1	1.25 x D	0.5 x D	1 x D	260	–	330	IPT	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	2	1.25 x D	0.5 x D	1 x D	200	–	260	IPT	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
	3	1.25 x D	0.5 x D	1 x D	200	–	260	IPT	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028
K	1	1.25 x D	0.5 x D	1 x D	390	–	520	IPT	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050
	2	1.25 x D	0.5 x D	1 x D	360	–	460	IPT	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	3	1.25 x D	0.5 x D	1 x D	330	–	430	IPT	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
S	1	1.0 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	2	1.0 x D	0.3 x D	0.3 x D	70	–	130	IPT	.0008	.0010	.0012	.0014	.0016	.0018	.0020	.0025
	3	1.25 x D	0.5 x D	1 x D	160	–	260	IPT	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
	4	1.25 x D	0.5 x D	1 x D	150	–	210	IPT	.0011	.0014	.0017	.0019	.0022	.0025	.0028	.0033
H	1	1.25 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group. Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group. Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 5VNS														
		 A		 B	 ALTIN			Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.						
					Cutting Speed — vc SFM			D1 — Diameter						
								frac.	1/4	3/8	1/2	5/8	3/4	1
Material Group		ap	ae	ap	min		max	dec.	.2500	.3750	.5000	.6250	.7500	1.000
P	1	0.75 x D	0.5 x D	0.75 x D	490	-	660	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	460	-	620	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	3	0.75 x D	0.5 x D	0.75 x D	390	-	520	IPT	0.0015	.0023	.0029	.0034	.0038	.0046
	4	0.75 x D	0.5 x D	0.5 x D	300	-	490	IPT	0.0014	.0020	.0026	.0030	.0033	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	-	330	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	6	0.75 x D	0.5 x D	0.5 x D	160	-	250	IPT	.0010	.0015	.0019	.0022	.0024	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	260	-	330	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.5 x D	0.75 x D	200	-	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	-	260	IPT	.0010	.0015	.0019	.0022	.0024	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	-	520	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	360	-	460	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	3	0.75 x D	0.5 x D	0.75 x D	330	-	430	IPT	.0012	.0018	.0023	.0027	.0030	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	160	-	300	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.3 x D	0.3 x D	70	-	130	IPT	.0008	.0012	.0016	.0018	.0020	.0025
	3	0.75 x D	0.5 x D	0.75 x D	160	-	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	4	0.75 x D	0.5 x D	0.75 x D	150	-	210	IPT	.0011	.0017	.0022	.0025	.0028	.0033
H	1	0.75 x D	0.5 x D	0.5 x D	260	-	460	IPT	.0014	.0020	.0026	.0030	.0033	.0039

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group. Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group. Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust accordingly on >1/2" diameter.

WIN WITH WIDIA™

AluSurf™ Carbide End Mills for High Metal Removal Rates and Superior Surface Finishes

Designed to significantly reduce machining time in aluminum!

- Use only one tool for roughing and finishing operations.
- Slotting is effective up to full, 1 x D axial depth; side milling (profiling) is effective up to 0.5 x D, radial by 1.5 x D axial depth.
- Three-flute series uses unequal flute spacing for chatter-free performance.
- Effective in a full range of machine speeds.
- Multiple corner radii and extended neck configurations are available as standard.

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

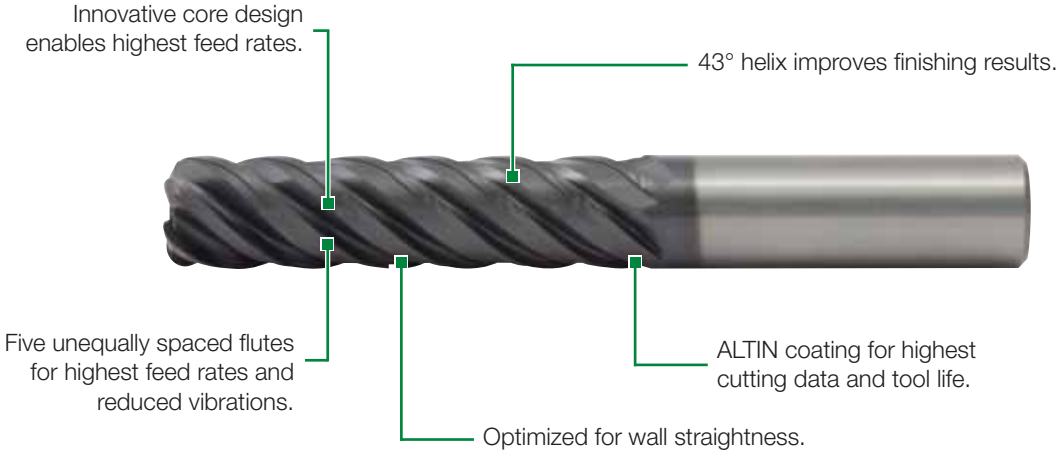
WIDIA™

High-Performance Solid Carbide End Mills • **VariMill II™ Long**

Designed to achieve highest surface quality and tool life in titanium, stainless steels, and steels. Innovative core and tool geometry design enable chatter-free corner machining in one pass. VariMill II Long covers 4 x D lengths of cut and semi-finishing and fine finishing operations with radii and sharp corner versions from stock.

VariMill II Long

- Tailored 43° helix improves surface finish.
- Less passes in side milling with 4 x D length of cut capability.
- One tool for semi-finishing and fine-finishing operations.
- No need for feed rate reduction when machining corners.



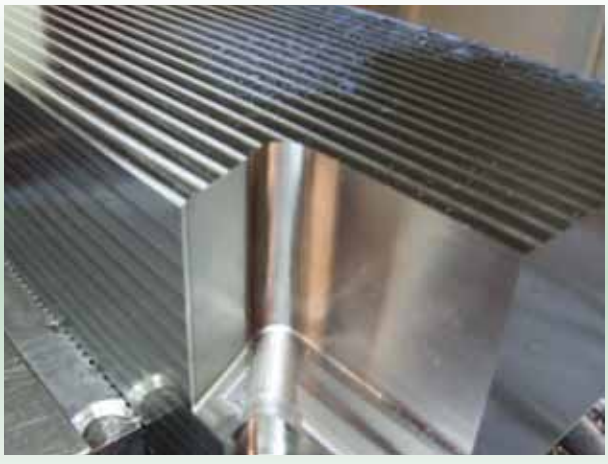
*To learn more, **scan here**.*
For instructions on how to scan, please see page xvii.

VariMill II™ Long Series

- Achieve excellent surface finish and outstanding wall straightness.
- Benefit from high accuracy even with thin wall machining.
- Simplify your programming of cavities by keeping the feed rate and radial engagement constant.

5W1S Series

- Highest surface quality and tool life in:
  - Titanium
  - Stainless steels
- Corner radii and sharp edges.
- 4 x D length of cut.

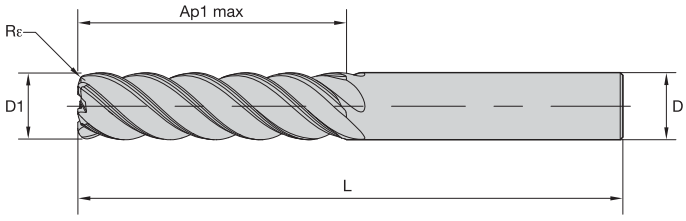


Application Example

Side milling 60° angled corner with constant feed rate.

Workpiece material:	Titanium 6Al-4V
Tool:	D = 5/8"
Cutting data:	ap = 2.5" ae = .02" vc = 328 SFM fz = .0023 IPT
Result:	Surface finish 16 RMS

- Unequal flute spacing.
- Non-center cutting.
- For finishing and semi-finishing applications.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	Tolerance	D	Tolerance h6 + / -
All	+.000/- .002"	≤1/8"	+0/-.00024"
		>1/8–1/4"	+0/-.00031"
		>1/4–3/8"	+0/-.00035"
		>3/8–23/32"	+0/-.00043"
		>23/32–1-3/16"	0/.00051"

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
AlTiN	●	●	●	●	●	●	●	●	●	○	○	○	○	●	●	●	●

P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

NEW!

Series 5W1S • VariMill II Long • 4 x D Length of Cut

ALTIN-MT	D1	D	length of cut Ap1 max	length L	Rε
TM5W1S07002A	1/4	1/4	1	3	.015
TM5W1S07002B	1/4	1/4	1	3	.030
TM5W1S07002S	1/4	1/4	1	3	–
TM5W1S08003A	5/16	5/16	1 1/4	3	.015
TM5W1S08003B	5/16	5/16	1 1/4	3	.030
TM5W1S08003S	5/16	5/16	1 1/4	3	–
TM5W1S10004A	3/8	3/8	1 1/2	4	.015
TM5W1S10004B	3/8	3/8	1 1/2	4	.030
TM5W1S10004C	3/8	3/8	1 1/2	4	.060
TM5W1S10004S	3/8	3/8	1 1/2	4	–
TM5W1S13005A	1/2	1/2	2	5	.015
TM5W1S13005B	1/2	1/2	2	5	.030
TM5W1S13005C	1/2	1/2	2	5	.060
TM5W1S13005S	1/2	1/2	2	5	–
TM5W1S16006A	5/8	5/8	2 1/2	5 1/4	.015
TM5W1S16006B	5/8	5/8	2 1/2	5 1/4	.030
TM5W1S16006C	5/8	5/8	2 1/2	5 1/4	.060
TM5W1S16006D	5/8	5/8	2 1/2	5 1/4	.090
TM5W1S16006E	5/8	5/8	2 1/2	5 1/4	.120
TM5W1S16006S	5/8	5/8	2 1/2	5 1/4	–
TM5W6S19007A	3/4	3/4	3	6	.015
TM5W6S19007B	3/4	3/4	3	6	.030
TM5W6S19007C	3/4	3/4	3	6	.060
TM5W6S19007D	3/4	3/4	3	6	.090
TM5W6S19007E	3/4	3/4	3	6	.120
TM5W6S19007S	3/4	3/4	3	6	–
TM5W6S25028A	1	1	4	7	.015
TM5W6S25028B	1	1	4	7	.030
TM5W6S25028C	1	1	4	7	.060
TM5W6S25028D	1	1	4	7	.090
TM5W6S25028E	1	1	4	7	.120
TM5W6S25028S	1	1	4	7	–

Series 5W1S													
		A		ALTIN-MT		Recommended feed per tooth (IPT=inch/th) for side milling (A).							
				Cutting Speed – vc SFM		D1 — Diameter							
						frac.	1/4	5/16	3/8	1/2	5/8	3/4	1
Material Group		ap	ae	min	max	dec.	.2500	.3125	.3750	.5000	.6250	.7500	1000
P	1	Ap1 max	0.05 x D*	990	1320	IPT	.0018	.0023	.0027	.0035	.0039	.0043	.0050
	2	Ap1 max	0.05 x D*	924	1254	IPT	.0018	.0023	.0027	.0035	.0039	.0043	.0050
	3	Ap1 max	0.05 x D*	792	1056	IPT	.0015	.0020	.0023	.0029	.0034	.0038	.0046
	4	Ap1 max	0.05 x D*	594	990	IPT	.0014	.0018	.0020	.0026	.0030	.0033	.0039
	5	Ap1 max	0.05 x D*	396	660	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	6	Ap1 max	0.05 x D*	330	495	IPT	.0010	.0013	.0015	.0019	.0022	.0024	.0028
M	1	Ap1 max	0.05 x D*	594	759	IPT	.0015	.0020	.0023	.0029	.0034	.0038	.0046
	2	Ap1 max	0.05 x D*	396	528	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	3	Ap1 max	0.05 x D*	396	462	IPT	.0010	.0013	.0015	.0019	.0022	.0024	.0028
K	1	Ap1 max	0.05 x D*	792	990	IPT	.0018	.0023	.0027	.0035	.0039	.0043	.0050
	2	Ap1 max	0.05 x D*	726	858	IPT	.0015	.0020	.0028	.0029	.0034	.0038	.0046
	3	Ap1 max	0.05 x D*	660	858	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
S	1	Ap1 max	0.05 x D*	330	594	IPT	.0015	.0020	.0028	.0029	.0034	.0038	.0046
	2	Ap1 max	0.05 x D*	165	264	IPT	.0008	.0010	.0012	.0016	.0018	.0020	.0025
	3	Ap1 max	0.05 x D*	396	528	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	4	Ap1 max	0.05 x D*	330	396	IPT	.0011	.0014	.0017	.0022	.0025	.0028	.0033
H	1	Ap1 max	0.05 x D*	462	528	IPT	.0014	.0018	.0020	.0026	.0030	.0033	.0039

**For the above cutting data, do not exceed an overall ae of .032".*

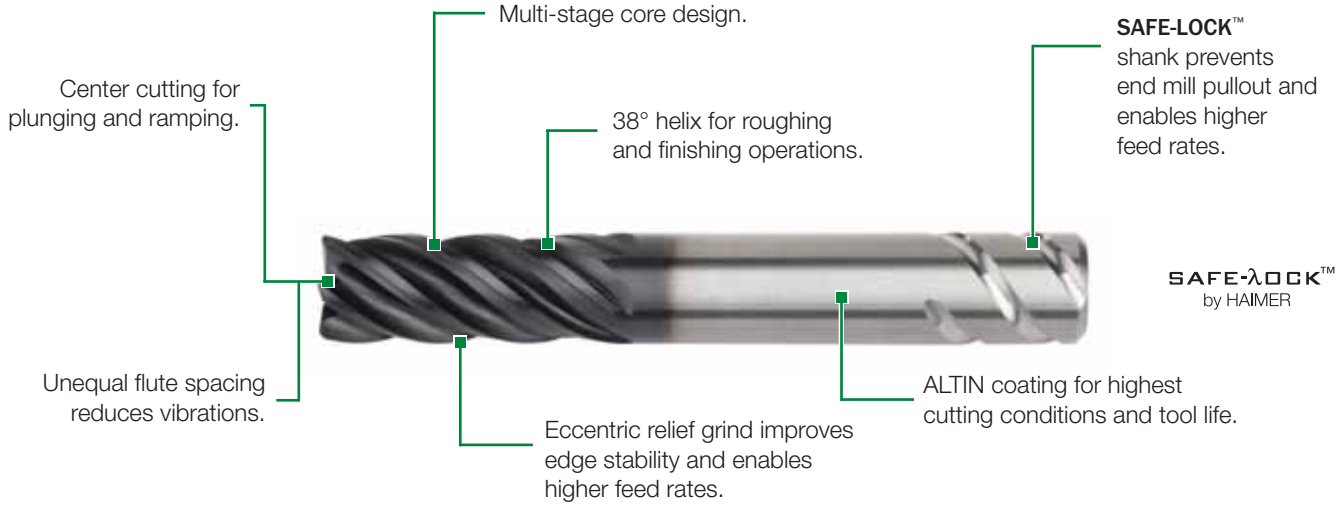
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machinining centers, please adjust parameters accordingly on >1/2" diameter.

High-Performance Solid Carbide End Mills • **VariMill II™ ER**

Engineered with Eccentric Relief (ER) grind at the cutting edges for greater edge strength, enabling higher metal removal rates and increased productivity. The new VariMill II ER is the first WIDIA™ off-the-shelf end mill available with **SAFE-LOCK**™ by HAIMER® providing excellent stability, eliminating end mill pullout, and increasing concentric tool clamping. Though primarily designed for roughing and finishing applications in the aerospace industry, VariMill II ER can be used as a solution for any titanium or stainless steel application and is capable of slotting, ramping, and plunging.

VariMill II ER

- High-performance tools for titanium and stainless steel workpiece materials.
- Roughing and finishing with one tool, lowering tool costs.
- Various radius and necked versions available.
- Standard offering with **SAFE-LOCK**™ by HAIMER®.



VariMill II™ ER Series

- Unique titanium geometry providing increased tool life and higher metal removal rates.
- Increased output due to fewer tool changes and higher metal removal rates.
- Roughing and finishing with one tool, lowering tool costs.
- 1 x D slotting capability requires less passes, increasing productivity.

5V0E Inch Series

- Extensive radii corner offering.

5VNE Inch Series

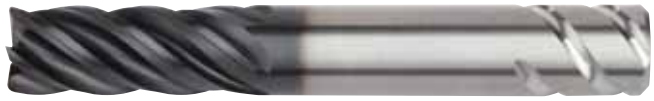
- Extensive radii corner offering.
- Neck design for depths requiring additional passes.

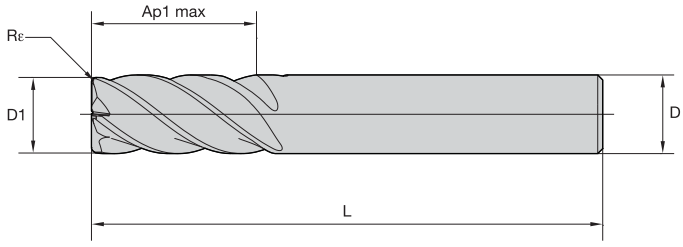
Application Example

Side milling of INCONEL® 718 component.

Workpiece material:	INCONEL 718
Tool:	D = 5/8"
Cutting data:	ap = 1.08" ae = .05" vc = 65 SFM fz = .0019 in/z
Result:	Increased tool life from 2 workpieces to 5

- Unequal flute spacing.
- Center cutting.
- Optimized geometry for titanium machining.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.





End Mill Tolerances

D1	tolerance	D	tolerance h6 +/-
All	+.000/-.002	≤1/8"	0/.00024
		>1/8–1/4"	0/.00031
		>1/4–3/8"	0/.00035
		>3/8–23/32"	0/.00043
		>23/32–1-3/16"	0/.00051

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
ALTIN	●	●	○	○	●	●	●	●	●	○	○	○	●	●	●	●	●

P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

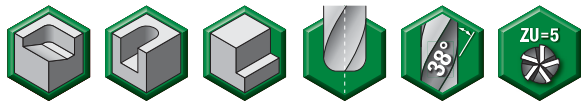
For application data, see page B46.

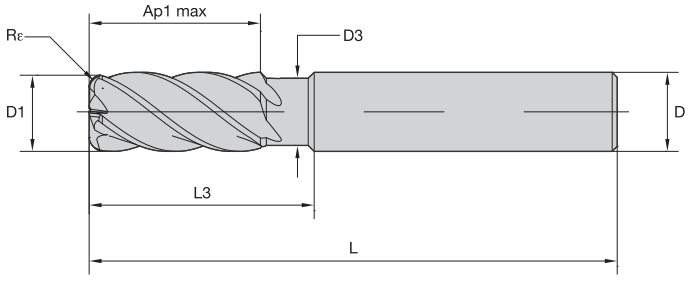
NEW!

Series 5V0E • VariMill II ER

ALTIN-MT	ALTIN-MV	ALTIN-MW	D1	D	Ap1 max	L	Rε
TM5V0E10004A	–	–	3/8	3/8	7/8	2 1/2	.015
TM5V0E10004B	–	–	3/8	3/8	7/8	2 1/2	.030
TM5V0E10004S	–	–	3/8	3/8	7/8	2 1/2	–
TM5V1E10004A	–	–	3/8	3/8	1	3	.015
TM5V1E10004B	–	–	3/8	3/8	1	3	.030
TM5V1E10004S	–	–	3/8	3/8	1	3	–
–	TM5V0E13015AV	TM5V0E13015AW	1/2	1/2	1 1/4	3	.015
–	TM5V0E13015BV	TM5V0E13015BW	1/2	1/2	1 1/4	3	.030
–	TM5V0E13015CV	TM5V0E13015CW	1/2	1/2	1 1/4	3	.060
–	TM5V0E13015DV	TM5V0E13015DW	1/2	1/2	1 1/4	3	.090
–	TM5V0E13015EV	TM5V0E13015EW	1/2	1/2	1 1/4	3	.120
–	TM5V0E13015SV	TM5V0E13015SW	1/2	1/2	1 1/4	3	–
–	TM5V0E16006BV	TM5V0E16006BW	5/8	5/8	1 1/4	3 1/2	.030
–	TM5V0E16006CV	TM5V0E16006CW	5/8	5/8	1 1/4	3 1/2	.060
–	TM5V0E16006SV	TM5V0E16006SW	5/8	5/8	1 1/4	3 1/2	–
–	TM5V0E19007BV	TM5V0E19007BW	3/4	3/4	1 1/2	4	.030
–	TM5V0E19007CV	TM5V0E19007CW	3/4	3/4	1 1/2	4	.060
–	TM5V0E19007DV	TM5V0E19007DW	3/4	3/4	1 1/2	4	.090
–	TM5V0E19007EV	TM5V0E19007EW	3/4	3/4	1 1/2	4	.120
–	TM5V0E19007SV	TM5V0E19007SW	3/4	3/4	1 1/2	4	–
–	TM5V0E25008BV	TM5V0E25008BW	1	1	1 3/4	4 1/2	.030
–	TM5V0E25008CV	TM5V0E25008CW	1	1	1 3/4	4 1/2	.060
–	TM5V0E25008EV	TM5V0E25008EW	1	1	1 3/4	4 1/2	.120
–	TM5V0E25008FV	TM5V0E25008FW	1	1	1 3/4	4 1/2	.250
–	TM5V0E25008SV	TM5V0E25008SW	1	1	1 3/4	4 1/2	–

- Unequal flute spacing.
- Center cutting.
- Optimized geometry for titanium machining.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.





End Mill Tolerances

D1	tolerance	D	tolerance h6 +/-
All	+.000/-.002	≤1/8"	0/.00024
		>1/8–1/4"	0/.00031
		>1/4–3/8"	0/.00035
		>3/8–23/32"	0/.00043
		>23/32–1-3/16"	0/.00051

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
ALTIN	●	●	○	○	●	●	●	●	●	○	○	○	●	●	●	●	●

P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

For application data, see page B46.

NEW!

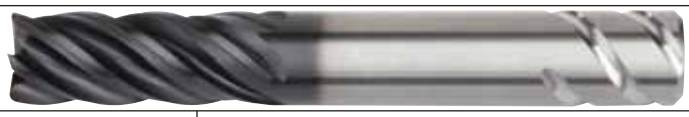
Series 5VNE • VariMill II ER • With Neck

ALTIN-MT	ALTIN-MV	ALTIN-MW	D1	D	D3	Ap1 max	L3	L	Rε
TM5VNE10014A	–	–	3/8	3/8	.353	7/8	1 7/8	4	.015
–	TM5VNE13005BV	TM5VNE13005BW	1/2	1/2	.470	1 1/4	2 1/4	4	.030
–	TM5VNE16006BV	TM5VNE16006BW	5/8	5/8	.588	1 1/4	2 1/4	4	.030
–	TM5VNE19017BV	TM5VNE19017BW	3/4	3/4	.705	1 1/2	3 1/4	5 1/2	.030
–	TM5VNE25018BV	TM5VNE25018BW	1	1	.940	1 3/4	3 1/4	5 1/2	.030

Series 5V0E • VariMill II ER

A

B



ALTIN

Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.

Material Group		A ap	A ae	B ap	Cutting Speed — vc SFM min		Cutting Speed — vc SFM max	D1 — Diameter frac.	3/8	1/2	5/8	3/4	1
								dec.	.3750	.5000	.6250	.7500	1.0000
P	1	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0027	.0035	.0039	.0043	.0050
P	2	1.5 x D	0.5 x D	1 x D	460	–	620	IPT	.0027	.0035	.0039	.0043	.0050
P	3	1.5 x D	0.5 x D	1 x D	390	–	520	IPT	.0023	.0029	.0034	.0038	.0046
P	4	1.5 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0020	.0026	.0030	.0033	.0039
P	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	.0018	.0023	.0027	.0030	.0036
P	6	1.5 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0015	.0019	.0022	.0024	.0028
M	1	1.5 x D	0.5 x D	1 x D	260	–	330	IPT	.0023	.0029	.0034	.0038	.0046
M	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0018	.0023	.0027	.0030	.0036
M	3	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0015	.0019	.0022	.0024	.0028
K	1	1.5 x D	0.5 x D	1 x D	390	–	520	IPT	.0027	.0035	.0039	.0043	.0050
K	2	1.5 x D	0.5 x D	1 x D	360	–	460	IPT	.0023	.0029	.0034	.0038	.0046
K	3	1.5 x D	0.5 x D	1 x D	330	–	430	IPT	.0018	.0023	.0027	.0030	.0036
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0023	.0029	.0034	.0038	.0046
S	2	1.5 x D	0.3 x D	0.3 x D	70	–	130	IPT	.0012	.0016	.0018	.0020	.0025
S	3	1.5 x D	0.5 x D	1 x D	160	–	260	IPT	.0018	.0023	.0027	.0030	.0036
S	4	1.5 x D	0.5 x D	1 x D	150	–	210	IPT	.0017	.0022	.0025	.0028	.0033
H	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0020	.0026	.0030	.0033	.0039

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 5VNE • VariMill II ER

A

B

ALTIN

Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.

Material Group		A ap	A ae	B ap	Cutting Speed — vc SFM min		Cutting Speed — vc SFM max	D1 — Diameter frac.	3/8	1/2	5/8	3/4	1
								dec.	.3750	.5000	.6250	.7500	1.0000
P	1	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0027	.0035	.0039	.0043	.0050
P	2	1.5 x D	0.5 x D	1 x D	460	–	620	IPT	.0027	.0035	.0039	.0043	.0050
P	3	1.5 x D	0.5 x D	1 x D	390	–	520	IPT	.0023	.0029	.0034	.0038	.0046
P	4	1.5 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0020	.0026	.0030	.0033	.0039
P	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	.0018	.0023	.0027	.0030	.0036
P	6	1.5 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0015	.0019	.0022	.0024	.0028
M	1	1.5 x D	0.5 x D	1 x D	260	–	330	IPT	.0023	.0029	.0034	.0038	.0046
M	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0018	.0023	.0027	.0030	.0036
M	3	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0015	.0019	.0022	.0024	.0028
K	1	1.5 x D	0.5 x D	1 x D	390	–	520	IPT	.0027	.0035	.0039	.0043	.0050
K	2	1.5 x D	0.5 x D	1 x D	360	–	460	IPT	.0023	.0029	.0034	.0038	.0046
K	3	1.5 x D	0.5 x D	1 x D	330	–	430	IPT	.0018	.0023	.0027	.0030	.0036
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0023	.0029	.0034	.0038	.0046
S	2	1.5 x D	0.3 x D	0.3 x D	70	–	130	IPT	.0012	.0016	.0018	.0020	.0025
S	3	1.5 x D	0.5 x D	1 x D	160	–	260	IPT	.0018	.0023	.0027	.0030	.0036
S	4	1.5 x D	0.5 x D	1 x D	150	–	210	IPT	.0017	.0022	.0025	.0028	.0033
H	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0020	.0026	.0030	.0033	.0039

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

WIN WITH WIDIA™

X-Feed™ End Mills for High-Feed Milling

Specifically engineered to machine hardened steel up to 67 HRC at extreme speeds and feeds.

- Unique tool with new 6-flute style for high productivity.
- Necked shanks provide extended reach in deep cavities.
- High feed rates, up to .024" per tooth on a 3/4" tool.
- Machine hardened materials at 2–3x the metal removal rate of competitive end mills.
- Wide range of cutting diameters: down to 6mm for small and medium pocket work.
- Innovative new geometry maximizes metal removal rates.
- High metal removal rates lower manufacturing costs.

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

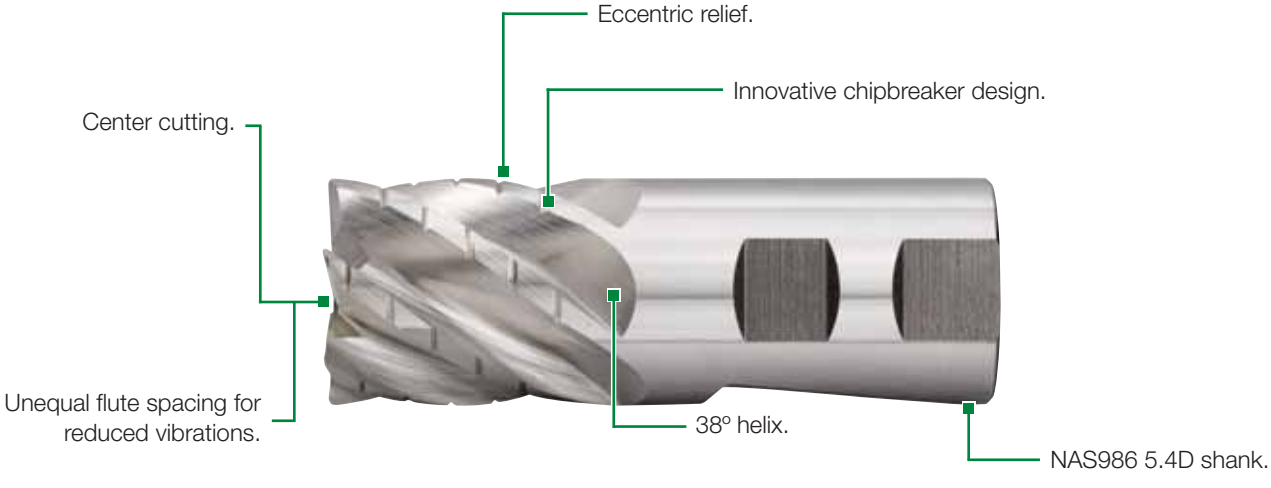
WIDIA™

High-Speed Steel ER Rougher

The next generation of premium cobalt HSS Roughers are designed specifically for titanium and stainless steels. They are engineered with an Eccentric Relief (ER) grind to provide a stronger cutting edge that requires less torque to operate. The unique proprietary chipbreaker geometry will break and control the chip, enabling higher metal removal rates and greater productivity. The HSS Rougher offers the best-in-class performance for difficult-to-machine workpiece materials.

HSS ER ROUGHER

- Six-flute design with proprietary chipbreaker providing superior chip control.
- Eccentric relief geometry provides a stronger cutting edge resulting in longer tool life.
- NAS986 5.4D shank adds the flexibility of dual clamping.
- Higher metal removal rates enable productivity with lower tool costs.



High-Speed Steel ER Rougher

- Achieve outstanding tool life results due to unequal flute spacing and eccentric relief reinforcing the cutting edge.
- Benefit from proprietary chipbreaker pattern for improved chip formation.
- Apply at highest feed rates in full slotting, ramping, and side milling due to proprietary core design.

620E Series

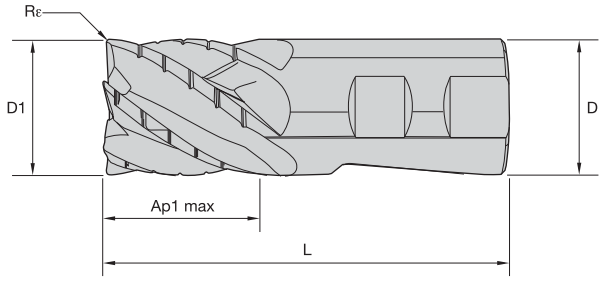
- Highest metal removal rates and tool life in:
  - Titanium
  - Stainless steels
- Corner radii.
- Various length of cut.

Application example

Roughing a forged landing gear link.
Gantry-type vertical milling machine.

Workpiece material:	Titanium 6Al-4V
Tool:	D = 1 1/2"
Cutting data:	ap = 3" ae = 1/4" vc = 60 SFM fz = .006 IPT
Result:	20% higher cutting speed and more than 70% higher feed per tooth. 110% higher tool life compared to previous competitive tool.

- Center cutting.
- Premium cobalt HSS.
- Eccentric relief grind with chipbreaker.
- Optimized geometry for titanium machining.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.002/-0.0	All	h6

	M		S
	1	2	4
uncoated	●	●	●

P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

Series 620E • HSS-E ER Rougher • Lists 620E 621E 623E 625E

UNCOATED-W	D1	D	length of cut Ap1 max	length L	Rε
620E32009CW	1 1/4	1 1/4	2	4 1/2	.060
620E38009CW	1 1/2	1 1/4	2	4 1/2	.060
620E3800ACW	1 1/2	1 1/2	2	5 1/4	.060
621E32009CW	1 1/4	1 1/4	4	6 1/2	.060
621E38009CW	1 1/2	1 1/4	4	6 1/2	.060
621E3800ACW	1 1/2	1 1/2	4	7 1/4	.060
623E32009CW	1 1/4	1 1/4	3	5 1/2	.060
623E38009CW	1 1/2	1 1/4	3	5 1/2	.060
623E3800ACW	1 1/2	1 1/2	3	6 1/4	.060
625E51022CW	2	2	2	5 3/4	.060
625E51032CW	2	2	3	6 3/4	.060
625E51042CW	2	2	4	7 3/4	.060
625E51062CW	2	2	6	9 3/4	.060

Series 620E • HSS-E ER Rougher • Lists 620E 621E 623E 625E											
											
		A		B	Uncoated			Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.			
					Cutting Speed — vc SFM			D1 — Diameter			
								frac.	1 1/4	1 1/2	2
Material Group		ap	ae	ap	min		max	dec.	1.2500	1.5000	2.0000
M	1	1.5 x D	0.5 x D	1 x D	40	-	60	IPT	0.0052	0.0053	0.0053
	2	1.5 x D	0.5 x D	1 x D	40	-	60	IPT	0.0042	0.0042	0.0043
S	4	1.5 x D	0.5 x D	1 x D	16	-	50	IPT	0.0038	0.0039	0.0039

NOTE: Side milling applications — for longest length tools, reduce ae by 30%.
Slot milling applications — for longest length tools, reduce ap by 30%.
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

WIDIA

Indexable Milling

High-Feed Applications • **M370™ Series**

Designed for high feed rate productivity, M370 Series provides the latest insert technology with outstanding performance and reliability. Its double-sided concept and six cutting edges provide security and optimal metal removal with an efficient cost per edge.

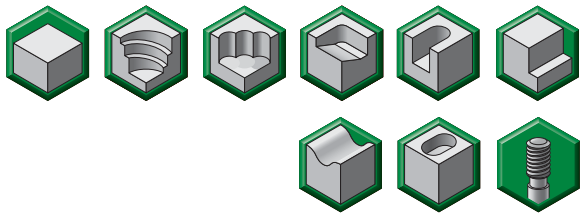
M370

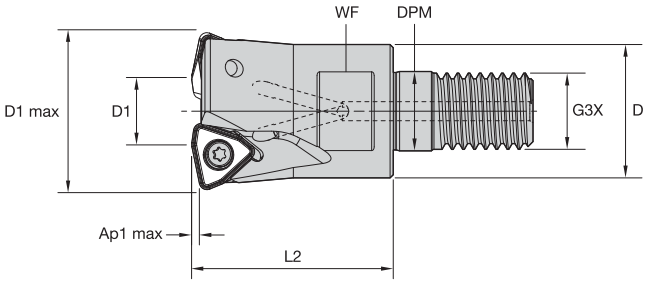
- Double-sided design offers six cutting edges per insert.
- Extremely high metal removal rates.
- First choice for high-feed roughing applications.

8mm iC Insert WOEJ0804
Up to .049" Ap max
Diameter range 1–3"

12mm iC Insert WOEJ1207
Up to .078" Ap max
Diameter range 1.5–5"

- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.





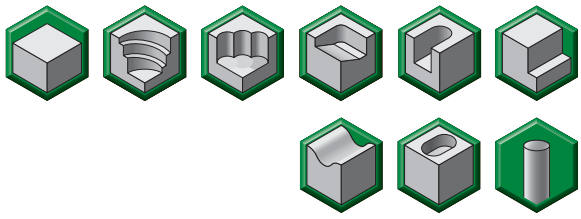
Screw-On End Mills

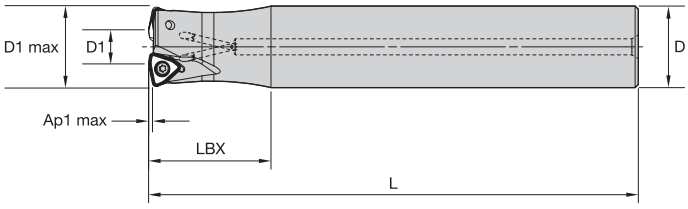
order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	lbs
4047591	**M370D100Z02M12WO08**	1.000	.460	.827	.492	M12	1.250	.669	.049	2	45500	Yes	.19
4171164	**M370D100Z03M12WO08**	1.000	.460	.827	.492	M12	1.377	.667	.049	3	46000	Yes	.19
4171165	**M370D125Z02M16WO08**	1.250	.700	1.132	.669	M16	1.500	.940	.049	2	38900	Yes	.41
4047592	**M370D125Z03M16WO08**	1.250	.700	1.132	.669	M16	1.500	.945	.049	3	38900	Yes	.41
4047653	**M370D150Z03M16WO08**	1.500	.950	1.142	.669	M16	1.500	.866	.049	3	34500	Yes	.49
4171166	**M370D150Z04M16WO08**	1.500	.950	1.142	.669	M16	1.500	.945	.049	4	34500	Yes	.48

Spare Parts

D1 max	 insert screw	in. lbs.	 Torx Plus driver
1.000	**MS2219**	16	**DT9IP**
1.250	**MS2219**	16	**DT9IP**
1.500	**MS2219**	16	**DT9IP**

- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.





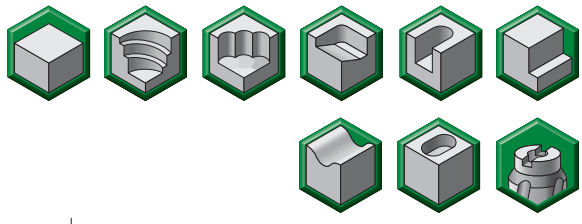
Cylindrical End Mills

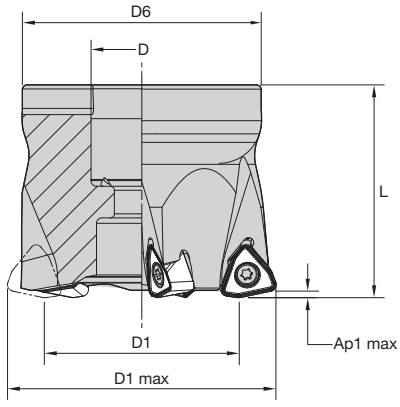
order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
4047654	**M370D100Z02C100WO08L600**	1.000	.460	1.000	6.000	1.500	.049	2	45500	Yes	1.17
4047655	**M370D100Z02C100WO08L800**	1.000	.460	1.000	8.000	1.500	.049	2	45500	Yes	1.60
4047656	**M370D100Z03C100WO08L600**	1.000	.460	1.000	6.000	1.500	.049	3	45500	Yes	1.16
4047657	**M370D125Z03C125WO08L600**	1.250	.700	1.250	6.000	1.500	.049	3	38900	Yes	1.87
4047658	**M370D125Z03C125WO08L800**	1.250	.700	1.250	8.000	1.500	.049	3	38900	Yes	2.55
4047659	**M370D150Z03C125WO08L600**	1.500	.950	1.250	6.000	1.500	.049	3	34500	Yes	1.97
4171167	**M370D150Z03C125WO08L800**	1.500	.950	1.250	7.686	1.500	.049	3	34500	Yes	5.11
4171168	**M370D150Z04C150WO08L600**	1.500	.950	1.500	6.000	1.500	.049	4	34500	Yes	2.70

Spare Parts

D1 max	 insert screw	in. lbs.	 wrench
1.000	**MS2219**	16	**DT9IP**
1.250	**MS2219**	16	**DT9IP**
1.500	**MS2219**	16	**DT9IP**

- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.



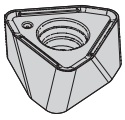


Shell Mills

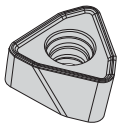
order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4047660	**M370D150Z04S050W008**	1.500	.950	.500	1.417	1.575	.049	4	34500	Yes	.41
4047661	**M370D200Z05S075W008**	2.000	1.450	.750	1.732	1.575	.049	5	29000	Yes	.82
4047662	**M370D200Z07S075W008**	2.000	1.450	.750	1.732	1.575	.049	7	29000	Yes	.83
4171169	**M370D250Z07S075W008**	2.500	1.950	.750	1.732	1.575	.049	7	29000	Yes	1.42
4171170	**M370D300Z08S100W008**	3.000	2.270	1.000	2.362	1.968	.049	8	22900	Yes	4.82

Spare Parts

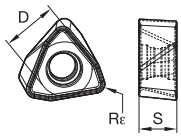
D1 max	 insert screw	in. lbs.	 Torx Plus driver	 socket-head cap screw
1.500	**MS2219**	16	**DT9IP**	**S424**
2.000	**MS2219**	16	**DT9IP**	**S445**
2.500	**MS2219**	16	**DT9IP**	**S445**
3.000	**MS2219**	16	**DT9IP**	**MS2038**



WOEJ-MM



WOEJ-MH



● first choice
○ alternate choice

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

- -MM geometry provides lower cutting forces. First choice for steel, stainless steel, and high-temp alloys.
- -MH geometry is the first choice for high-strength steel and cast iron.

WOEJ-MM

catalog number	cutting edges	D	S	Rε	TN5515	TN6520	TN6525	TN6540	TN7535
WOEJ080412SRMM	6	.307	.185	.048		●	●	●	●

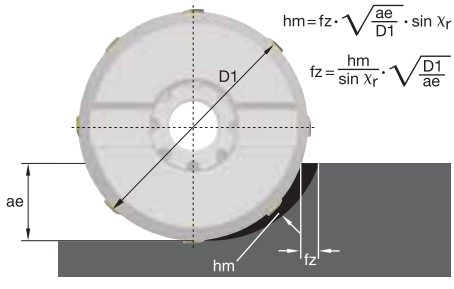
WOEJ-MH

catalog number	cutting edges	D	S	Rε	TN5515	TN6520	TN6525	TN6540	TN7535
WOEJ080412SRMH	6	.307	.187	.048	●	●	●	●	●

		TN5515			TN6520			TN6525			TN6540			TN7535		
Edge Geometry		feed per tooth fz (inch)														
..-MM		.014	**.031**	.059	.014	**.031**	.059	.014	**.031**	.059	.014	**.035**	.063	.014	**.035**	.063
..-MH		.014	**.045**	.070	.014	**.040**	.065	.014	**.040**	.065	.014	**.045**	.070	.014	**.045**	.070
Material Group		vc (ft/min)														
P	1	–	–	–	–	–	–	1150	**890**	750	950	**720**	620	1180	**920**	790
	2	–	–	–	–	–	–	790	**590**	520	660	**490**	430	820	**620**	540
	3	–	–	–	–	–	–	660	**490**	430	560	**430**	360	690	**520**	460
	4	–	–	–	–	–	–	690	**520**	430	560	**430**	360	710	**540**	460
	5	–	–	–	–	–	–	560	**430**	360	460	**330**	300	590	**430**	360
	6	–	–	–	750	**560**	460	750	**560**	460	620	**460**	390	790	**590**	490
	7	–	–	–	560	**430**	390	560	**430**	390	460	**360**	330	590	**460**	390
	8	–	–	–	490	**390**	330	490	**390**	330	430	**330**	260	520	**390**	330
	9	–	–	–	430	**330**	260	430	**330**	260	360	**260**	200	460	**330**	260
	10	–	–	–	560	**460**	430	560	**460**	430	460	**390**	330	590	**480**	430
	11	–	–	–	390	**300**	230	390	**300**	230	330	**230**	200	390	**300**	230
	12	–	–	–	–	–	–	720	**560**	460	590	**460**	390	750	**570**	490
	13.1	–	–	–	–	–	–	620	**460**	390	520	**390**	330	660	**480**	390
	13.2	–	–	–	–	–	–	310	**230**	200	260	**200**	160	330	**250**	200
M	14.1	–	–	–	–	–	–	620	**390**	300	520	**330**	230	660	**390**	300
	14.2	–	–	–	–	–	–	490	**300**	230	430	**260**	200	520	**310**	230
	14.3	–	–	–	–	–	–	390	**230**	160	330	**200**	130	390	**230**	180
	14.4	–	–	–	–	–	–	330	**200**	130	260	**160**	130	330	**200**	150
K	15	1740	**1280**	920	1250	**920**	660	–	–	–	–	–	–	–	–	–
	16	1350	**1020**	750	980	**720**	560	–	–	–	–	–	–	–	–	–
	17	1510	**1020**	750	1120	**720**	560	790	**590**	520	660	**490**	430	820	**620**	540
	18	980	**720**	560	720	**520**	390	660	**490**	430	560	**430**	360	690	**520**	460
	19	1210	**950**	720	890	**690**	520	–	–	–	–	–	–	–	–	–
	20	1020	**750**	590	720	**560**	430	–	–	–	–	–	–	–	–	–
N	21	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	22	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	23	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	24	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	25	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	26	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	27	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	28	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	29	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	30	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	31	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	32	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	33	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	34	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	35	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	36	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	37	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
H	38.1	–	–	–	–	–	–	390	**300**	230	–	–	–	–	–	–
	38.2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	39.1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	39.2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

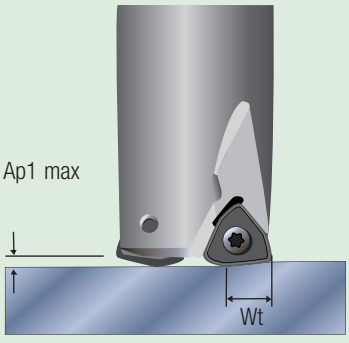
*NOTE: First choice starting feed (fz) is in **bold** type.*
Use corresponding speed (vc).
fz and vc are valid for ae ≥0.4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

ae/D1 =	0.2	0.3	0.4
fz-Factor	1.5	1.3	1.0
vc-Factor	1.3	1.2	1.1

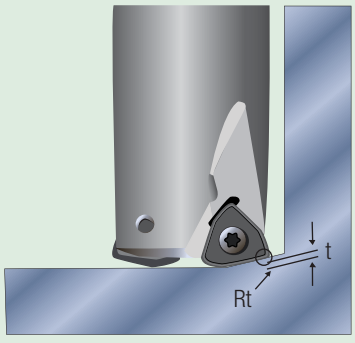


Applying High-Feed Tools

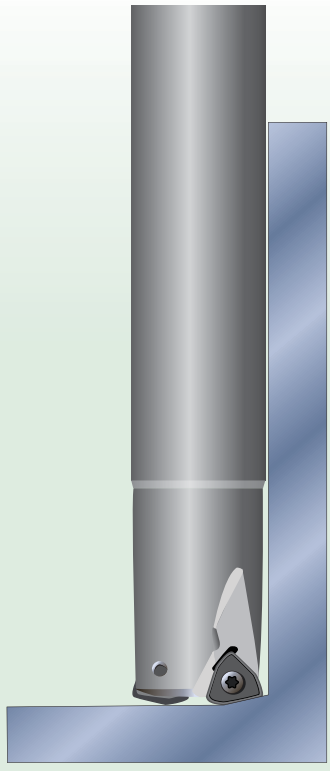
The High-Feed concept bases its strategy on small depth of cut and higher fz values, which result in a higher MRR and productivity with low radial forces.



Small Ap1 values and higher feed rates generate lower cutting forces versus traditional milling strategies.



For CAM programming, the tools can be programmed as a toroidal tool type by using the Rt value as the insert radius.



Recommended when long overhang is necessary due to lower radial forces. Maximum L/D ratio of 10 x D.

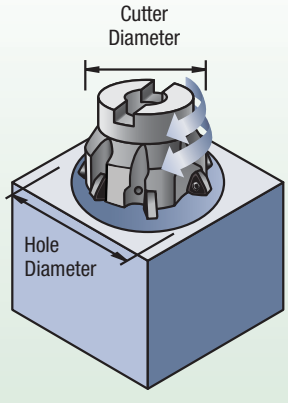
General Programming Information for Applying M370

L/D ratio	starting Ap1	starting fz range
<3	.035"	.04–.051"
>3–<5	.024"	.04–.051"
>5–<7	.016"	.024–.04"

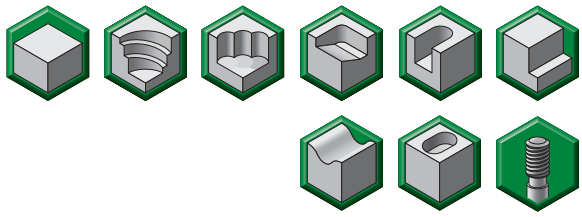
Rt	t	Wt
.10"	.04"	.30"

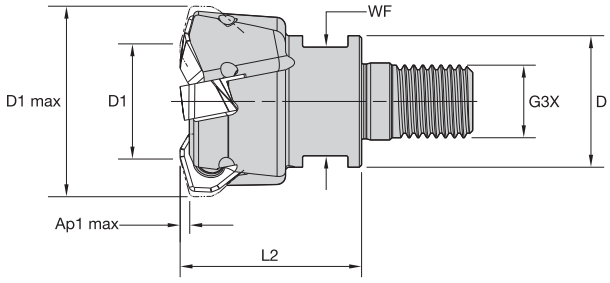
■ Maximum Linear Ramping and Helical Interpolation from Solid

cutter diameter	max linear ramp angle (straight line)	min hole diameter	max hole diameter	Ap1 max per revolution
1.00"	3.1°	1.41"	1.98"	.049"
1.25"	2.2°	1.91"	2.48"	.049"
1.50"	1.8°	2.41"	2.98"	.049"
2.00"	1.3°	3.40"	3.98"	.049"
2.50"	1.0°	4.66"	4.98"	.049"
3.00"	0.8°	5.22"	5.98"	.049"



- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.





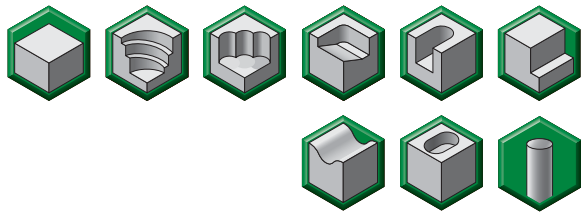
Screw-On End Mills

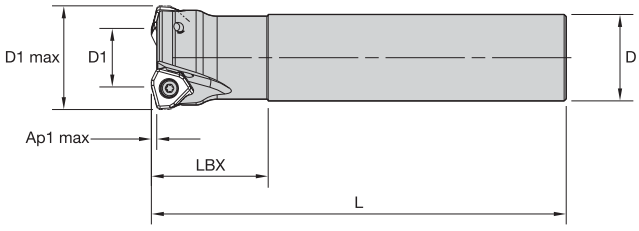
order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	lbs
5352393	**M370D150Z02M16WO12**	1.500	.837	1.142	.670	M16	1.690	.943	.078	2	22380	Yes	.49

Spare Parts

D1 max	insert screw	in. lbs.	Torx Plus driver
1.500	**MS2085**	35.000	**DT15IP**

- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.





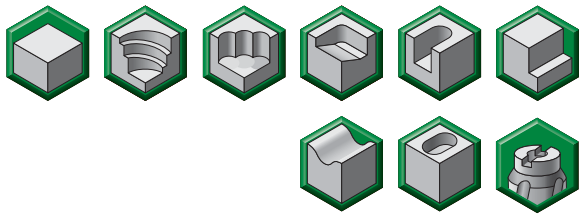
Cylindrical End Mills

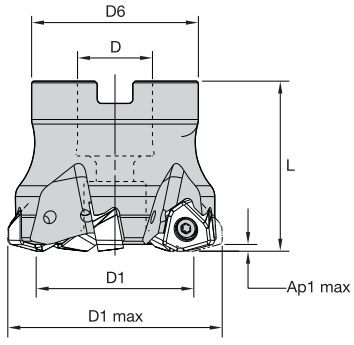
order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
5352394	**M370D150Z02C125WO12L600**	1.500	.837	1.250	6.000	1.690	.078	2	22380	Yes	1.92
5352395	**M370D150Z02C150WO12L1000**	1.500	.837	1.500	10.000	2.500	.078	2	22380	Yes	4.50

Spare Parts

D1 max	 insert screw	in. lbs.	 Torx Plus driver
1.500	**MS2085**	35.000	**DT15IP**

- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.





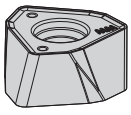
Shell Mills

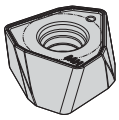
order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
5352396	**M370D200Z03S075WO12**	2.000	1.335	.750	1.750	1.575	.078	3	19380	Yes	.70
5352397	**M370D200Z04S075WO12**	2.000	1.335	.750	1.750	1.575	.078	4	19380	Yes	.69
5352398	**M370D250Z05S075WO12**	2.500	1.834	.750	1.750	1.750	.078	5	17330	Yes	1.06
5352399	**M370D250Z05S100WO12**	2.500	1.834	1.000	2.190	1.750	.078	5	17330	Yes	1.27
5352420	**M370D300Z06S100WO12**	3.000	2.333	1.000	2.750	1.750	.078	6	15820	Yes	2.08
5352421	**M370D300Z05S125WO12**	3.000	2.333	1.250	2.750	2.000	.078	5	15820	Yes	2.30
5352422	**M370D300Z06S125WO12**	3.000	2.333	1.250	2.750	2.000	.078	6	15820	Yes	2.32
5352423	**M370D400Z06S150WO12**	4.000	3.333	1.500	3.625	2.000	.078	6	13700	Yes	3.81
5352424	**M370D400Z08S150WO12**	4.000	3.333	1.500	3.625	2.000	.078	8	13700	Yes	3.85
5352425	**M370D500Z07S150WO12**	5.000	4.333	1.500	3.810	2.375	.078	7	12260	Yes	6.62
5352426	**M370D500Z09S150WO12**	5.000	4.333	1.500	3.810	2.375	.078	9	12260	Yes	6.68

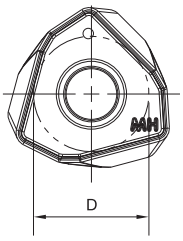
Spare Parts

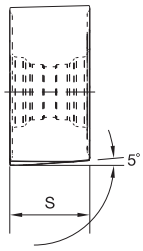



D1 max	insert screw	in. lbs.	Torx Plus driver	socket-head cap screw	coolant lock screw assembly
2.000	**MS2085**	35.000	**DT15IP**	**S445**	**–**
2.500	**MS2085**	35.000	**DT15IP**	**S445**	**–**
2.500	**MS2085**	35.000	**DT15IP**	**S458**	**–**
3.000	**MS2085**	35.000	**DT15IP**	**S458**	**–**
3.000	**MS2085**	35.000	**DT15IP**	**S467**	**–**
4.000	**MS2085**	35.000	**DT15IP**	**–**	**–**
5.000	**MS2085**	35.000	**DT15IP**	**–**	**S2163C**


WOEJ-MM


WOEJ-MH





● first choice
○ alternate choice

	WK15CM	WP20CM	WP25PM	WP35CM	WU35PM
P		●	●	●	●
M		○	●	○	●
K	●	○	○	○	
N					
S			●		●
H		○	○		

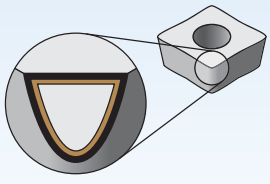
- MM geometry provides lower cutting forces. First choice for steel, stainless steel and high temp alloys.
- MH geometry is the first choice for high-strength steel and cast iron.

WOEJ-MM

catalog number	cutting edges	D	S	Rε	WK15CM	WP20CM	WP25PM	WP35CM	WU35PM
WOEJ120712SRMM	6	12,00	7,30	1,27		●	●	●	●

WOEJ-MH

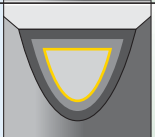
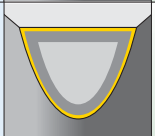
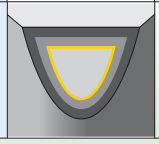
catalog number	cutting edges	D	S	Rε	WK15CM	WP20CM	WP25PM	WP35CM	WU35PM
WOEJ120712SRMH	6	.472	.287	.050	●	●	●	●	●



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

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

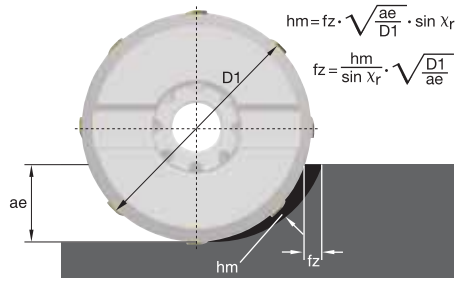
wear resistance ⟷ toughness

Grade	Coating	Grade Description	05	10	15	20	25	30	35	40	45
WK15CM		A multilayered TiN-MT-TiCN-Al_2O_3-CVD-coated carbide grade with advanced post-coat treatment. WK15CM is a wear-resistant grade with balanced toughness for general milling of cast irons at higher speeds. Best results in dry but can also be used wet.	K								
WP20CM		WP20CM is a multilayered TiN-MT-TiCN-Al_2O_3-CVD-coated carbide grade with advanced post-coat treatment. The substrate is a well-balanced combination of wear resistance and toughness. WP20CM is primarily for light and general machining of steels and stainless steels or roughing of cast irons.	P M K								
WP25PM		AlTiN-PVD-coated carbide grade engineered to provide better performance in general machining of high-temperature alloys and stainless steel. WP25PM resists breakage and offers improved wear resistance and increased strength.	P M K S								
WU35PM		A high-performance TiAlN-PVD-coated carbide grade for milling steel, stainless steel, and high-temperature alloys. The good thermal shock resistance of the substrate makes this grade ideal for both wet and dry machining. WU35PM is primarily for use in general and heavy machining.	P M S								
WP35CM		A multilayered TiN-TiCN-Al_2O_3-CVD-coated carbide grade with advanced Victory™ post-coat treatment and a very tough substrate. WP35CM has a wide application area in general and rough milling of steels and cast irons. It performs best dry but can also be used wet.	P K								

		WK15CM			WP20CM			WP25PM			WU35PM			WP35CM		
Edge Geometry		feed per tooth fz (inch)														
..-MM		—	—	—	.015	**.030**	.069	.015	**.031**	.069	.015	**.035**	.069	.015	**.035**	.069
..-MH		.015	**.030**	.079	.015	**.031**	.079	.015	**.033**	.079	.015	**.039**	.079	.015	**.039**	.079
Material Group		vc (ft/min)														
P	1	–	—	–	1755	**1560**	1790	1065	**1130**	1295	835	**900**	1035	1790	**1560**	1445
	2	—	—	—	1755	**1560**	1790	1065	**1130**	1295	835	**900**	1035	1790	**1560**	1445
	3	–	—	–	1755	**1560**	1790	1065	**1130**	1295	835	**900**	1035	1790	**1560**	1445
	4	—	—	—	1755	**1560**	1790	1065	**1130**	1295	835	**900**	1035	1790	**1560**	1445
	5	–	—	–	1755	**1560**	1790	1065	**1130**	1295	835	**900**	1035	1790	**1560**	1445
	6	—	—	—	1080	**1215**	1345	785	**950**	1080	640	**755**	855	900	**1000**	1100
	7	–	—	–	1080	**1215**	1345	785	**950**	1080	640	**755**	855	900	**1000**	1100
	8	—	—	—	1000	**1080**	1215	705	**835**	1000	560	**670**	785	820	**900**	1000
	9	–	—	–	1000	**1080**	1215	705	**835**	1000	560	**670**	785	820	**900**	1000
	10	—	—	—	755	**835**	900	590	**740**	885	475	**590**	690	625	**690**	740
	11	–	—	–	755	**835**	900	590	**740**	885	475	**590**	690	625	**690**	740
	12	—	—	—	900	**985**	1080	590	**655**	740	475	**525**	590	835	**900**	1015
	13.1	–	—	–	575	**655**	755	395	**490**	655	310	**395**	525	–	**540**	625
	13.2	—	—	—	575	**655**	755	395	**490**	655	310	**395**	525	—	**540**	625
M	14.1	–	—	–	670	**785**	885	655	**705**	805	540	**590**	670	625	**720**	820
	14.2	—	—	—	490	**575**	640	375	**475**	560	310	**395**	460	460	**525**	575
	14.3	–	—	–	670	**785**	885	655	**705**	805	540	**590**	670	625	**720**	820
	14.4	—	—	—	625	**705**	805	525	**625**	740	425	**525**	605	560	**640**	740
K	15	1345	**1510**	1655	1425	**1280**	1150	720	**820**	900	–	—	–	935	**1050**	1165
	16	1345	**1510**	1655	1425	**1280**	1150	720	**820**	900	—	—	—	935	**1050**	1165
	17	1080	**1165**	1310	1130	**1015**	920	590	**640**	705	–	—	–	755	**835**	920
	18	1080	**1165**	1310	1130	**1015**	920	590	**640**	705	—	—	—	755	**835**	920
	19	900	**985**	1100	950	**835**	785	475	**525**	590	–	—	–	640	**690**	770
	20	900	**985**	1100	950	**835**	785	475	**525**	590	—	—	—	640	**690**	770
N	21	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	23	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	25	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	27	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	29	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S	31	–	—	–	–	—	–	115	**150**	165	100	**115**	150	–	—	–
	32	—	—	—	—	—	—	115	**150**	165	100	**115**	150	—	—	—
	33	–	—	–	–	—	–	115	**150**	165	100	**115**	150	–	—	–
	34	—	—	—	—	—	—	115	**165**	195	100	**150**	180	—	—	—
	35	–	—	–	–	—	–	115	**165**	195	100	**150**	180	–	—	–
	36	—	—	—	—	—	—	150	**195**	280	115	**180**	245	—	—	—
	37	–	—	–	–	—	–	150	**195**	280	115	**180**	245	–	—	–
H	38.1	–	—	–	375	**460**	560	280	**360**	475	–	—	–	–	—	–
	38.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	39.1	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	39.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

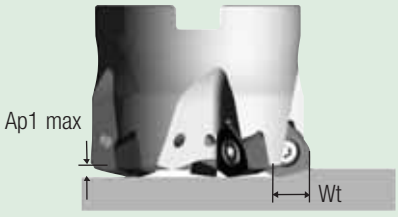
*NOTE: First choice starting feed (fz) is in **bold** type.*
Use corresponding speed (vc).
fz and vc are valid for ae ≥0.4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

ae/D1 =	0.2	0.3	0.4
fz-Factor	1.5	1.3	1.0
vc-Factor	1.3	1.2	1.1

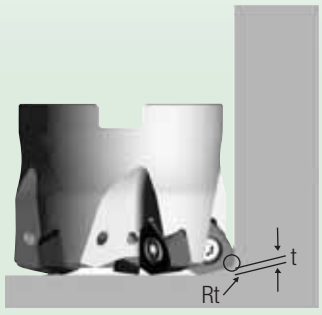


Applying High-Feed Tools

The High-Feed concept bases its strategy on small depth of cut and higher fz values, which result in a higher MRR and productivity with low radial forces.



Small Ap1 values and higher feed rates generate lower cutting forces versus traditional milling strategies.



For CAM programming, the tools can be programmed as a toroidal tool type by using the Rt value as the insert radius.

Recommended when long overhang is necessary due to lower radial forces. Maximum L/D ratio of 10 x D.

General Programming Information for Applying M370

	CAM programming information		
	Rt	Wt	t
inch value	0.13	0.37	0.06

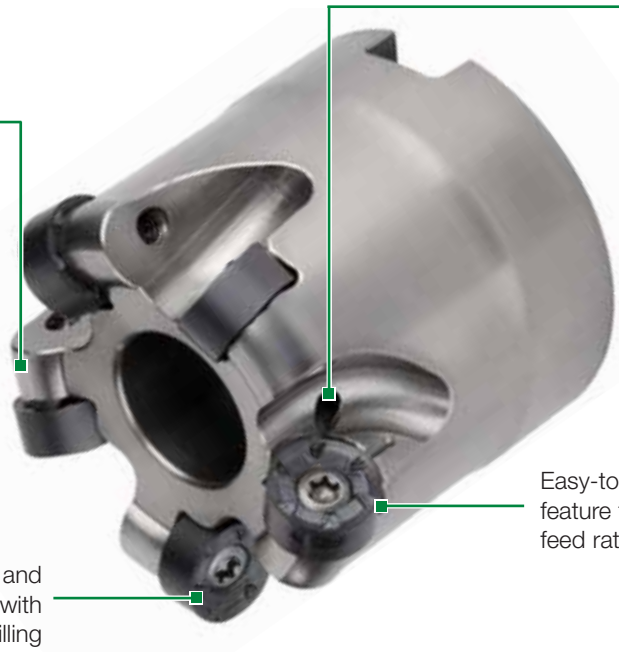
■ Maximum Linear Ramping and Helical Interpolation from Solid • Inch

diameter	max ramp angle	max ramp angle for 360° helical interpolation	max plunge depth	min hole diameter (DH min)	max flat-bottom hole diameter (DH1 max)	max diameter (no flat bottom)
1.50	6.4°	1.70°	0.837	1.96	2.26	3.00
2.00	3.6°	1.06°	1.335	2.94	3.26	4.00
2.50	2.5°	0.78°	1.834	3.93	4.26	5.00
3.00	1.9°	0.61°	2.333	4.93	5.26	6.00
4.00	1.3°	0.43°	3.333	6.93	7.26	8.00
5.00	1.0°	0.33°	4.333	8.92	9.26	10.00

Double-Sided Round Insert • **M200™ Series**

Revolutionary double-sided round insert, capable of running in multiple types of milling operations and workpiece materials, increases customer's productivity with the most efficient cost per edge.

M200



Screw-On, end mill, and shell mill cutters with internal coolant.

Higher clearance in bodies to permit pocketing, profiling, and 5-axis machining.

Easy-to-use and unique anti-rotation feature for excellent stability for higher feed rates and cutting forces.

Three different insert sizes and three insert topography styles with the new WIDIA™ Victory™ milling grades cover any type of component and application.

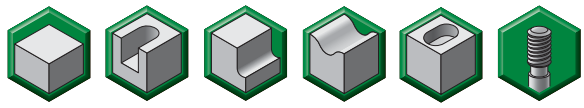
- Up to 12 cutting edges per insert.
- Effective anti-rotation feature.
- Able to apply in all type of materials and milling applications.
- Latest WIDIA™ Victory™ grades offered.

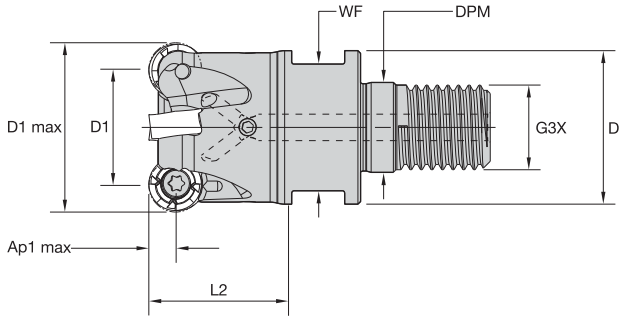
M200 iC 10
10mm iC insert
8 cutting edges

M200 iC 12
12mm iC insert
12 cutting edges

M200 iC 16
16mm iC insert
12 cutting edges

- Double-sided, eight cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





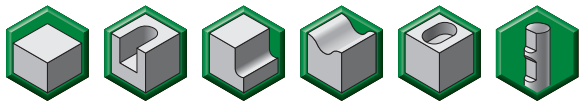
Screw-On End Mills

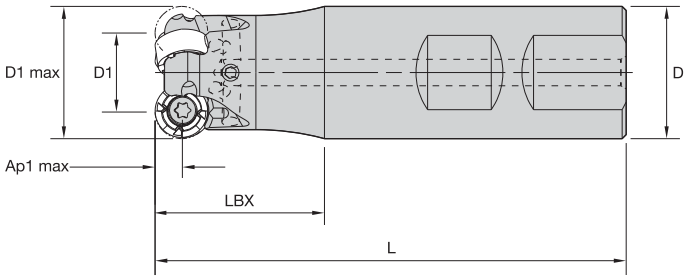
order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	lbs
5283432	**M200D100Z03M12RN10**	1.000	.606	.827	.490	M12	1.250	.667	.200	3	54200	Yes	.16
5283433	**M200D125Z03M16RN10**	1.250	.856	1.142	.670	M16	1.500	.943	.200	3	48500	Yes	.37
5283434	**M200D125Z04M16RN10**	1.250	.856	1.142	.670	M16	1.500	.943	.200	4	48500	Yes	.38
5283435	**M200D150Z05M16RN10**	1.500	1.106	1.142	.670	M16	1.500	.943	.200	5	44300	Yes	.45

Spare Parts

D1 max	 insert screw	in. lbs.	 Torx driver
1.000	**191.848**	18	**170.025**
1.250	**191.848**	18	**170.025**
1.500	**191.848**	18	**170.025**

- Double-sided, eight cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





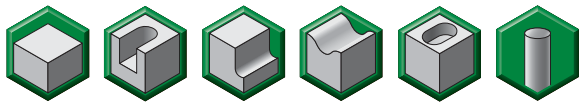
Weldon End Mills

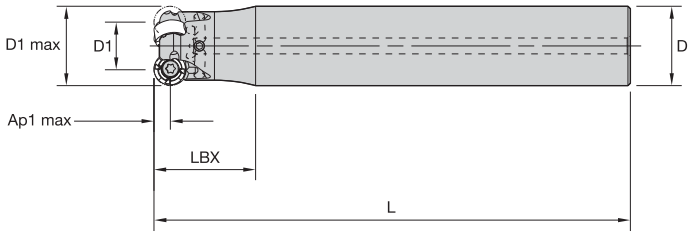
order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
5283436	**M200D100Z03W100RN10**	1.000	.606	1.000	4.280	2.000	.200	3	54200.0	Yes	.74
5283437	**M200D125Z03W125RN10**	1.250	.856	1.250	4.280	2.000	.200	3	48500.0	Yes	1.20

Spare Parts

D1 max	insert screw	in. lbs.	Torx driver
1.000	**191.848**	18	**170.025**
1.250	**191.848**	18	**170.025**

- Double-sided, eight cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





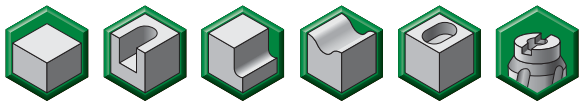
Cylindrical End Mills

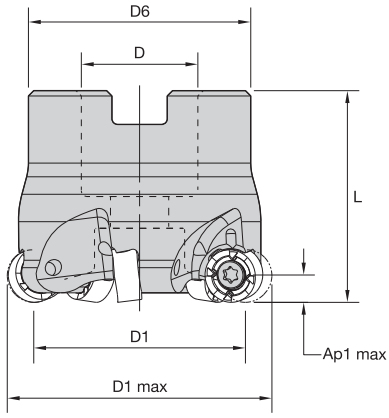
order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
5283438	**M200D100Z03C100RN10L600**	1.000	.606	1.000	6.000	1.500	.200	3	54200	Yes	1.15
5283439	**M200D100Z03C100RN10L800**	1.000	.606	1.000	8.000	1.500	.200	3	54200	Yes	1.58
5283480	**M200D125Z03C125RN10L900**	1.250	.856	1.250	9.000	1.500	.200	3	48500	Yes	2.85

Spare Parts

D1 max	 insert screw	in. lbs.	 Torx driver
1.000	**191.848**	18	**170.025**
1.250	**191.848**	18	**170.025**

- Double-sided, eight cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.



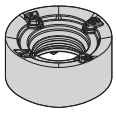


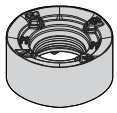
Shell Mills

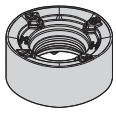
order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
5283481	**M200D150Z03S050RN10**	1.500	1.106	.500	1.300	1.570	.200	3	44300	Yes	.46
5283482	**M200D150Z05S050RN10**	1.500	1.106	.500	1.300	1.570	.200	5	44300	Yes	.43
5283483	**M200D200Z04S075RN10**	2.000	1.606	.750	1.654	2.000	.200	4	38300	Yes	1.04
5283484	**M200D200Z06S075RN10**	2.000	1.606	.750	1.654	2.000	.200	6	38300	Yes	1.02

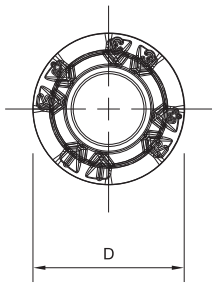
Spare Parts

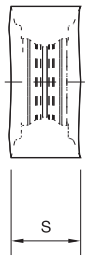
D1 max	 insert screw	in. lbs.	 Torx driver	 socket-head cap screw
1.500	**191.848**	18	**170.025**	**S422**
2.000	**191.848**	18	**170.025**	**S445**


RNGJ-ML


RNGJ-MM
RNPJ-MM


RNPJ-MH





- -ML geometry is the first choice for stainless steel and high-temp alloys.
- -MM geometry is for general purpose, especially for steel.
- -MH geometry is the first choice for heavy applications, cast iron, and high-strength steel.

● first choice
○ alternate choice

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

■ RNGJ-ML

catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNGJ10T3M0EML	8	.394	.188			●	●	●

■ RNGJ-MM

catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNGJ10T3M0SMM	8	.394	.188			●	●	

■ RNPJ-MM

catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNPJ10T3M0SMM	8	.394	.188		●	●		●

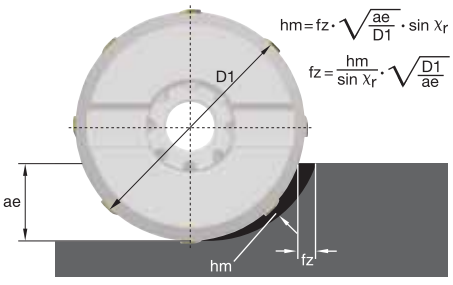
■ RNPJ-MH

catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNPJ10T3M0SMH	8	.394	.187	●	●	●	●	●

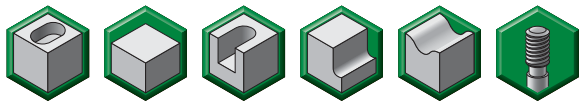
		WK15CM			WP20CM			WP25PM			WU35PM			WP35CM		
Edge Geometry		feed per tooth fz (inch)														
..-ML		0.002	**0.007**	0.007	0.002	**0.007**	0.008	0.002	**0.007**	0.008	0.002	**0.007**	0.008	0.002	**0.007**	0.008
..-MM		0.005	**0.010**	0.015	0.005	**0.010**	0.016	0.005	**0.010**	0.016	0.005	**0.010**	0.016	0.005	**0.010**	0.016
..-MH		0.008	**0.011**	0.017	0.008	**0.011**	0.018	0.008	**0.011**	0.018	0.008	**0.011**	0.018	0.008	**0.011**	0.018
Material Group		vc (ft/min)														
P	1	–	—	–	1755	**1560**	1790	1065	**1130**	1295	835	**900**	1035	1790	**1560**	1445
	2	–	—	–	1755	**1560**	1790	1065	**1130**	1295	835	**900**	1035	1790	**1560**	1445
	3	–	—	–	1755	**1560**	1790	1065	**1130**	1295	835	**900**	1035	1790	**1560**	1445
	4	–	—	–	1755	**1560**	1790	1065	**1130**	1295	835	**900**	1035	1790	**1560**	1445
	5	–	—	–	1755	**1560**	1790	1065	**1130**	1295	835	**900**	1035	1790	**1560**	1445
	6	–	—	–	1080	**1215**	1345	785	**950**	1080	640	**755**	855	900	**1000**	1100
	7	–	—	–	1080	**1215**	1345	785	**950**	1080	640	**755**	855	900	**1000**	1100
	8	–	—	–	1000	**1080**	1215	705	**835**	1000	560	**670**	785	820	**900**	1000
	9	–	—	–	1000	**1080**	1215	705	**835**	1000	560	**670**	785	820	**900**	1000
	10	–	—	–	755	**835**	900	590	**740**	885	475	**590**	690	625	**690**	740
	11	–	—	–	755	**835**	900	590	**740**	885	475	**590**	690	625	**690**	740
	12	–	—	–	900	**985**	1080	590	**655**	740	475	**525**	590	835	**900**	1015
	13.1	–	—	–	575	**655**	755	395	**490**	655	310	**395**	525	–	**540**	625
	13.2	–	—	–	575	**655**	755	395	**490**	655	310	**395**	525	–	**540**	625
M	14.1	–	—	–	670	**785**	885	655	**705**	805	540	**590**	670	625	**720**	820
	14.2	–	—	–	490	**575**	640	375	**475**	560	310	**395**	460	460	**525**	575
	14.3	–	—	–	670	**785**	885	655	**705**	805	540	**590**	670	625	**720**	820
	14.4	–	—	–	625	**705**	805	525	**625**	740	425	**525**	605	560	**640**	740
K	15	1345	**1510**	1655	1425	**1280**	1150	720	**820**	900	–	—	–	935	**1050**	1165
	16	1345	**1510**	1655	1425	**1280**	1150	720	**820**	900	–	—	–	935	**1050**	1165
	17	1080	**1165**	1310	1130	**1015**	920	590	**640**	705	–	—	–	755	**835**	920
	18	1080	**1165**	1310	1130	**1015**	920	590	**640**	705	–	—	–	755	**835**	920
	19	900	**985**	1100	950	**835**	785	475	**525**	590	–	—	–	640	**690**	770
	20	900	**985**	1100	950	**835**	785	475	**525**	590	–	—	–	640	**690**	770
N	21	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	22	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	23	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	24	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	25	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	26	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	27	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	28	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	29	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	30	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
S	31	–	—	–	–	—	–	115	**150**	165	100	**115**	150	–	—	–
	32	–	—	–	–	—	–	115	**150**	165	100	**115**	150	–	—	–
	33	–	—	–	–	—	–	115	**150**	165	100	**115**	150	–	—	–
	34	–	—	–	–	—	–	115	**165**	195	100	**150**	180	–	—	–
	35	–	—	–	–	—	–	115	**165**	195	100	**150**	180	–	—	–
	36	–	—	–	–	—	–	150	**195**	280	115	**180**	245	–	—	–
	37	–	—	–	–	—	–	150	**195**	280	115	**180**	245	–	—	–
H	38.1	–	—	–	375	**460**	560	280	**360**	475	–	—	–	–	—	–
	38.2	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	39.1	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	39.2	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–

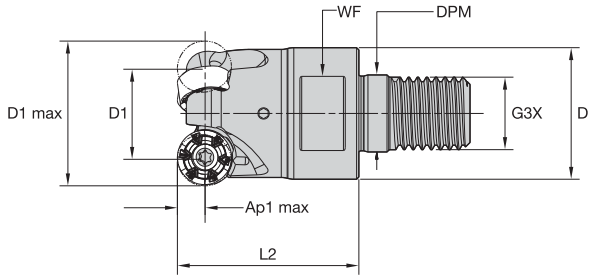
*NOTE: First choice starting feed (fz) is in **bold** type.*
Use corresponding speed (vc).
fz and vc are valid for ae ≥0.4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

ae/D1 =	0.2	0.3	0.4
fz-Factor	1.5	1.3	1.0
vc-Factor	1.3	1.2	1.1



- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





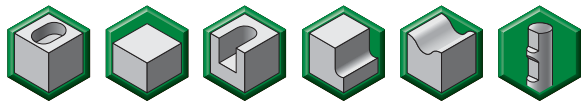
M200 • Screw-On End Mills

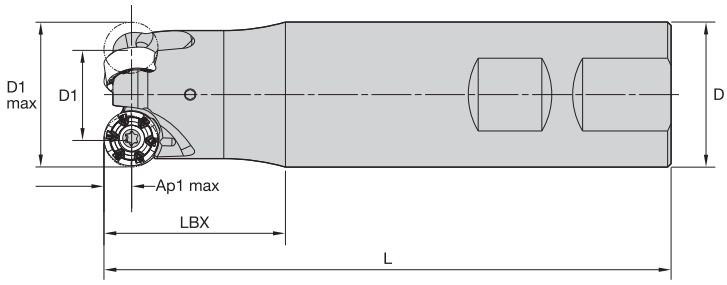
order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	lbs
5068352	**M200D125Z03M16RN12**	1.250	.778	1.142	.670	M16	1.500	.943	.117	3	39160	Yes	.37
5068370	**M200D150Z03M16RN12**	1.500	1.028	1.142	.670	M16	1.500	.943	.117	3	35890	Yes	.44
5068371	**M200D150Z04M16RN12**	1.500	1.028	1.142	.670	M16	1.500	.943	.117	4	35890	Yes	.44

Spare Parts

D1 max	insert screw	in. lbs.	Torx driver
1.250	**193.492**	35	**170.025**
1.500	**193.492**	35	**170.025**

- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





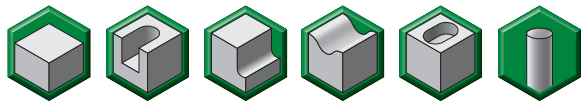
M200 • Weldon End Mills

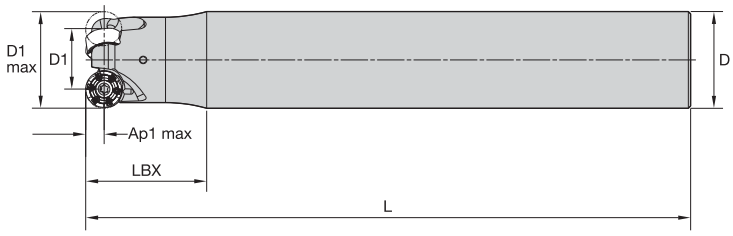
order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
5068372	**M200D125Z02W125RN12**	1.250	.778	1.250	3.530	1.250	.117	2	39160.0	Yes	.98

Spare Parts

D1 max	insert screw	in. lbs.	Torx driver
1.250	**193.492**	35	**170.025**

- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





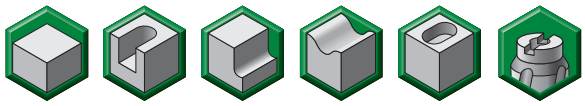
M200 • Cylindrical End Mills

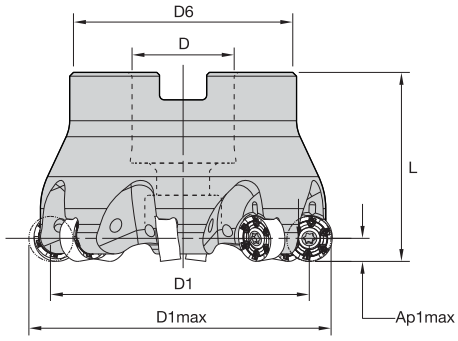
order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
5068374	**M200D125Z02C125RN12L900**	1.250	.778	1.500	9.000	1.250	.117	2	39160	Yes	2.85
5068400	**M200D150Z03C150RN12L900**	1.500	1.028	1.500	9.250	1.500	.117	3	35890	Yes	4.21

Spare Parts

D1 max	 insert screw	in. lbs.	 Torx driver
1.250	**193.492**	35	**170.025**
1.500	**193.492**	35	**170.025**

- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.



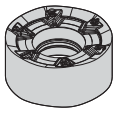


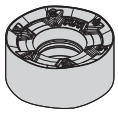
M200 • Shell Mills

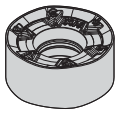
order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
5068401	**M200D150Z04S050RN12**	1.500	1.028	.500	1.300	1.570	.117	4	35890	Yes	.41
5068402	**M200D200Z04S075RN12**	2.000	1.528	.750	1.750	2.000	.117	4	31080	Yes	1.02
5068403	**M200D200Z05S075RN12**	2.000	1.528	.750	1.750	2.000	.117	5	31080	Yes	1.03
5068404	**M200D250Z07S075RN12**	2.500	2.028	.750	1.750	2.000	.117	7	27800	Yes	1.53
5068405	**M200D300Z08S100RN12**	3.000	2.528	1.000	2.189	2.000	.117	8	25370	Yes	2.08
5068406	**M200D400Z09S150RN12**	4.000	3.528	1.500	3.380	2.000	.117	9	21970	Yes	3.95

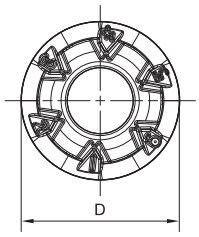
Spare Parts

D1 max	 insert screw	in. lbs.	 wrench	 socket-head cap screw
1.500	**193.492**	35	**170.025**	**S422**
2.000	**193.492**	35	**170.025**	**S445**
2.500	**193.492**	35	**170.025**	**S445**
3.000	**193.492**	35	**170.025**	**S448**
4.000	**193.492**	35	**170.025**	**—**


RNGJ-ML


RNGJ-MM
RNPJ-MM


RNGJ-MH
RNPJ-MH



- -ML geometry is the first choice for stainless steel and high-temp alloys.
- -MM geometry is for general purpose, especially for steel.
- -MH geometry is the first choice for heavy applications, cast iron, and high-strength steels.

● first choice
○ alternate choice

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

Indexable Milling

RNGJ-ML

catalog number	cutting edges	D	S	WK15PM	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNGJ1204M0EML	12	.472	.187				●	●	●

RNGJ-MM

catalog number	cutting edges	D	S	WK15PM	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNGJ1204M0SMM	12	.472	.187	●			●	●	●

RNGJ-MH

catalog number	cutting edges	D	S	WK15PM	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNGJ1204M0SMH	12	.472	.187	●			●	●	●

RNPJ-MM

catalog number	cutting edges	D	S	WK15PM	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNPJ1204M0SMM	12	.472	.187			●	●	●	●

RNPJ-MH

catalog number	cutting edges	D	S	WK15PM	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNPJ1204M0SMH	12	.472	.187		●	●	●	●	●

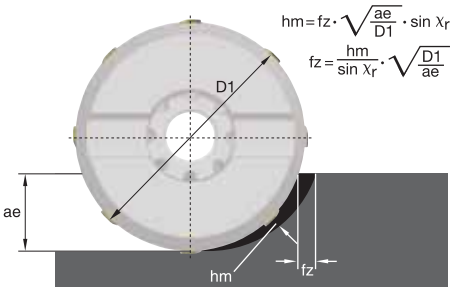
		WK15PM			WK15CM			WP20CM			WP25PM			WU35PM			WP35CM		
Edge Geometry		feed per tooth fz (inch)																	
..-ML		0.05	**0.09**	0.15	0.05	**0.09**	0.15	0.05	**0.09**	0.16	0.05	**0.09**	0.16	0.05	**0.09**	0.16	0.05	**0.09**	0.16
..-MM		0.12	**0.21**	0.35	0.12	**0.21**	0.33	0.12	**0.21**	0.35	0.12	**0.21**	0.35	0.12	**0.21**	0.35	0.12	**0.21**	0.35
..-MH		0.20	**0.30**	0.42	0.20	**0.30**	0.42	0.20	**0.30**	0.45	0.20	**0.30**	0.45	0.20	**0.30**	0.45	0.20	**0.30**	0.45
Material Group		vc (ft/min)																	
P	1	–	—	–	–	—	–	535	**475**	545	325	**345**	395	255	**275**	315	545	**475**	440
	2	—	—	—	—	—	—	535	**475**	545	325	**345**	395	255	**275**	315	545	**475**	440
	3	–	—	–	–	—	–	535	**475**	545	325	**345**	395	255	**275**	315	545	**475**	440
	4	—	—	—	—	—	—	535	**475**	545	325	**345**	395	255	**275**	315	545	**475**	440
	5	–	—	–	–	—	–	535	**475**	545	325	**345**	395	255	**275**	315	545	**475**	440
	6	—	—	—	—	—	—	330	**370**	410	240	**290**	330	195	**230**	260	275	**305**	335
	7	–	—	–	–	—	–	330	**370**	410	240	**290**	330	195	**230**	260	275	**305**	335
	8	—	—	—	—	—	—	305	**330**	370	215	**255**	305	170	**205**	240	250	**275**	305
	9	–	—	–	–	—	–	305	**330**	370	215	**255**	305	170	**205**	240	250	**275**	305
	10	—	—	—	—	—	—	230	**255**	275	180	**225**	270	145	**180**	210	190	**210**	225
	11	–	—	–	–	—	–	230	**255**	275	180	**225**	270	145	**180**	210	190	**210**	225
	12	—	—	—	—	—	—	275	**300**	330	180	**200**	225	145	**160**	180	255	**275**	310
	13.1	–	—	–	–	—	–	175	**200**	230	120	**150**	200	95	**120**	160	-	**165**	190
	13.2	—	—	—	—	—	—	175	**200**	230	120	**150**	200	95	**120**	160	-	**165**	190
M	14.1	–	—	–	–	—	–	205	**240**	270	200	**215**	245	165	**180**	205	190	**220**	250
	14.2	—	—	—	—	—	—	150	**175**	195	115	**145**	170	95	**120**	140	140	**160**	175
	14.3	–	—	–	–	—	–	205	**240**	270	200	**215**	245	165	**180**	205	190	**220**	250
	14.4	—	—	—	—	—	—	190	**215**	245	160	**190**	225	130	**160**	185	170	**195**	225
K	15	260	**295**	325	410	**460**	505	435	**390**	350	220	**250**	275	–	—	–	285	**320**	355
	16	260	**295**	325	410	**460**	505	435	**390**	350	220	**250**	275	—	—	—	285	**320**	355
	17	215	**225**	255	330	**355**	400	345	**310**	280	180	**195**	215	–	—	–	230	**255**	280
	18	215	**225**	255	330	**355**	400	345	**310**	280	180	**195**	215	—	—	—	230	**255**	280
	19	170	**190**	215	275	**300**	335	290	**255**	240	145	**160**	180	–	—	–	195	**210**	235
	20	170	**190**	215	275	**300**	335	290	**255**	240	145	**160**	180	—	—	—	195	**210**	235
N	21	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	23	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	25	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	27	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	29	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S	31	–	—	–	–	—	–	–	—	–	35	**45**	50	30	**35**	45	–	—	–
	32	—	—	—	—	—	—	—	—	—	35	**45**	50	30	**35**	45	—	—	—
	33	–	—	–	–	—	–	–	—	–	35	**45**	50	30	**35**	45	–	—	–
	34	—	—	—	—	—	—	—	—	—	35	**50**	60	30	**45**	55	—	—	—
	35	–	—	–	–	—	–	–	—	–	35	**50**	60	30	**45**	55	–	—	–
	36	—	—	—	—	—	—	—	—	—	45	**60**	85	35	**55**	75	—	—	—
	37	–	—	–	–	—	–	–	—	–	45	**60**	85	35	**55**	75	–	—	–
H	38.1	–	—	–	–	—	–	115	**140**	170	85	**110**	145	–	—	–	–	—	–
	38.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	39.1	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	39.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

*NOTE: First choice starting feed (fz) is in **bold** type.*
Use corresponding speed (vc).
fz and vc are valid for ae ≥0.4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

ae/D1 =	0.2	0.3	0.4
fz-Factor	1.5	1.3	1.0
vc-Factor	1.3	1.2	1.1

$$hm = fz \cdot \sqrt{\frac{ae}{D1}} \cdot \sin \chi_r$$

$$fz = \frac{hm}{\sin \chi_r} \cdot \sqrt{\frac{D1}{ae}}$$



- Double-sided, 12 cutting edges.
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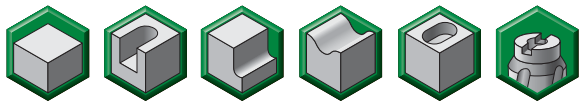
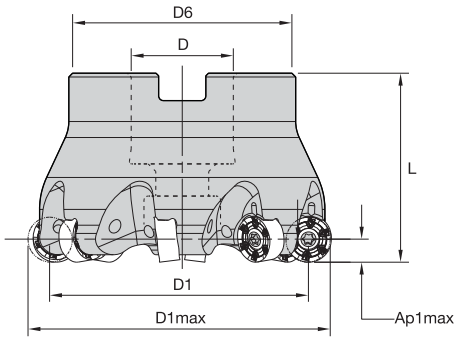
- Pocketing and profiling capabilities.



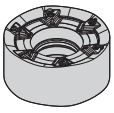


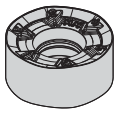
Shell Mills

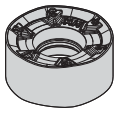
order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
5283521	**M200D200Z04S075RN16**	2.000	1.370	.750	1.752	2.000	.156	4	26400	Yes	.91
5283522	**M200D250Z05S100RN16**	2.500	1.870	1.000	2.189	2.000	.156	5	22600	Yes	1.51
5283523	**M200D300Z05S100RN16**	3.000	2.370	1.000	2.189	2.000	.156	5	20100	Yes	2.01
5283524	**M200D300Z07S100RN16**	3.000	2.370	1.000	2.189	2.000	.156	7	20100	Yes	1.91
5283525	**M200D400Z06S150RN16**	4.000	3.370	1.500	3.812	2.000	.156	6	16800	Yes	3.96
5283526	**M200D400Z08S150RN16**	4.000	3.370	1.500	3.812	2.000	.156	8	16800	Yes	4.04

Spare Parts

D1 max	 insert screw	in. lbs.	 Torx driver	 socket-head cap screw
2.000	**193.343**	35	**170.025**	**S445**
2.500	**193.343**	35	**170.025**	**S459**
3.000	**193.343**	35	**170.025**	**S459**
4.000	**193.343**	35	**170.025**	**–**


RNGJ-ML


RNPJ-MM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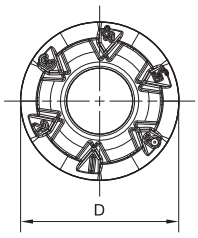

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● first choice
○ alternate choice

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

■ RNGJ-ML

catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNGJ1605M0EML	12	.630	.250			●	●	●

■ RNPJ-MM

catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNPJ1605M0SMM	12	.630	.250		●	●	●	●

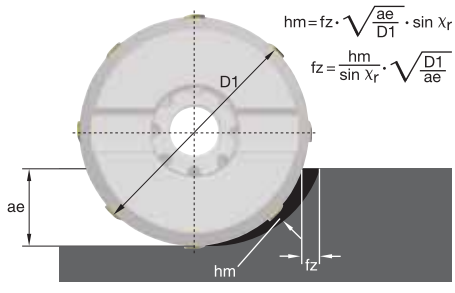
■ RNPJ-MH

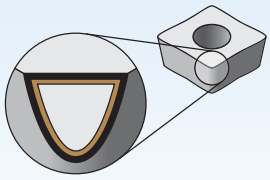
catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNPJ1605M0SMH	12	.630	.250	●	●	●	●	●

		WK15CM			WP20CM			WP25PM			WU35PM			WP35CM		
Edge Geometry		feed per tooth fz (inch)														
	..-ML	0.002	**0.007**	0.008	0.002	**0.007**	0.009	0.002	**0.007**	0.009	0.002	**0.007**	0.009	0.002	**0.007**	0.009
	..-MM	0.005	**0.010**	0.013	0.005	**0.010**	0.014	0.005	**0.010**	0.014	0.005	**0.010**	0.014	0.005	**0.010**	0.014
	..-MH	0.009	**0.012**	0.017	0.009	**0.012**	0.019	0.009	**0.012**	0.019	0.009	**0.012**	0.019	0.009	**0.012**	0.019
Material Group		vc (ft/min)														
P	1	–	—	–	1755	**1560**	1790	1065	**1130**	1295	835	**900**	1035	1790	**1560**	1445
	2	–	—	–	1755	**1560**	1790	1065	**1130**	1295	835	**900**	1035	1790	**1560**	1445
	3	–	—	–	1755	**1560**	1790	1065	**1130**	1295	835	**900**	1035	1790	**1560**	1445
	4	–	—	–	1755	**1560**	1790	1065	**1130**	1295	835	**900**	1035	1790	**1560**	1445
	5	–	—	–	1755	**1560**	1790	1065	**1130**	1295	835	**900**	1035	1790	**1560**	1445
	6	–	—	–	1080	**1215**	1345	785	**950**	1080	640	**755**	855	900	**1000**	1100
	7	–	—	–	1080	**1215**	1345	785	**950**	1080	640	**755**	855	900	**1000**	1100
	8	–	—	–	1000	**1080**	1215	705	**835**	1000	560	**670**	785	820	**900**	1000
	9	–	—	–	1000	**1080**	1215	705	**835**	1000	560	**670**	785	820	**900**	1000
	10	–	—	–	755	**835**	900	590	**740**	885	475	**590**	690	625	**690**	740
	11	–	—	–	755	**835**	900	590	**740**	885	475	**590**	690	625	**690**	740
	12	–	—	–	900	**985**	1080	590	**655**	740	475	**525**	590	835	**900**	1015
	13.1	–	—	–	575	**655**	755	395	**490**	655	310	**395**	525	–	**540**	625
	13.2	–	—	–	575	**655**	755	395	**490**	655	310	**395**	525	—	**540**	625
M	14.1	–	—	–	670	**785**	885	655	**705**	805	540	**590**	670	625	**720**	820
	14.2	–	—	–	490	**575**	640	375	**475**	560	310	**395**	460	460	**525**	575
	14.3	–	—	–	670	**785**	885	655	**705**	805	540	**590**	670	625	**720**	820
	14.4	–	—	–	625	**705**	805	525	**625**	740	425	**525**	605	560	**640**	740
K	15	1345	**1510**	1655	1425	**1280**	1150	720	**820**	900	–	—	–	935	**1050**	1165
	16	1345	**1510**	1655	1425	**1280**	1150	720	**820**	900	–	—	–	935	**1050**	1165
	17	1080	**1165**	1310	1130	**1015**	920	590	**640**	705	–	—	–	755	**835**	920
	18	1080	**1165**	1310	1130	**1015**	920	590	**640**	705	–	—	–	755	**835**	920
	19	900	**985**	1100	950	**835**	785	475	**525**	590	–	—	–	640	**690**	770
	20	900	**985**	1100	950	**835**	785	475	**525**	590	–	—	–	640	**690**	770
N	21	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	22	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	23	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	24	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	25	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	26	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	27	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	28	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	29	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	30	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
S	31	–	—	–	–	—	–	115	**150**	165	100	**115**	150	–	—	–
	32	–	—	–	–	—	–	115	**150**	165	100	**115**	150	–	—	–
	33	–	—	–	–	—	–	115	**150**	165	100	**115**	150	–	—	–
	34	–	—	–	–	—	–	115	**165**	195	100	**150**	180	–	—	–
	35	–	—	–	–	—	–	115	**165**	195	100	**150**	180	–	—	–
	36	–	—	–	–	—	–	150	**195**	280	115	**180**	245	–	—	–
	37	–	—	–	–	—	–	150	**195**	280	115	**180**	245	–	—	–
H	38.1	–	—	–	375	**460**	560	280	**360**	475	–	—	–	–	—	–
	38.2	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	39.1	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	39.2	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–

*NOTE: First choice starting feed (fz) is in **bold** type.*
Use corresponding speed (vc).
fz and vc are valid for ae ≥0.4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

ae/D1 =	0.2	0.3	0.4
fz-Factor	1.5	1.3	1.0
vc-Factor	1.3	1.2	1.1





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

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

wear resistance ⟷ toughness

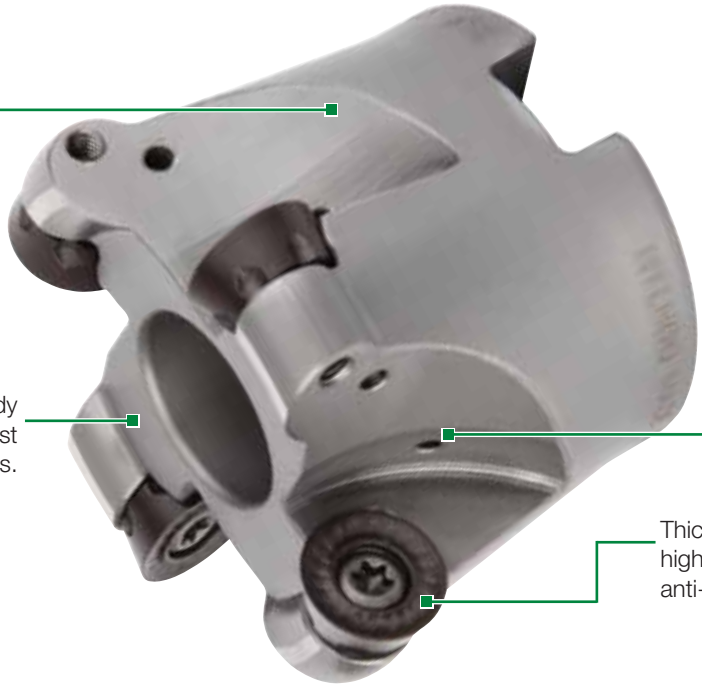
Grade

Coating	Grade Description	05 10 15 20 25 30 35 40 45
WK15PM	A TiAlN-PVD-coated carbide grade developed specifically for general machining of ductile cast iron and can be used with or without coolant.	K
WK15CM	A multilayered TiN-MT-TiCN-Al_2O_3-CVD-coated carbide grade with advanced post-coat treatment. WK15CM is a wear-resistant grade with balanced toughness for general milling of cast irons at higher speeds. Best results in dry but can also be used wet.	K
WP20CM	WP20CM is a multilayered TiN-MT-TiCN-Al_2O_3-CVD-coated carbide grade with advanced post-coat treatment. The substrate is a well-balanced combination of wear resistance and toughness. WP20CM is primarily for light and general machining of steels and stainless steels or roughing of cast irons.	P M K
WP25PM	AlTiN-PVD-coated carbide grade engineered to provide better performance in general machining of high-temperature alloys and stainless steel. WP25PM resists breakage and offers improved wear resistance and increased strength.	P M K S
WU35PM	A high-performance TiAlN-PVD-coated carbide grade for milling steel, stainless steel, and high-temperature alloys. The good thermal shock resistance of the substrate makes this grade ideal for both wet and dry machining. WU35PM is primarily for use in general and heavy machining.	P M S
WP35CM	A multilayered TiN-TiCN-Al_2O_3-CVD-coated carbide grade with advanced Victory™ post-coat treatment and a very tough substrate. WP35CM has a wide application area in general and rough milling of steels and cast irons. It performs best dry but can also be used wet.	P K

Versatile Platform for All Materials and Applications • **M100™ Series Copy Mills**

A trusted multipurpose solution for profiling and copy applications, the M100 Series ensures a reliable platform for all of your copy milling, face milling, helical interpolation, and roughing needs, even in your most demanding operations.

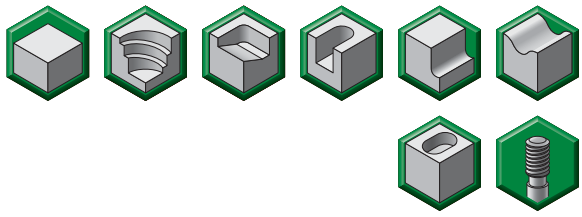
M100

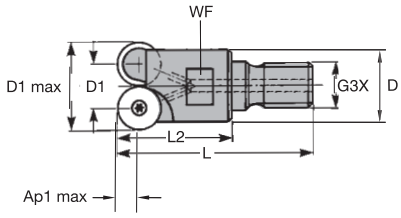


- Thick inserts ensure reliability and consistent results.
- Anti-rotation systems in larger iC inserts provide higher MRR capabilities.
- Increased chip evacuation and through tool coolant for enhanced performance.
- New -MMX geometry: High precision pressed insert that significantly improves performance in stainless steel and high-temperature alloys.

New -MMX geometry

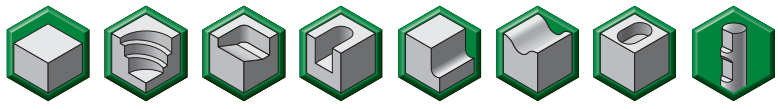
- General-purpose face and copy milling.
- Excellent variety of grades and geometries available.
- Anti-rotation feature for top security.

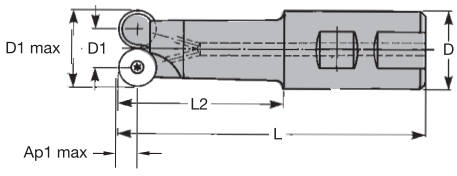




Screw-On End Mills

order number	catalog number	D1 max	D1	D	G3X	L	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646609	**M100D100Z02M12RD12**	1.000	.528	.827	M12	2.366	1.500	.750	.236	2	50.0°	23000	Yes	.44
2646615	**M100D125Z02M16RD12**	1.250	.778	1.142	M16	2.715	1.750	1.000	.236	2	23.0°	19000	Yes	.66
2646620	**M100D150Z02M16RD12**	1.500	1.028	1.142	M16	2.715	1.750	1.000	.236	3	27.0°	17000	Yes	.71





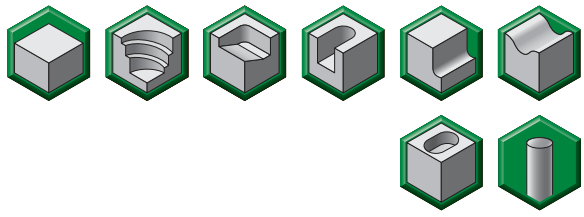
Weldon End Mills

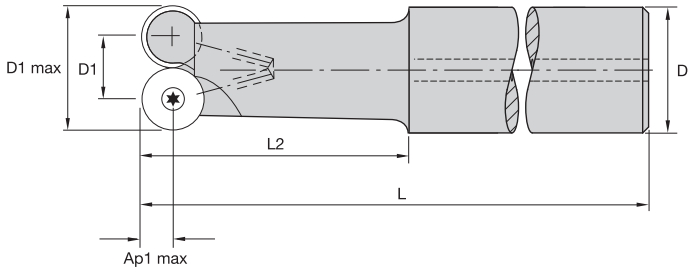
order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646610	**M100D100Z02W100RD12**	1.000	.528	1.000	4.780	2.500	.236	2	50.0°	23000	Yes	1.00
2646611	**M100D100Z02W100RD12L553**	1.000	.528	1.000	5.530	3.250	.236	2	50.0°	23000	Yes	1.25
2646612	**M100D100Z02W125RD12**	1.000	.528	1.250	6.400	4.120	.236	2	50.0°	23000	Yes	1.60
2646613	**M100D100Z02W125RD12L705**	1.000	.528	1.250	7.050	4.870	.236	2	50.0°	23000	Yes	1.75
2646614	**M100D100Z02W125RD12L715**	1.000	.528	1.250	7.150	4.870	.236	2	50.0°	23000	Yes	1.75
2646616	**M100D125Z02W125RD12**	1.250	.778	1.250	5.400	3.120	.236	2	23.0°	19000	Yes	1.40
2646617	**M100D125Z02W125RD12L615**	1.250	.778	1.250	6.150	3.870	.236	2	23.0°	19000	Yes	1.60
2646618	**M100D125Z02W150RD12**	1.250	.778	1.500	7.250	4.560	.236	2	23.0°	19000	Yes	2.10
2646619	**M100D125Z02W150RD12L800**	1.250	.778	1.500	8.000	5.310	.236	2	23.0°	19000	Yes	2.50
2646621	**M100D150Z03W125RD12**	1.500	1.028	1.250	5.650	3.370	.236	3	27.0°	17000	Yes	1.80
2646622	**M100D150Z03W125RD12L715**	1.500	1.028	1.250	7.150	4.870	.236	3	27.0°	17000	Yes	2.25

Spare Parts

D1 max	 insert screw	in. lbs.	 Torx driver
1.000	**12148038800**	27	**12148000600**
1.250	**12148038800**	27	**12148000600**
1.500	**12148038800**	27	**12148000600**

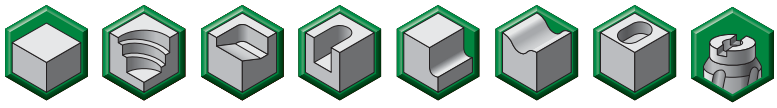
- General-purpose face and copy milling.
- Excellent variety of grades and geometries available.
- Anti-rotation feature for top security.

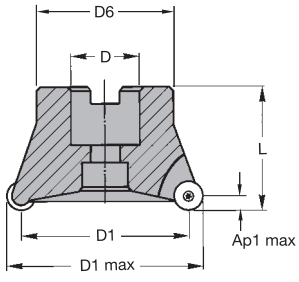




Cylindrical End Mills

order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646607	M100D100Z02C100RD12L478	1.000	.528	1.000	4.780	2.500	.236	2	50.0°	23000	Yes	1.00
2646608	M100D100Z02C125RD12L715	1.000	.528	1.250	7.150	4.870	.236	2	50.0°	23000	Yes	1.60





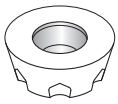
Shell Mills

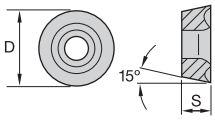
order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646724	M100D200Z04S075RD12	2.000	1.530	.750	1.700	1.630	.236	4	10.0°	15000	Yes	.55
2646725	M100D200Z05S075RD12	2.000	1.530	.750	1.700	1.630	.236	5	10.0°	15000	Yes	.55
2646728	M100D250Z06S100RD12	2.500	2.028	1.000	2.200	1.750	.236	6	8.0°	14000	Yes	1.05
2646732	M100D300Z07S100RD12	3.000	2.528	1.000	2.300	2.000	.236	7	5.0°	12000	Yes	1.65

Spare Parts

D1 max	insert screw	in. lbs.	Torx driver
1.000	12148038800	27	12148000600
2.000	12148038800	27	12148000600
2.500	12148038800	27	12148000600
3.000	12148038800	27	12148000600


RDHT-TX


RDHW-ML
RDHW-MH



● first choice
○ alternate choice

		TN2510	TN6525	TN6540	TN7525	TN7535
P		○	●	●	●	●
M			○	●	○	○
K		●	○	○		○
N						
S				●		
H		●				

RDHT-TX

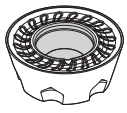
catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDHT1204M0TX	.472	.188	.005				●	

RDHW-ML

catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDHW1204M0ML	.472	.188	.004	●				

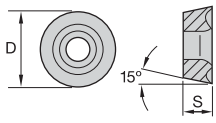
RDHW-MH

catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDHW1204M0MH	.472	.188	.006	●				


RDPT-MMX


RDMT-TX


RDMW-TX



RDPT-MMX

catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDPT1204M0SMMX	.472	.187	.007			●		●

RDMT-TX

catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDMT1204M0TX	.472	.188	.006	●	●	●	●	●

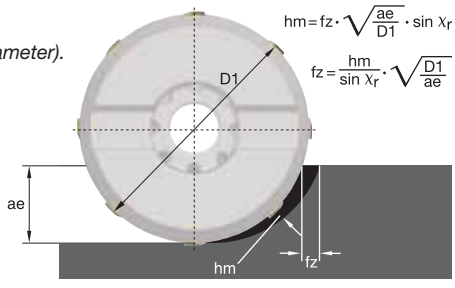
RDMW-TX

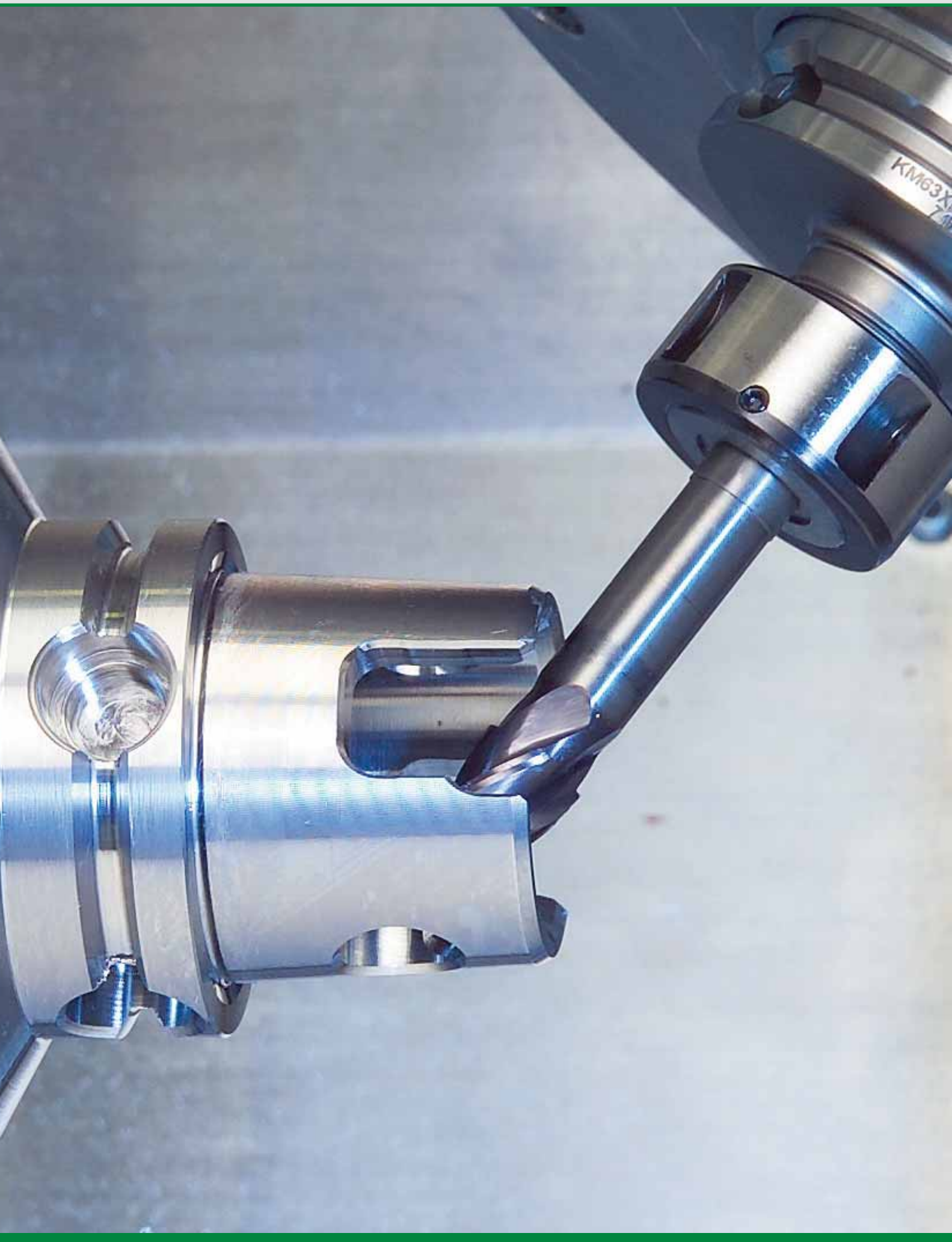
catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDMW1204M0TX	.472	.188	.006	●		●	●	●

		TN2510			TN6525			TN6540			TN7525			TN7535		
Edge Geometry		feed per tooth fz (inch)														
..ML		.0031	**.0055**	.0063												
..MOTX		.0031	**.0069**	.0094	.0032	**.0071**	.0097	.0043	**.0095**	.0130	.0031	**.0069**	.0094	.0039	**.0087**	.0118
..MH		.0031	**.0069**	.0094												
..MMX								.0039	**.0095**	.0157						
Material Group		vc (ft/min)														
P	1	1280	**950**	820	1150	**850**	750	950	**720**	620	1350	**1050**	920	1180	**920**	790
	2	850	**660**	590	790	**590**	520	660	**490**	430	950	**720**	620	820	**620**	540
	3	720	**590**	460	660	**520**	430	560	**430**	360	790	**590**	520	690	**520**	460
	4	720	**590**	460	660	**520**	430	560	**430**	360	820	**620**	520	710	**540**	460
	5	620	**430**	390	560	**390**	360	460	**330**	300	690	**490**	430	590	**430**	360
	6	820	**620**	490	750	**560**	460	620	**460**	390	920	**690**	560	790	**590**	490
	7	620	**460**	430	560	**430**	390	460	**360**	330	690	**520**	460	590	**460**	390
	8	590	**430**	360	520	**390**	330	430	**330**	260	590	**460**	390	520	**390**	330
	9	460	**360**	260	430	**330**	230	360	**260**	200	520	**390**	300	460	**330**	260
	10	620	**490**	430	560	**460**	390	460	**390**	330	690	**560**	490	590	**480**	430
	11	430	**300**	260	390	**260**	230	330	**230**	200	460	**330**	260	390	**300**	230
	12	790	**720**	490	720	**560**	460	590	**460**	390	850	**660**	560	750	**570**	490
	13.1	690	**490**	430	620	**460**	390	520	**390**	330	750	**560**	460	660	**480**	390
	13.2	360	**260**	230	330	**230**	200	260	**200**	160	390	**300**	230	330	**250**	200
M	14.1	–	—	–	750	**620**	430	620	**520**	360	920	**750**	520	790	**660**	460
	14.2	—	—	—	590	**590**	390	490	**490**	330	720	**690**	460	620	**610**	410
	14.3	–	—	–	430	**430**	330	360	**360**	260	520	**520**	360	460	**440**	310
	14.4	—	—	—	390	**330**	230	330	**260**	200	460	**390**	260	390	**330**	230
K	15	1510	**1120**	920	–	—	–	–	—	–	–	—	–	–	—	–
	16	1150	**850**	720	—	—	—	—	—	—	—	—	—	—	—	—
	17	1280	**920**	750	790	**590**	520	660	**490**	430	–	—	–	790	**590**	520
	18	920	**560**	460	660	**520**	430	560	**430**	360	—	—	—	660	**520**	430
	19	1280	**750**	620	–	—	–	–	—	–	–	—	–	–	—	–
	20	1020	**620**	520	—	—	—	—	—	—	—	—	—	—	—	—
N	21	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	23	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	25	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	27	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	29	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S	31	–	—	–	–	—	–	200	**160**	150	–	—	–	–	—	–
	32	—	—	—	—	—	—	160	**130**	110	—	—	—	—	—	—
	33	–	—	–	–	—	–	110	**80**	70	–	—	–	–	—	–
	34	—	—	—	—	—	—	100	**70**	50	—	—	—	—	—	—
	35	–	—	–	–	—	–	100	**70**	50	–	—	–	–	—	–
	36	—	—	—	—	—	—	260	**160**	130	—	—	—	—	—	—
	37	–	—	–	–	—	–	230	**150**	110	–	—	–	–	—	–
H	38.1	950	**790**	660	–	—	–	–	—	–	–	—	–	–	—	–
	38.2	790	**660**	520	—	—	—	—	—	—	—	—	—	—	—	—
	39.1	590	**490**	390	–	—	–	–	—	–	–	—	–	–	—	–
	39.2	390	**330**	230	—	—	—	—	—	—	—	—	—	—	—	—

*NOTE: First choice starting feed (fz) is in **bold** type. Use corresponding speed (vc).*
fz is valid for face milling with width of cut (ae) ≥ 0.4 D1 and Ap1 max.
For smaller ae and ap, use the given correction factors (D = diameter of insert, D1 = cutter diameter).

ae/D1 =	0.2	0.3	0.4
fz-Factor	1.5	1.3	1.0
vc-Factor	1.3	1.2	1.1



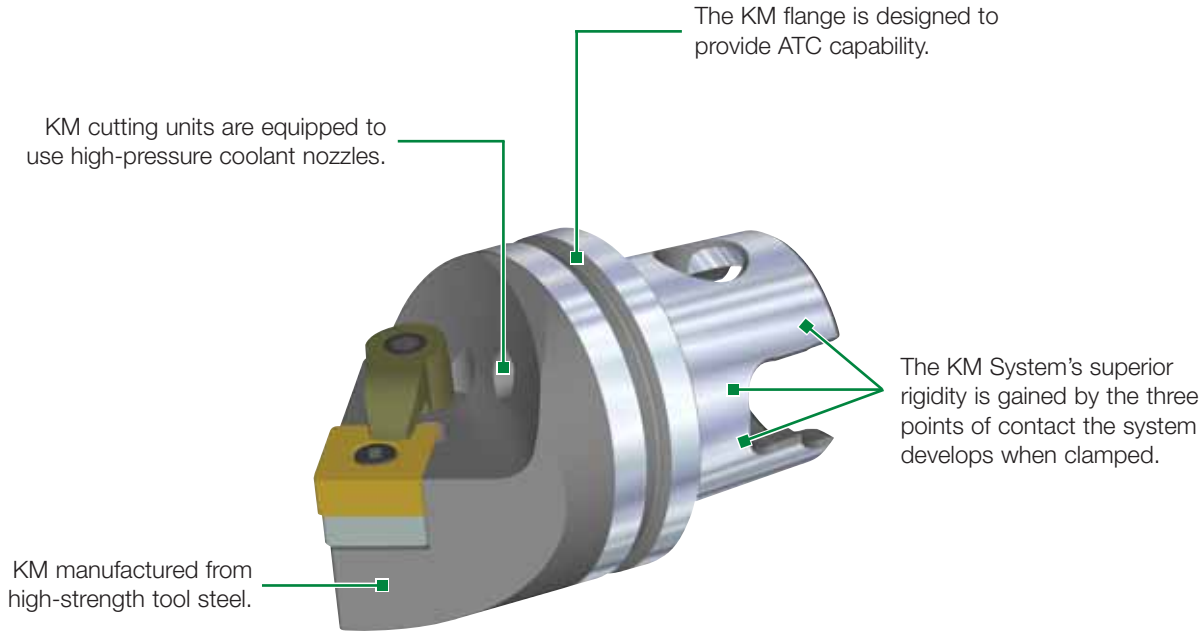


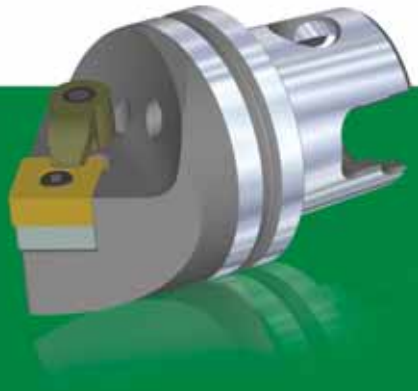
Tooling Systems

KM™ Quick Change Clamping System • **KM32TS™ Series**

The KM Quick Change Clamping System is the best system on the market suitable for static, rotating, and multitasking operations. With its industry-leading design, the KM Quick Change System provides greater clamping forces than other quick-change systems. The KM Quick Change System gives you the flexibility to use KM on any application within your shop.

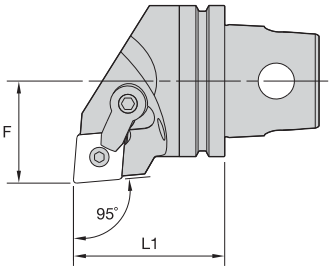
KM32TS

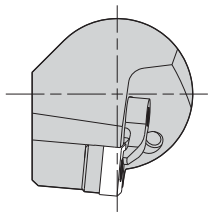


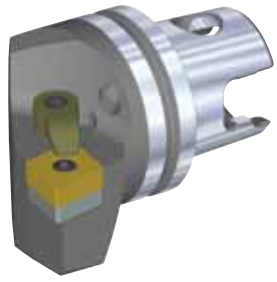


- KM™ is an ISO standard (ISO 26622).
- KM clamping units provide a 4:1 mechanical advantage.
- KM cutting units are capable of 100 bar (1,500 psi) coolant pressure.

KM QUICK CHANGE





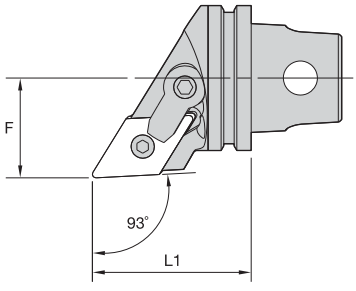


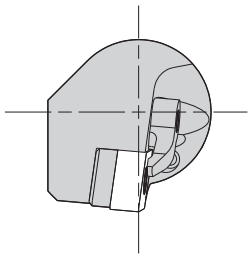
MCLN 95°




order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw
	right hand									
1023224	KM32TSMCLNR12	35	1.378	22	.866	CN..120408/CN..432	ICSN432	KLM46	CKM20LP	STCM11
	left hand									
1023228	KM32TSMCLNL12	35	1.378	22	.866	CN..120408/CN..432	ICSN432	KLM46	CKM20LP	STCM11

KM QUICK CHANGE



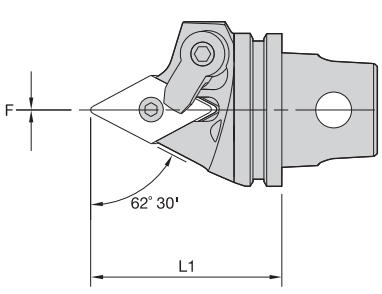


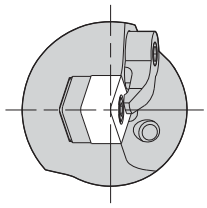
MDJN 93°

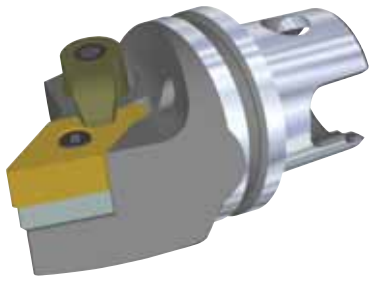



order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw
	right hand									
3095644	KM32TSMDJNR1504	35	1.378	22	.866	DN..150408/DN..432	IDSN442	KLM46L	CKM20LP	STCM11
1023232	KM32TSMDJNR1506	35	1.378	22	.866	DN..150608/DN..442	IDSN432	KLM46L	CKM20LP	STCM11
	left hand									
3095643	KM32TSMDJNL1504	35	1.378	22	.866	DN..150408/DN..432	IDSN442	KLM46L	CKM20LP	STCM11
1023275	KM32TSMDJNL1506	35	1.378	22	.866	DN..150608/DN..442	IDSN432	KLM46L	CKM20LP	STCM11

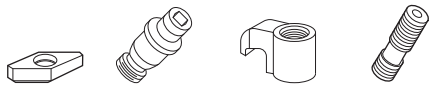
KM QUICK CHANGE





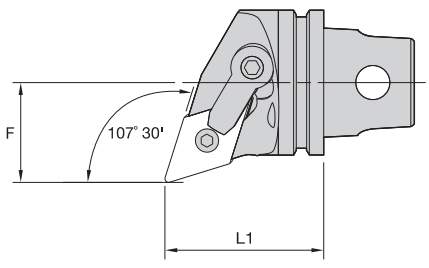


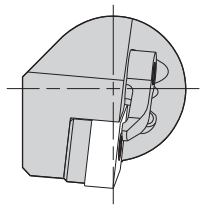
MDPN 62° 30'



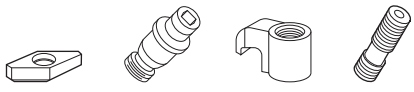
order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw
3095645	KM32TSMDPNN1504	40	1.575	0	.000	DN..150408/DN..432	IDSN442	KLM46L	CKM20LP	STCM11
1022560	KM32TSMDPNN1506	40	1.575	0	.000	DN..150608/DN..442	IDSN432	KLC46L	CKM20LP	STCC11

KM QUICK CHANGE

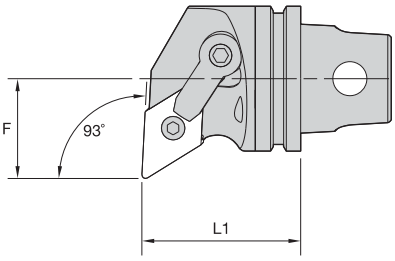


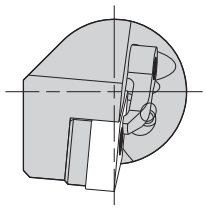


MDQN 107° 30'



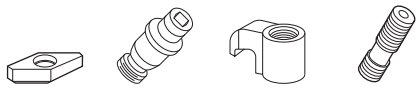
order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw
	right hand									
1023233	KM32TSMDQNR1506	35	1.378	22	.866	DN..150608/DN..442	IDSN432	KLM46L	CKM23LP	STCM11
	left hand									
1023276	KM32TSMDQNL1506	35	1.378	22	.866	DN..150608/DN..442	IDSN432	KLM46L	CKM23LP	STCM11



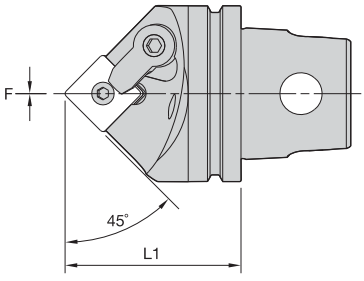


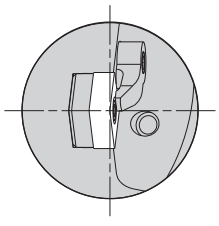
KM QUICK CHANGE

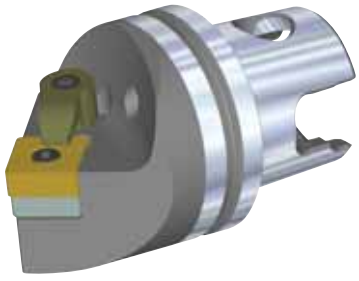
MDUN 93°



order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw
	right hand									
1023274	KM32TSMDUNR1506	35	1.378	22	.866	DN..150608/DN..442	IDSN432	KLM46L	CKM23LP	STCM11
	left hand									
1023277	KM32TSMDUNL1506	35	1.378	22	.866	DN..150608/DN..442	IDSN432	KLM46L	CKM23LP	STCM11

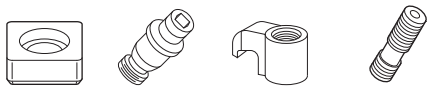




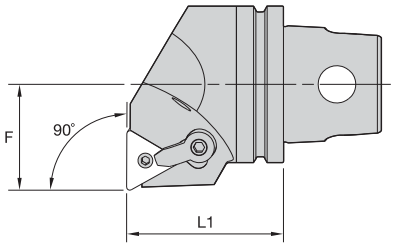


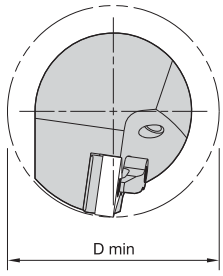
KM QUICK CHANGE

MSDN 45°



order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw
1144875	KM32TSMSDNN12	40	1.575	0	.000	SN..120408/SN..432	ISSN432	KLM46	CKM20LP	STCM11

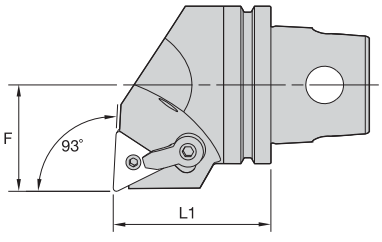


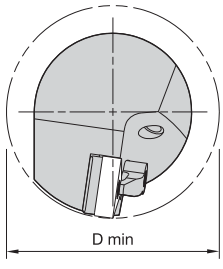


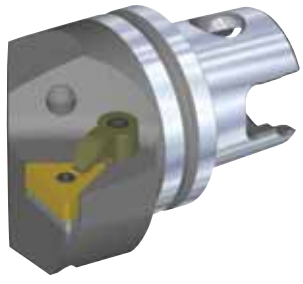
KM QUICK CHANGE

MTFN 90°

order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lock pin	clamp	clamp screw
	left hand											
1023281	KM32TSMTFNL16	35	1.378	22	.866	44	1.732	TN..160408/TN..332	ITSN322	KLM34L	CKM7LP	STCM9





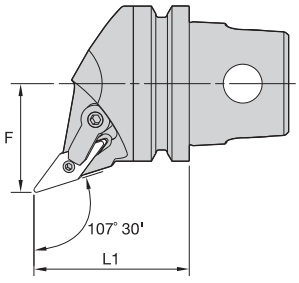


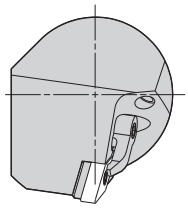
KM QUICK CHANGE

MTUN 93°

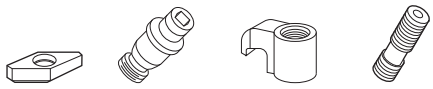
order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lock pin	clamp	clamp screw
	right hand											
1144903	KM32TSMTUNR16	35	1.378	22	.866	44	1.732	TN..160408/TN..332	ITSN322	KLM34L	CKM7LP	STCM9

KM QUICK CHANGE



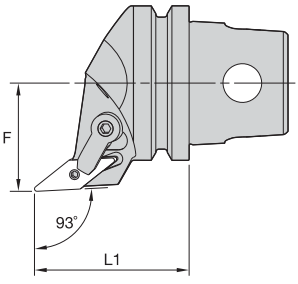


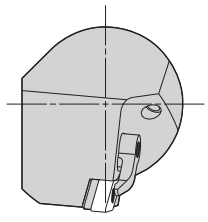
■ MVHN 107° 30'



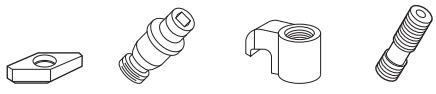
order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw
	right hand									
1144909	KM32TSMVHNR16	35	1.378	22	.866	VN..160408/VN..332	IVSN322	KLM34L	CKM23LP	STCM11
	left hand									
1144910	KM32TSMVHNL16	35	1.378	22	.866	VN..160408/VN..332	IVSN322	KLM34L	CKM23LP	STCM11

KM QUICK CHANGE

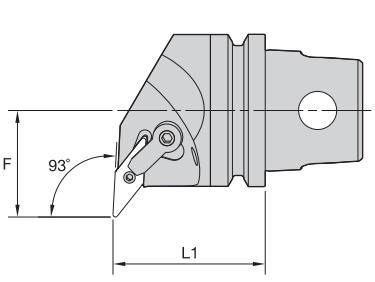


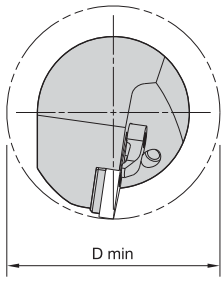


■ MVJN 93°



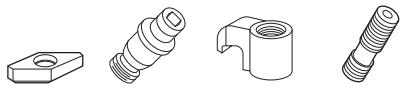
order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw
	right hand									
1023280	KM32TSMVJNR16	40	1.575	22	.866	VN..160408/VN..332	IVSN322	KLM34L	CKM23LP	STCM11
	left hand									
1023283	KM32TSMVJNL16	40	1.575	22	.866	VN..160408/VN..332	IVSN322	KLM34L	CKM23LP	STCM11



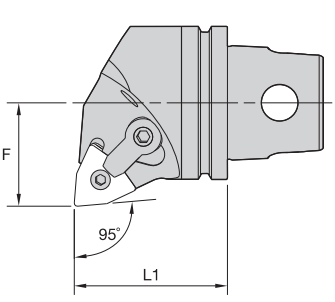


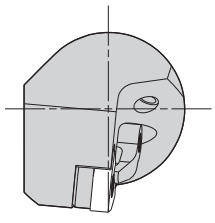
KM QUICK CHANGE

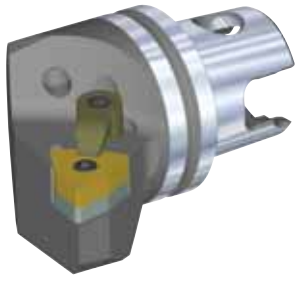
MVUN 93°



order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lock pin	clamp	clamp screw
	right hand											
1144911	**KM32TSMVUNR16**	35	1.378	27	1.063	54	2.126	VN..160408/VN..332	**IVSN322**	**KLM34L**	**CKM23LP**	**STCM11**
	left hand											
1144912	**KM32TSMVUNL16**	35	1.378	27	1.063	54	2.126	VN..160408/VN..332	**IVSN322**	**KLM34L**	**CKM23LP**	**STCM11**

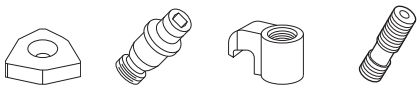




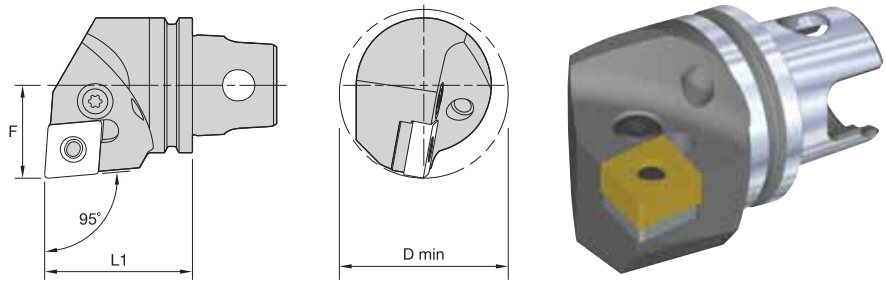


KM QUICK CHANGE

MWLN 95°



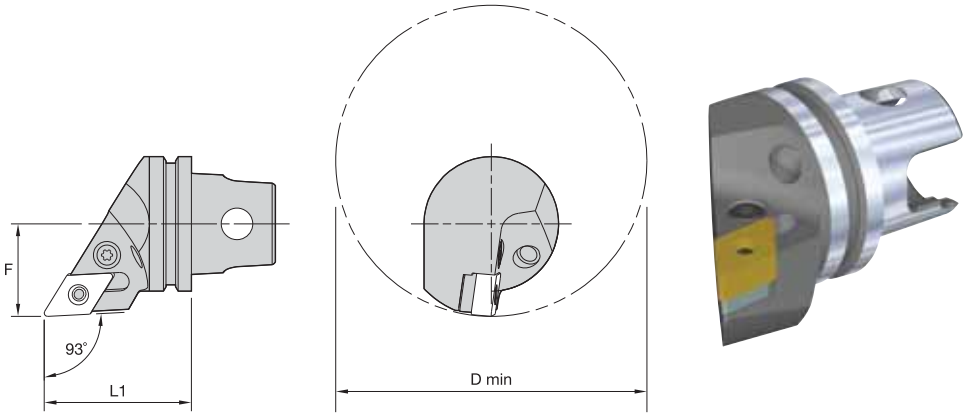
order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw
	right hand									
1144914	**KM32TSMWLNR08**	35	1.378	22	.866	WN..080408/WN..432	**IWSN433**	**KLM46**	**CKM20LP**	**STCM11**
	left hand									
1144915	**KM32TSMWLNL08**	35	1.378	22	.866	WN..080408/WN..432	**IWSN433**	**KLM46**	**CKM20LP**	**STCM11**



KM QUICK CHANGE

PCLN 95°

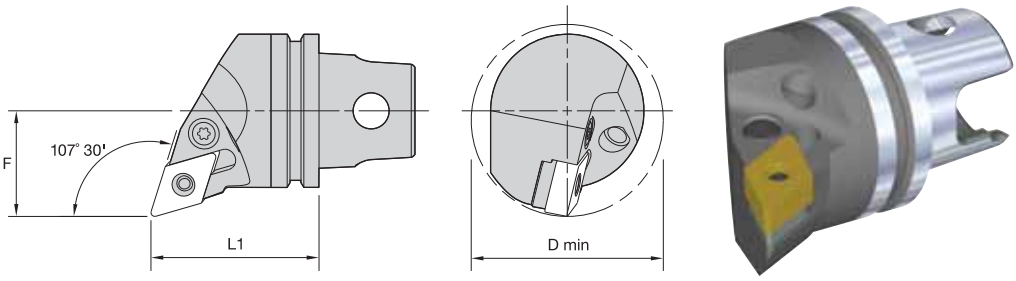
order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lever screw	shim pin	toggle lever	punch
	right hand												
1624632	KM32TSPCLNR12	35	1.378	22	.866	40	1.575	CN..120408/CN..432	512.112	514.123	513.023	511.023	515.018
	left hand												
1135468	KM32TSPCLNL12	35	1.378	22	.866	40	1.575	CN..120408/CN..432	512.112	514.123	513.023	511.023	515.018



KM QUICK CHANGE

PDJN 93°

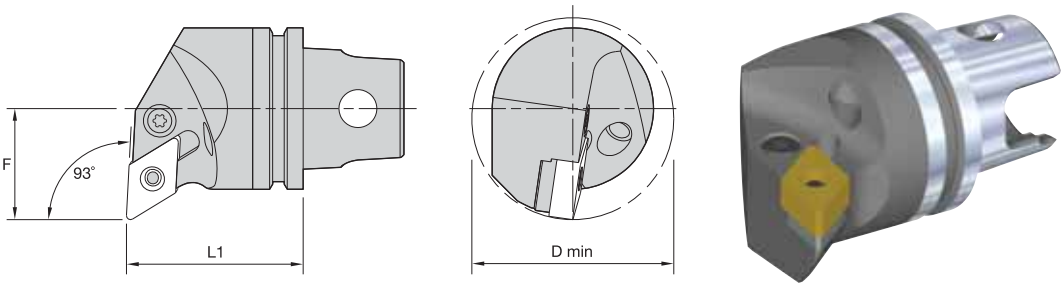
order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lever screw	shim pin	toggle lever	punch
	right hand												
1232377	KM32TSPDJNR11	35	1.378	22	.866	74	2.913	DN..110408/DN..332	512.060	514.118	513.060	511.060	515.018
	left hand												
1232378	KM32TSPDJNL11	35	1.378	22	.866	74	2.913	DN..110408/DN..332	512.060	514.118	513.060	511.060	515.018



KM QUICK CHANGE

PDQN 107° 30'

order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lever screw	shim pin	toggle lever	punch
	right hand												
1671515	KM32TSPDQNR11	35	1.378	22	.866	44	1.732	DN..110408/DN..332	512.060	514.118	513.060	511.060	515.018

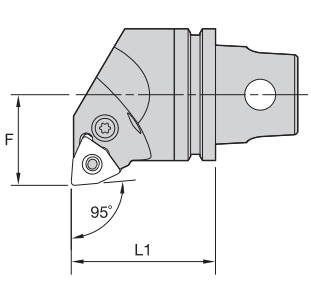


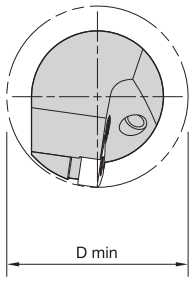
KM QUICK CHANGE

PDUN 93°

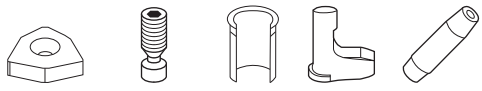
order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lever screw	shim pin	toggle lever	punch
	right hand												
1232375	KM32TSPDUNR11	35	1.378	22	.866	40	1.575	DN..110408/DN..332	512.060	514.118	513.060	511.060	515.018
	left hand												
1232376	KM32TSPDUNL11	35	1.378	22	.866	40	1.575	DN..110408/DN..332	512.060	514.118	513.060	511.060	515.018

KM QUICK CHANGE



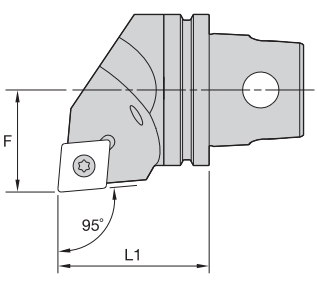


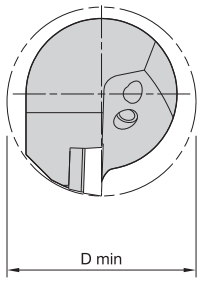
PWLN 95°



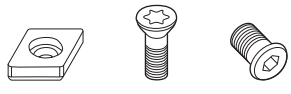
order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lever screw	shim pin	toggle lever	punch
	right hand												
1232372	KM32TSPWLNR06	35	1.378	22	.866	44	1.732	WN..060408/WN..332	512.134	514.118	513.018	511.018	515.018
	left hand												
1232374	KM32TSPWLNL06	35	1.378	22	.866	44	1.732	WN..060408/WN..332	512.134	514.118	513.018	511.018	515.018

KM QUICK CHANGE

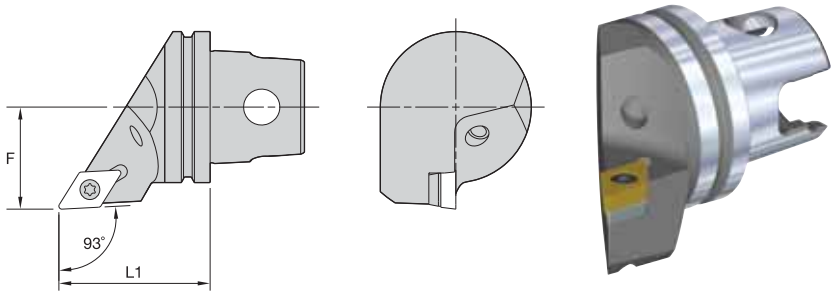




SCLC 95°



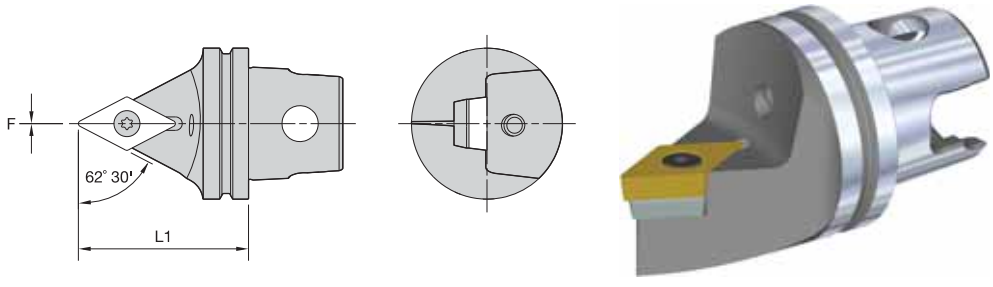
order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	insert screw	shim screw
	right hand										
1144416	KM32TSSCLCR09	35	1.378	22	.866	44	1.732	CC..09T308/CC..3252	SKCP343	MS1156	SRS3
1144430	KM32TSSCLCR12	35	1.378	22	.866	44	1.732	CC..120408/CC..432	SKCP453	MS1158	SRS4
	left hand										
1144417	KM32TSSCLCL09	35	1.378	22	.866	44	1.732	CC..09T308/CC..3252	SKCP343	MS1156	SRS3
1144434	KM32TSSCLCL12	35	1.378	22	.866	44	1.732	CC..120408/CC..432	SKCP453	MS1158	SRS4



KM QUICK CHANGE

SDJC 93°

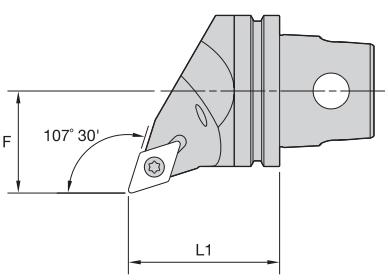
order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	insert screw	shim screw
	right hand								
1144422	KM32TSSDJCR11	35	1.378	22	.866	DC..11T308/DC..3252	SKDP343	MS1156	SRS3
	left hand								
1144427	KM32TSSDJCL11	35	1.378	22	.866	DC..11T308/DC..3252	SKDP343	MS1156	SRS3

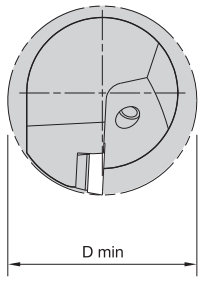


KM QUICK CHANGE

SDNC 62° 30'

order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	insert screw	shim screw
1144424	KM32TSSDNCN11	35	1.378	0	.000	DC..11T308/DC..3252	SKDP343	MS1156	SRS3

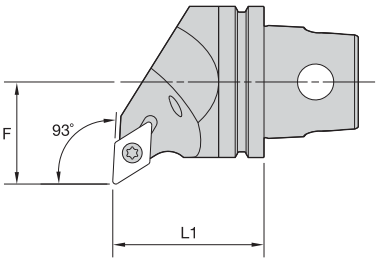


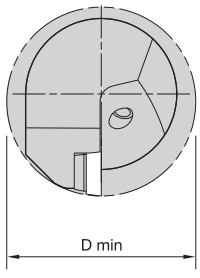


KM QUICK CHANGE

SDQC 107° 30'

order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	insert screw	shim screw
	right hand										
1144423	KM32TSSDQCR11	35	1.378	22	.866	44	1.732	DC..11T308/DC..3252	SKDP343	MS1156	SRS3
	left hand										
1144428	KM32TSSDQCL11	35	1.378	22	.866	44	1.732	DC..11T308/DC..3252	SKDP343	MS1156	SRS3

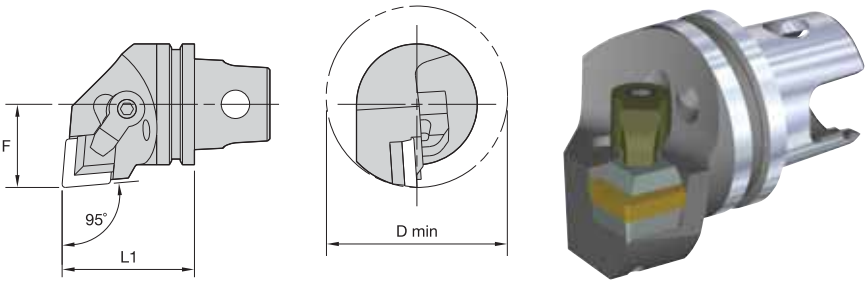




KM QUICK CHANGE

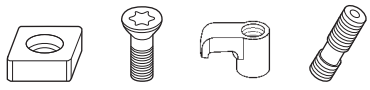
SDUC 93°

order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	insert screw	shim screw
	right hand										
1144425	KM32TSSDUCR11	35	1.378	22	.866	44	1.732	DC..11T308/DC..3252	SKDP343	MS1156	SRS3
	left hand										
1144429	KM32TSSDUCL11	35	1.378	22	.866	44	1.732	DC..11T308/DC..3252	SKDP343	MS1156	SRS3



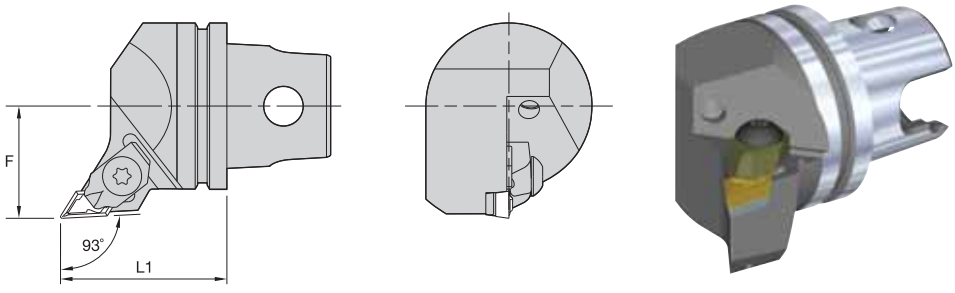
KM QUICK CHANGE

CCLP 95°



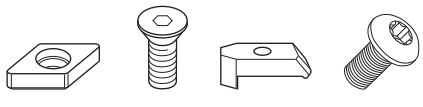
order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	shim screw	clamp	clamp screw
	left hand											
1091617	KM32TSCCLPL12	35	1.378	22	.866	48	1.890	CP..120308/CP.422	SM891	MS109	CKM37	STCM11

NOTE: Chipbreakers must be ordered separately. Chipbreaker catalog number is CBD-16N.



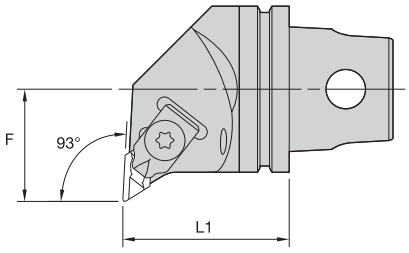
KM QUICK CHANGE

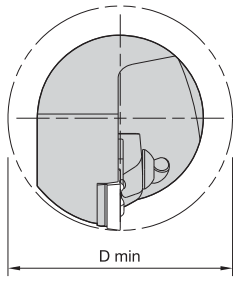
NKJC 93°

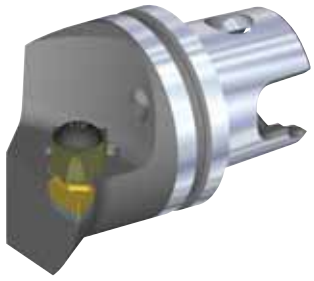


order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	shim screw	clamp	clamp screw
	right hand									
1019508	KM32TSNKJCR11	35	1.378	22	.866	KC..110304R08/NP..51R	SM885	MS959	CM71	MS1220
	left hand									
1019565	KM32TSNKJCL11	35	1.378	22	.866	KC..110304L08/NP..51L	SM886	MS959	CM79	MS1220

KM QUICK CHANGE



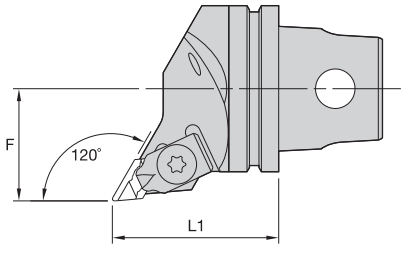


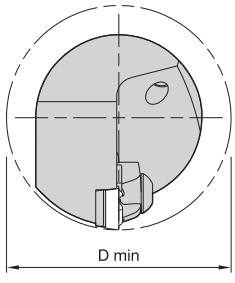


NKUC 93°

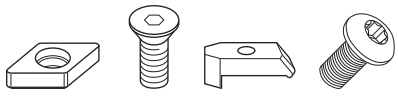
order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	shim screw	clamp	clamp screw
	right hand											
1019509	KM32TSNKUCR11	35	1.378	22	.866	44	1.732	KC..110304L08/NP..51L	SM886	MS959	CM68	MS1220
	left hand											
1019566	KM32TSNKUCL11	35	1.378	22	.866	44	1.732	KC..110304R08/NP..51R	SM885	MS959	CM68	MS1220

KM QUICK CHANGE

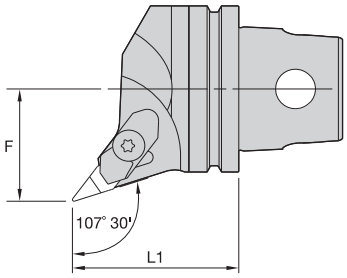


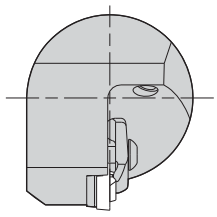


NKXC 120°



order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	shim screw	clamp	clamp screw
	left hand											
1019567	KM32TSNKXCL11	35	1.378	22	.866	44	1.732	KC..110304R08/NP..51R	SM885	MS959	CM68	MS1220

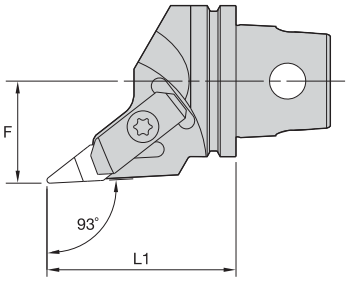


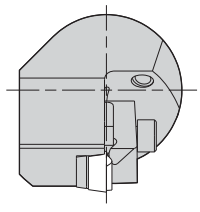


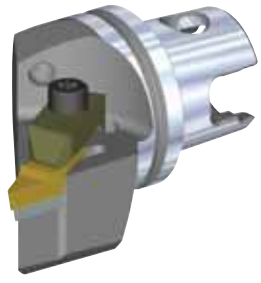
KM QUICK CHANGE

NVHB 107° 30'

order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	shim screw	clamp	clamp screw
	right hand									
1144421	KM32TSNVHBR11	35	1.378	22	.866	VBMR110304/VBMR221	SM813	MS959	CM158	MS1375



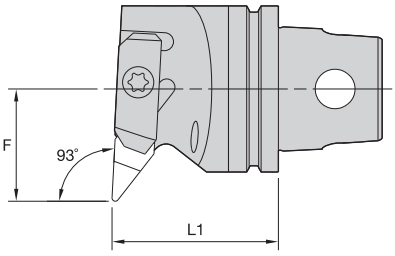


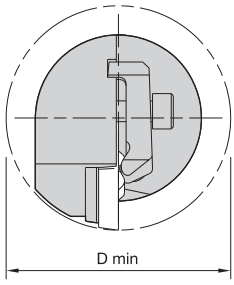


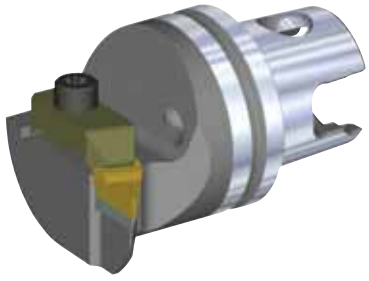
KM QUICK CHANGE

NVJC 93°

order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	shim screw	clamp	clamp screw
	right hand									
1144437	KM32TSNVJCR16	47	1.850	22	.866	VCGR160408/VPGR332	SM812	MS959	CM113	MS1489PKG
	left hand									
1144440	KM32TSNVJCL16	47	1.850	22	.866	VCGR160408/VPGR332	SM812	MS959	CM114	MS1489PKG



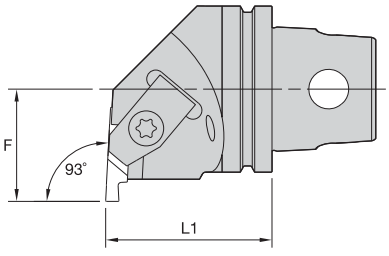


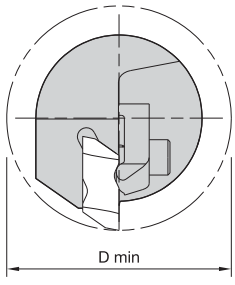


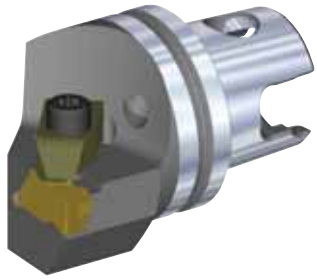
KM QUICK CHANGE

NVUC 93°

order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	shim screw	clamp	clamp screw
	right hand											
1091627	**KM32TSNVUCR16**	35	1.378	27	1.063	54	2.126	VCGR160408/VPGR332	**SM812**	**MS959**	**CM113**	**MS1489**
	left hand											
1019564	**KM32TSNVUCL16**	35	1.378	27	1.063	54	2.126	VCGR160408/VPGR332	**SM812**	**MS959**	**CM114**	**MS1489**

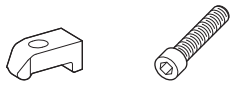




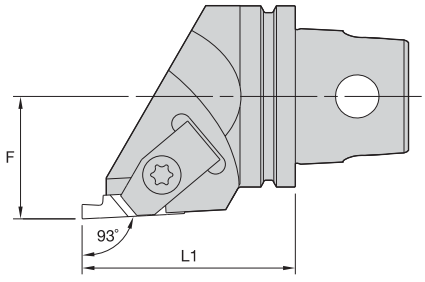


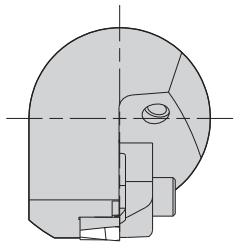
KM QUICK CHANGE

NE 93°



order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	clamp	clamp screw
	right hand									
1019406	**KM32TSNER2**	35	1.378	22	.866	44	1.732	NG2L	**CM75**	**MS1488**
1019410	**KM32TSNER3**	35	1.378	22	.866	44	1.732	NG3L	**CM73**	**MS1489**

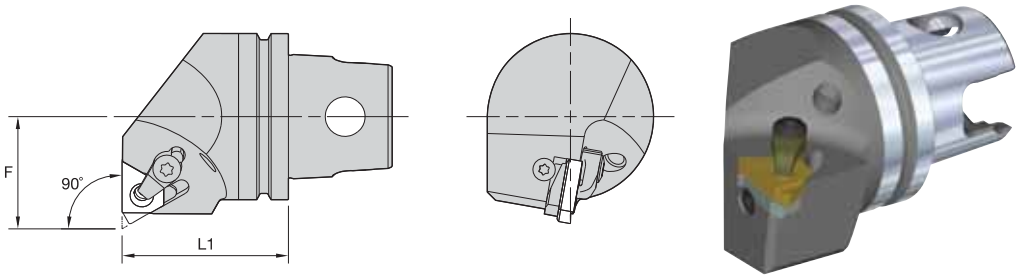




KM QUICK CHANGE

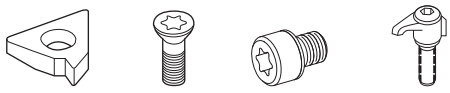
■ NS 90°

order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	clamp	clamp screw
	right hand							
1019407	KM32TSNSR2	35	1.378	22	.866	NG2R	CM74	MS1488
1019411	KM32TSNSR3	40	1.575	22	.866	NG3R	CM72	MS1489
	left hand							
1019409	KM32TSNSL2	35	1.378	22	.866	NG2L	CM75	MS1488
1019413	KM32TSNSL3	40	1.575	22	.866	NG3L	CM73	MS1489

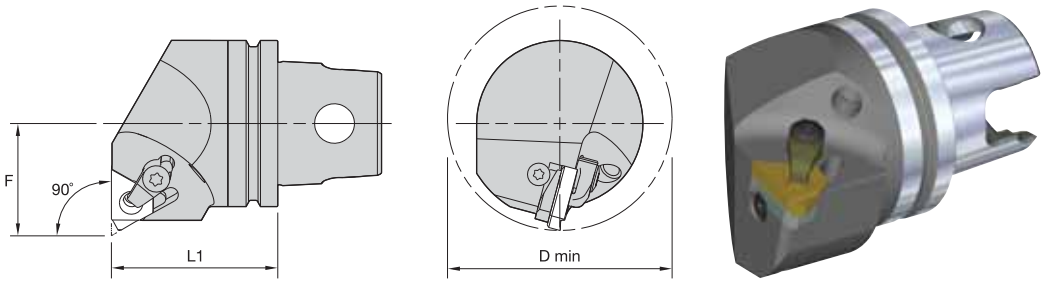


KM QUICK CHANGE

LSE-E 90° • External Only

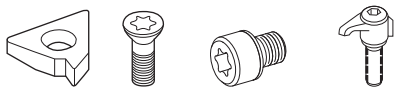


order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	insert screw	shim screw	clamp assembly
	left hand									
1144372	KM32TSLSEL16E	35	1.378	22	.866	LT16ER	SMYE3	SSA3T	SSY3T	CKC3



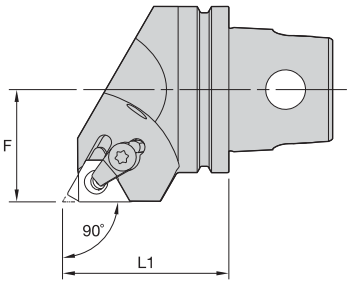
KM QUICK CHANGE

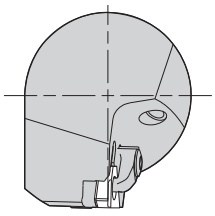
LSE-N 90° • Internal Only



order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	insert screw	shim screw	clamp assembly
	right hand											
1144357	KM32TSLSER16N	35	1.378	22	.866	44	1.732	LT16NR	SMYI3	SSA3T	SSY3T	CKC3

NOTE: Cutting units are supplied with insert screw and clamp assembly. However, tools are designed to use either the insert screw or the clamp assembly, not both.





KM QUICK CHANGE

LSS 90°

order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	insert screw	shim screw	clamp assembly
	right hand									
1019298	**KM32TSLSSR16**	35	1.378	22	.866	LT16ER	**SMYE3**	**SSA3T**	**SSY3T**	**CKC3**
	left hand									
1019299	**KM32TSLSSL16**	35	1.378	22	.866	LT16EL	**SMYI3**	**SSA3T**	**SSY3T**	**CKC3**

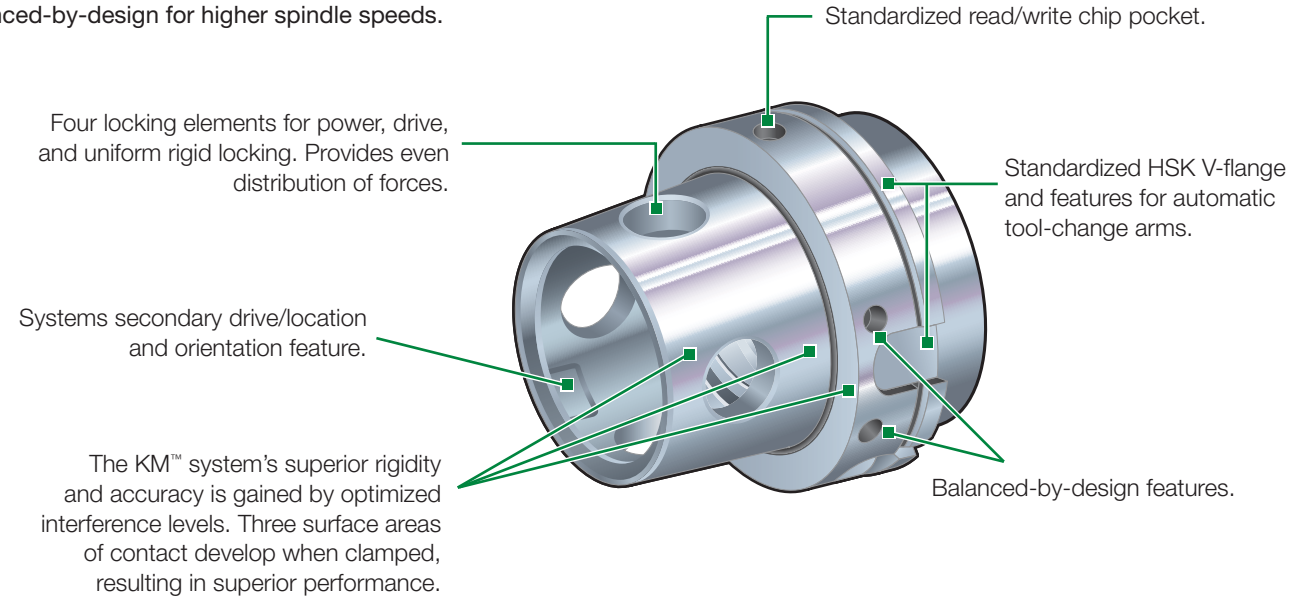
NOTE: Cutting units are supplied with insert screw and clamp assembly. However, tools are designed to use either the insert screw or the clamp assembly, not both.

KM4X™

The KM4X 4-ball spindle interface provides 3x more bending capacity than comparable systems. The greater bending capacity enables customers to fully utilize the capabilities of their machine and cutting tools when working with tough materials like titanium or during heavy machining. Increased metal removal rates optimize machine production and decrease overall manufacturing cost.

KM4X

- Heavy-duty, rigid configuration.
- 3x more bending capability.
- Increased metal removal rates.
- Full utilization of machine tools.
- Decreased manufacturing costs.
- Balanced-by-design for higher spindle speeds.

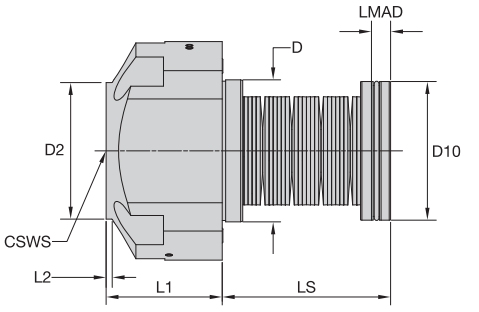


The Latest Innovation in Spindle Interface Technology

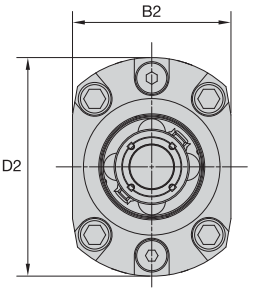
- KM4X™ offers the most rigid connection able to withstand extremely high bending due to a combination of high interference and high clamping forces.
- KM4X provides 3x more bending capacity than comparable face contact systems.
- KM™ is the only connection that maintains stiffness at elevated rotational speeds and is suitable for a range of applications from low speeds with high torque to very high spindle speeds.
- KM4X is better balanced between bending and torsion capabilities.
- The ability to retrofit KM4X to an existing machine tool offers the added advantage of increasing throughput.

Design Advantages

- The new screw-on KM4X is designed for high stability.
- Universal design enables old-style tools to be used interchangeably with new styles and many competitor screw-on cutters and extensions.
- Clamping method utilizes face contact to create a rigid connection.



LMAD travel



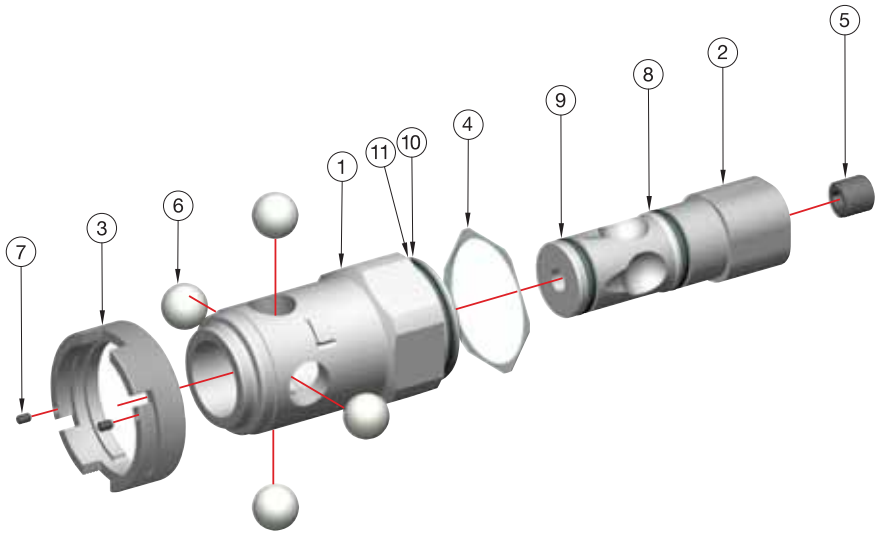
KM QUICK CHANGE

NACA

order number	catalog number	CSWS system size	D	F	L1	LS	D2	LMAD travel
5326071	**KM4X100NCADS85**	KM4X100	104	0	85,0	123	100	13,00

Actuating Force

catalog number	actuating force (kN)	actuating force (lbs)
KM4X100NCADS85	70	15700

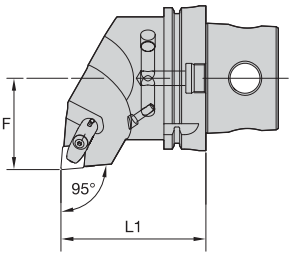


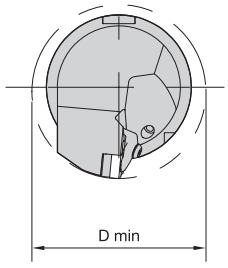
KM QUICK CHANGE

■ KIT

detail number	description	catalog number	order number
1	canister	**2699630**	**5408797**
2	lockrod	**2404270**	**5408798**
3	canister ring	**2404272**	**5408799**
4	canister spacer	**2699631**	**5413745**
5	modified set screw	**(M16 x 2,0)**	**5408990**
6	chrome ball	**LMB200025**	**5413539**
7	set screw	**S-1786**	**5413744**
8	O-ring	**OR01109139V75**	**5413740**
9	O-ring	**OR01046139V75**	**5413741**
10	back-up ring	**BUR135V90**	**5413742**
11	O-ring	**OR01925103V75**	**5413743**

KM QUICK CHANGE

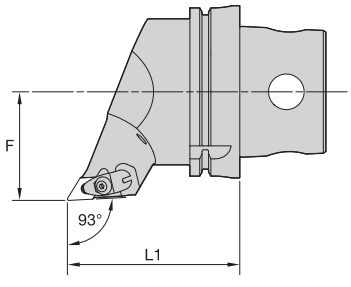


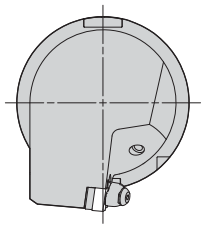


DCLN 95°

order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	shim screw	clamp assembly	pin	kg	lbs
	right hand													
5345267	**KM4X100DCLNR12KC04**	100	3.937	63	2.480	120	4.72	CN..120408/CN..432	**ICSN443**	**KMSP415IP**	**CM234R ASSY**	**SSP025016M**	4,52	9.97
5345268	**KM4X100DCLNR16KC06**	100	3.937	63	2.480	120	4.72	CN..160612/CN..543	**ICSN543**	**KMSP515IP**	**CM209R ASSY**	**SSP025018M**	4,51	9.94
	left hand													
5345265	**KM4X100DCLNL12KC04**	100	3.937	63	2.480	120	4.72	CN..120408/CN..432	**ICSN443**	**KMSP415IP**	**CM234R ASSY**	**SSP025016M**	4,52	9.97
5345266	**KM4X100DCLNL16KC06**	100	3.937	63	2.480	120	4.72	CN..160612/CN..543	**ICSN543**	**KMSP515IP**	**CM209R ASSY**	**SSP025018M**	4,51	9.94

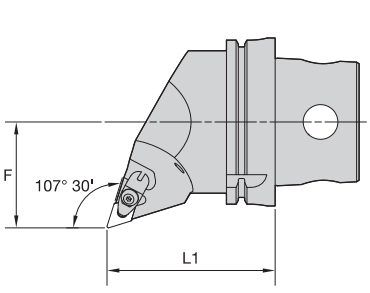
KM QUICK CHANGE

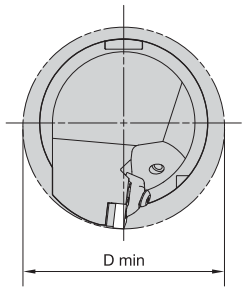




DDJN 93°

order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	shim screw	clamp assembly	pin	kg	lbs
	right hand											
5345310	**KM4X100DDJNR15KC06**	100	3.937	63	2.480	DN..150608/DN..442	**IDSN433**	**KMSP415IP**	**CM234R ASSY**	**SSP025016M**	4,19	9.24
	left hand											
5345269	**KM4X100DDJNL15KC06**	100	3.937	63	2.480	DN..150608/DN..442	**IDSN433**	**KMSP415IP**	**CM234R ASSY**	**SSP025016M**	4,19	9.24

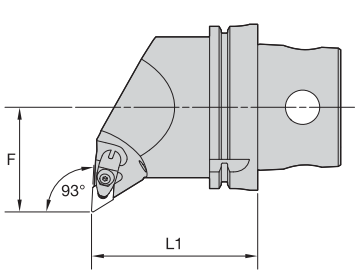


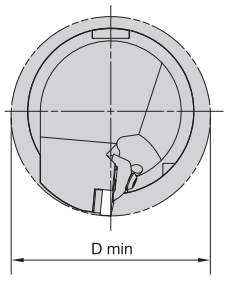


KM QUICK CHANGE

DDQN 107,5°

order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	shim screw	clamp assembly	pin	kg	lbs
	right hand													
2265440	KM63TSDDQNR15KC04	60	2.362	43	1.693	86	3.39	DN..150408/DN..432	IDSN443	KMSP415IP	CM234R ASSY	SSP025016M	1,11	2.44
2265442	KM63TSDDQNR15KC06	60	2.362	43	1.693	86	3.39	DN..150608/DN..442	IDSN433	KMSP415IP	CM234R ASSY	SSP025016M	1,11	2.44
	left hand													
2265441	KM63TSDDQNL15KC04	60	2.362	43	1.693	86	3.39	DN..150408/DN..432	IDSN443	KMSP415IP	CM234R ASSY	SSP025016M	1,11	2.44
2265443	KM63TSDDQNL15KC06	60	2.362	43	1.693	86	3.39	DN..150608/DN..442	IDSN433	KMSP415IP	CM234R ASSY	SSP025016M	1,11	2.44

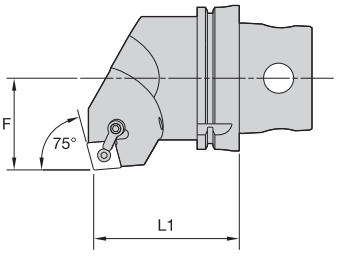


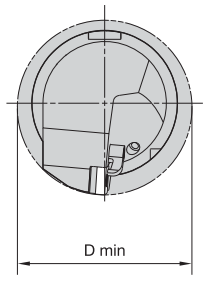


KM QUICK CHANGE

DDUN 93°

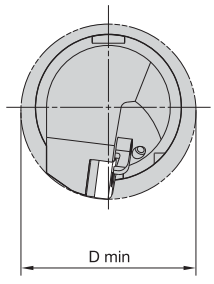
order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	shim screw	clamp assembly	pin	kg	lbs
	right hand													
5345315	KM4X100DDUNR15KC06	100	3.937	63	2.480	120	4.72	DN..150608/DN..442	IDSN433	KMSP415IP	CM234R ASSY	SSP025016M	4,56	10.05
	left hand													
5345314	KM4X100DDUNL15KC06	100	3.937	63	2.480	120	4.72	DN..150608/DN..442	IDSN433	KMSP415IP	CM234R ASSY	SSP025016M	4,56	10.05





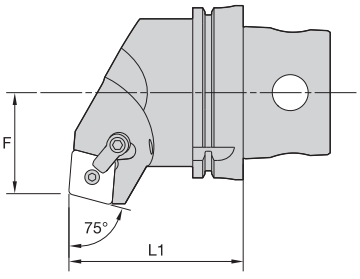
MCKN 75°

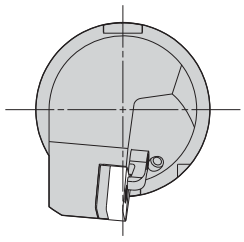
order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
	right hand													
5337807	KM4X100MCKNR19	100	3.937	63	2.480	120	4.724	CN..190612/CN..643	ICSN633	KLM68	CKM12	STCM4	4,80	10.58
	left hand													
5337806	KM4X100MCKNL19	100	3.937	63	2.480	120	4.724	CN..190612/CN..643	ICSN633	KLM68	CKM12	STCM4	4,87	10.74



MCLN 95°

order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
	right hand													
5337810	KM4X100MCLNR19	100	3.937	63	2.480	120	4.724	CN..190612/CN..643	ICSN633	KLM68	CKM12	STCM4	4,45	9.82
5337811	KM4X100MCLNR25	100	3.937	63	2.480	120	4.724	CN..250924/CN..866	ICSN846	KLM810	CKM24	STCM19	4,48	9.88
	left hand													
5337808	KM4X100MCLNL19	100	3.937	63	2.480	120	4.724	CN..190612/CN..643	ICSN633	KLM68	CKM12	STCM4	4,49	9.89
5337809	KM4X100MCLNL25	100	3.937	63	2.480	120	4.724	CN..250924/CN..866	ICSN846	KLM810	CKM24	STCM19	4,53	9.98

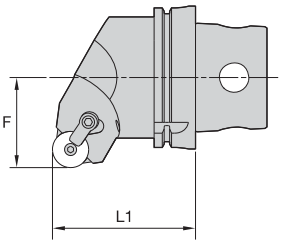


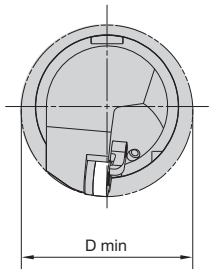


KM QUICK CHANGE

MCRN 75°

order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
	right hand											
5337814	KM4X100MCRNR19	100	3.937	58	2.283	CN..190612/CN..643	ICSN633	KLM68	CKM12	STCM4	4,47	9.86
5337815	KM4X100MCRNR25	100	3.937	58	2.283	CN..250924/CN..866	ICSN846	KLM810	CKM24	STCM19	4,58	10.09
	left hand											
5337812	KM4X100MCRNL19	100	3.937	58	2.283	CN..190612/CN..643	ICSN633	KLM68	CKM12	STCM4	4,53	9.98
5337813	KM4X100MCRNL25	100	3.937	58	2.283	CN..250924/CN..866	ICSN846	KLM810	CKM24	STCM19	4,57	10.06



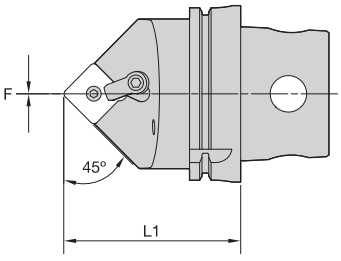


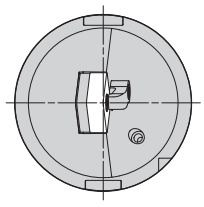
KM QUICK CHANGE

MRGN 0°

order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
	right hand													
5337734	KM4X100MRGNR12	100	3.937	63	2.480	120	4.724	RN..120400/RN..43	IRSN43	KLM46	CKM9	STCM4	1,52	9.97
5337735	KM4X100MRGNR19	100	3.937	63	2.480	120	4.724	RN..190600/RN..64	IRSN63	KLM68	CKM12	STCM4	4,52	9.97
5337736	KM4X100MRGNR25	100	3.937	63	2.480	120	4.724	RN..250900/RN..86	IRSN84	KLM810	CKM24	STCM19	4,55	10.03
	left hand													
5337737	KM4X100MRGNL12	100	3.937	63	2.480	120	4.724	RN..120400/RN..43	IRSN43	KLM46	CKM9	STCM4	4,59	10.13
5337738	KM4X100MRGNL19	100	3.937	63	2.480	120	4.724	RN..190600/RN..64	IRSN63	KLM68	CKM20	STCM4	4,60	10.15
5337739	KM4X100MRGNL25	100	3.937	63	2.480	120	4.724	RN..250900/RN..86	IRSN84	KLM810	CKM24	STCM19	4,62	10.20

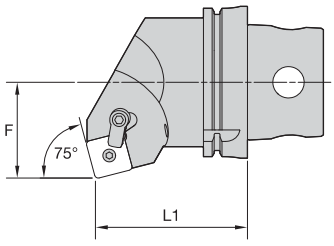
KM QUICK CHANGE

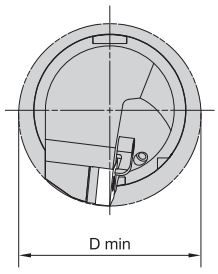




MSDN 45°

order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
5337697	**KM4X100MSDNN19**	100	3.937	0	.000	SN..190612/SN..643	**ISSN633**	**KLM68**	**CKM12**	**STCM4**	3,97	8.76
5337698	**KM4X100MSDNN25**	100	3.937	0	.000	SN..250924/SN..856	**ISSN846**	**KLM810**	**CKM24**	**STCM19**	3,97	8.76

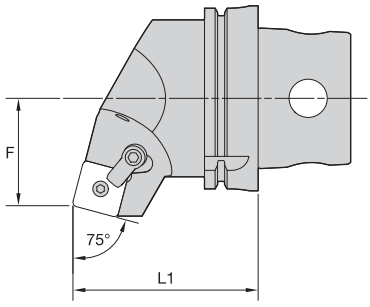


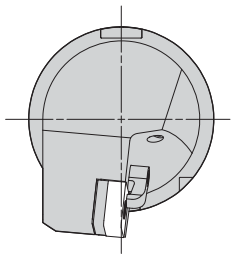


KM QUICK CHANGE

MSKN 75°

order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
	right hand													
5337711	**KM4X100MSKNR19**	100	3.937	63	2.480	120	4.724	SN..190612/SN..643	**ISSN633**	**KLM68**	**CKM12**	**STCM4**	4,59	10.12
5337712	**KM4X100MSKNR25**	100	3.937	63	2.480	120	4.724	SN..250924/SN..856	**ISSN846**	**KLM810**	**CKM24**	**STCM19**	4,73	10.42
	left hand													
5337699	**KM4X100MSKNL19**	100	3.937	63	2.480	120	4.724	SN..190612/SN..643	**ISSN633**	**KLM68**	**CKM12**	**STCM4**	4,79	10.56
5337710	**KM4X100MSKNL25**	100	3.937	63	2.480	120	4.724	SN..250924/SN..856	**ISSN846**	**KLM810**	**CKM24**	**STCM19**	4,77	10.51

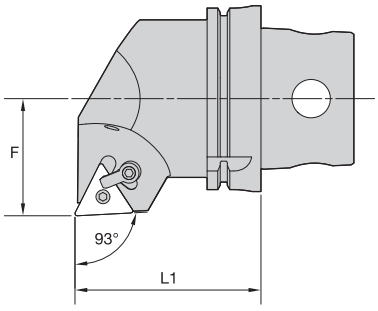


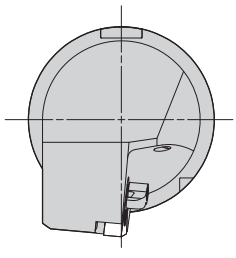


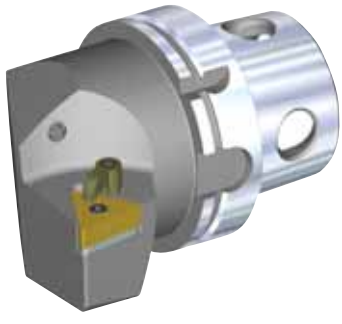
KM QUICK CHANGE

MSRN 75°

order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
	right hand											
5337715	KM4X100MSRNR19	100	3.937	58	2.283	SN..190612/SN..643	ISSN633	KLM68	CKM12	STCM4	4,47	9.85
5337716	KM4X100MSRNR25	100	3.937	58	2.283	SN..250924/SN..856	ISSN846	KLM810	CKM24	STCM19	4,46	9.83
	left hand											
5337713	KM4X100MSRNL19	100	3.937	58	2.283	SN..190612/SN..643	ISSN633	KLM68	CKM12	STCM4	4,44	9.78
5337714	KM4X100MSRNL25	100	3.937	58	2.283	SN..250924/SN..856	ISSN846	KLM810	CKM24	STCM19	4,41	9.73





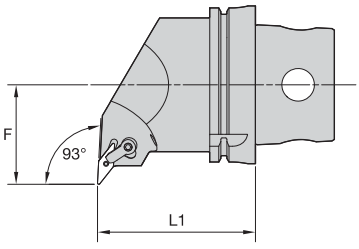


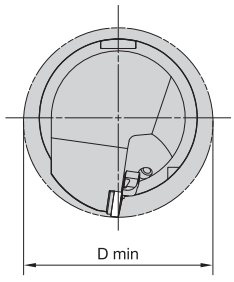
KM QUICK CHANGE

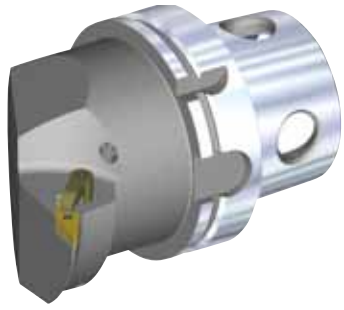
MTJN 93°

order number	catalog number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
	right hand											
5337717	KM4X100MTJNR27	100	3.937	63	2.480	TN..270612/TN..543	ITSN534	KLM58	CKM12	STCM4	4,75	10.49
5337718	KM4X100MTJNR33	100	3.937	63	2.480	TN..330912/TN..663	ITSN636	KLM68L	CKM12	STCM4	4,76	10.49
	left hand											
5337719	KM4X100MTJNL27	100	3.937	63	2.480	TN..270612/TN..543	ITSN534	KLM58	CKM12	STCM4	4,82	10.62
5337730	KM4X100MTJNL33	100	3.937	63	2.480	TN..330912/TN..663	ITSN636	KLM68L	CKM12	STCM4	4,79	10.57

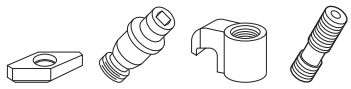
KM QUICK CHANGE





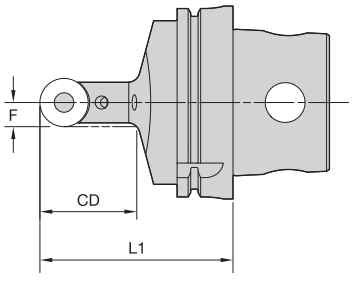


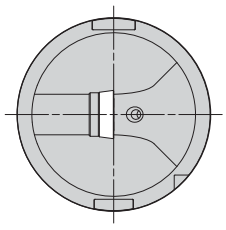
■ MVUN 93°

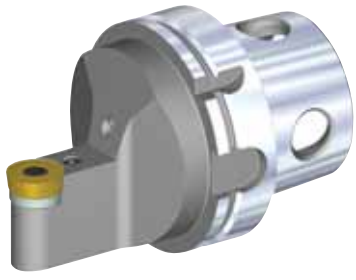


order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
	right hand													
5337732	**KM4X100MVUNR16**	100	3.937	63	2.480	120	4.724	VN..160408/VN..332	**IVSN322**	**KLM34L**	**CKM22**	**STCM20**	4,57	10.08
	left hand													
5337731	**KM4X100MVUNL16**	100	3.937	63	2.480	120	4.724	VN..160408/VN..332	**IVSN322**	**KLM34L**	**CKM22**	**STCM20**	4,90	10.81

KM QUICK CHANGE



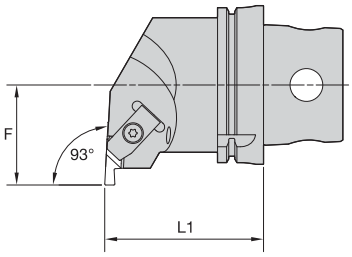


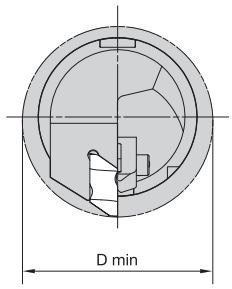


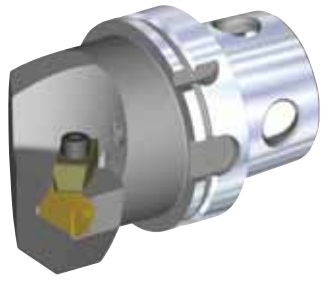
■ PRDCN

order number	catalog number	L1 mm	L1 in	F mm	F in	CD mm	CD in	gage insert	shim	clamp screw	clamp stud	kg	lbs
	left hand												
5337750	**KM4X100PRDCN20**	100	3.937	10	.394	40	1.581	RCMT2006M0	**169.333**	**121.820**	**119.073**	3,63	8.00
5337751	**KM4X100PRDCN25**	100	3.937	13	.492	50	1.975	RCMT2507M0RP	**169.337**	**121.820**	**118.404**	3,31	7.29
5337752	**KM4X100PRDCN32**	110	4.331	16	.630	60	2.368	RCMX3209M0RP	**169.339**	**121.030**	**118.604**	3,50	7.93

KM QUICK CHANGE







■ NE

order number	catalog number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	clamp	clamp screw	kg	lbs
	right hand											
5337758	KM4X100NER3	100	3.937	63	2.480	120	4.724	NG3L	CM73	MS1489	4,44	9.79
5337759	KM4X100NER4	100	3.937	63	2.480	120	4.724	NG4L	CM73	MS1489	4,49	9.90
5337770	KM4X100NER5	100	3.937	63	2.480	120	4.724	NG5L	CM81	MS1490	4,59	10.13
5337771	KM4X100NER6	100	3.937	63	2.480	120	4.724	NG6L	CM121	MS1489	4,48	9.88
	left hand											
5337754	KM4X100NEL3	100	3.937	63	2.480	120	4.724	NG3R	CM72	MS1489	4,44	9.79
5337755	KM4X100NEL4	100	3.937	63	2.480	120	4.724	NG4R	CM72	MS1489	4,49	9.90
5337756	KM4X100NEL5	100	3.937	63	2.480	120	4.724	NG5R	CM80	MS1490	4,59	10.13
5337757	KM4X100NEL6	100	3.937	63	2.480	120	4.724	NG6R	CM120	MS1489	4,48	9.88

TOOLING SYSTEMS

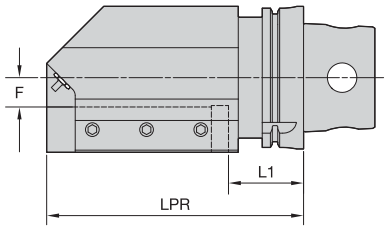
ERICKSON™ Toolholders

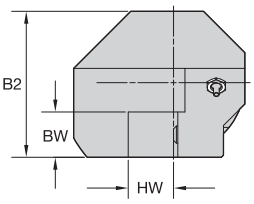
WIDIA™ proudly offers premium quality ERICKSON toolholder products, so you can be sure that you're buying the best the industry has to offer. The entire portfolio — including steep taper, HSK, straight shank extensions, collets, sleeves, and accompanying products — offers high productivity, increased accuracy, and application flexibility.

Designed for both manual and automatic tool changing, ERICKSON interfaces are ideally suited for most machine tools and feature a compact and rigid construction guaranteed to handle high torque and deliver optimal metal removal rates.

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

ERICKSON™

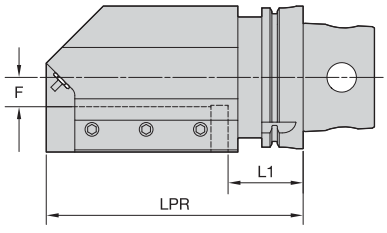


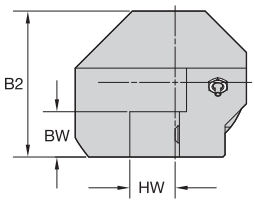


KM QUICK CHANGE

STA • Metric

order number	catalog number	B2	BW	F	HW	L1	LPR	nozzle	kg
	right hand								
5337782	KM4X100STAR20	102	32	21	32	53	180	PMT04526	12,09
5337783	KM4X100STAR24	102	38	14	38	53	180	PMT04526	11,61
5337784	KM4X100STAR2525M	102	25	27	25	55	180	PMT04526	12,52
5337785	KM4X100STAR3232M	102	32	20	32	55	180	PMT04526	12,09
	left hand								
5337779	KM4X100STAL24	102	38	14	38	53	180	PMT04526	11,61
5337780	KM4X100STAL2525M	102	25	27	25	55	180	PMT04526	12,52
5337781	KM4X100STAL3232M	102	32	20	32	55	180	PMT04526	12,09

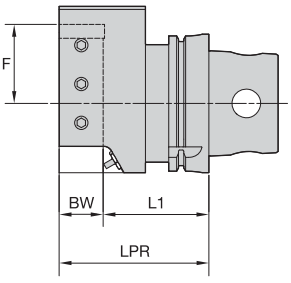


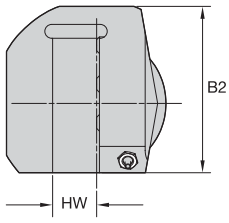


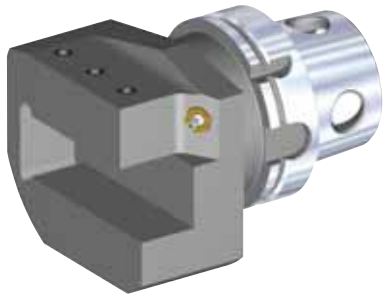
KM QUICK CHANGE

STA • Inch

order number	catalog number	B2	BW	F	HW	L1	LPR	nozzle	lbs
	right hand								
5337782	KM4X100STAR20	4.028	1.250	.809	1.250	2.071	7.087	PMT04526	26.66
5337783	KM4X100STAR24	4.028	1.500	.559	1.500	2.071	7.087	PMT04526	25.60
5337784	KM4X100STAR2525M	4.028	.984	1.075	.984	2.165	7.087	PMT04526	27.60
5337785	KM4X100STAR3232M	4.028	1.260	.799	1.260	2.165	7.087	PMT04526	26.67
	left hand								
5337779	KM4X100STAL24	4.028	1.500	.559	1.500	2.071	7.087	PMT04526	25.60
5337780	KM4X100STAL2525M	4.028	.984	1.075	.984	2.165	7.087	PMT04526	27.60
5337781	KM4X100STAL3232M	4.028	1.260	.799	1.260	2.165	7.087	PMT04526	26.67





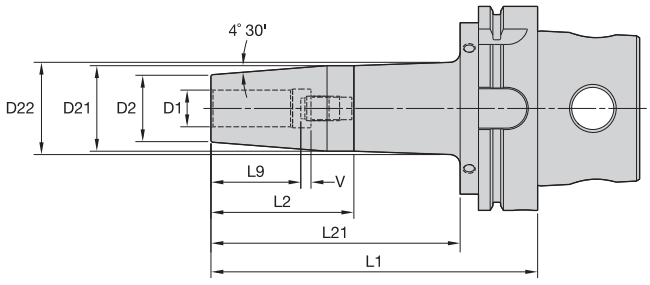


KM QUICK CHANGE

■ ETA • Inch

order number	catalog number	B2	BW	F	HW	L1	LPR	nozzle	lbs
	right hand								
5337778	**KM4X100ETAR20**	4.724	1.250	-2.244	1.250	3.002	4.252	**PMT04526**	16.52
	left hand								
5337777	**KM4X100ETAL20**	4.724	1.250	-2.244	1.250	3.002	4.252	**PMT04526**	16.52

- Balanceable — fine tune with optional M6 set screws.
- Suitable for carbide and HSS cutting tools.



KM QUICK CHANGE

Cutting Tool Shank Requirements metric (ISO standard)

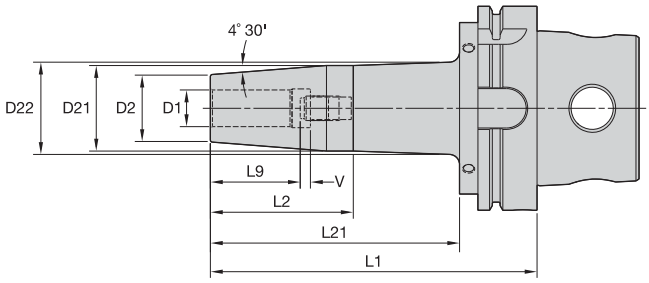
cutting tool shank diameter	tolerance	
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013
32, 40, & 50	h6	0,000/-0,016

TT GP HPV MM-KM4X • Metric

order number	catalog number	D1	D2	D21	D22	L1	L2	L9	L21	V	stop screw	wrench size stop screw
4156046	KM4X100HPVTT06085M	6	21	27	—	85	56	26	—	10	TTSS05014M	2,5mm
4156047	KM4X100HPVTT06160M	6	21	27	32	160	50	26	122	10	TTSS05014M	2,5mm
4156048	KM4X100HPVTT08085M	8	21	27	—	85	56	26	—	10	TTSS06014M	3mm
4156049	KM4X100HPVTT08160M	8	21	27	32	160	50	26	122	10	TTSS06014M	3mm
4156050	KM4X100HPVTT10090M	10	24	32	—	90	61	31	—	10	TTSS08014M	4mm
4156051	KM4X100HPVTT10160M	10	24	32	36	160	63	31	122	10	TTSS08014M	4mm
4156052	KM4X100HPVTT12095M	12	24	32	—	95	66	36	—	10	TTSS10014M	5mm
4156113	KM4X100HPVTT12160M	12	24	32	36	160	63	36	122	10	TTSS10014M	5mm
4156114	KM4X100HPVTT14095M	14	27	34	—	95	66	36	—	10	TTSS10014M	5mm
4156115	KM4X100HPVTT14160M	14	27	34	38	160	57	36	122	10	TTSS10014M	5mm
4156116	KM4X100HPVTT16100M	16	27	34	—	100	71	39	—	10	TTSS12014M	6mm
4156117	KM4X100HPVTT16160M	16	27	34	38	160	57	39	122	10	TTSS12014M	6mm
4156118	KM4X100HPVTT18100M	18	33	42	—	100	71	39	—	10	TTSS12014M	6mm
4156119	KM4X100HPVTT18160M	18	33	42	46	160	69	39	122	10	TTSS12014M	6mm
4156120	KM4X100HPVTT20105M	20	33	42	—	105	76	41	—	10	TTSS16014M	8mm
4156121	KM4X100HPVTT20160M	20	33	42	46	160	69	41	122	10	TTSS16014M	8mm
4156122	KM4X100HPVTT25115M	25	44	53	—	115	86	47	—	10	TTSS16014M	8mm
4156123	KM4X100HPVTT25160M	25	44	53	57	160	69	47	122	10	TTSS16014M	8mm
4156124	KM4X100HPVTT32120M	32	44	53	—	120	91	51	—	10	TTSS16014M	8mm
4156125	KM4X100HPVTT32160M	32	44	53	57	160	69	51	122	10	TTSS16014M	8mm

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
Supplied with stop screw.
Optional M6~1.0P x 5 lg fine-balancing screw set (10 pieces) available. Order number: MS1276PKG. Must be ordered separately.

- Balanceable — fine tune with optional M6 set screws.
- Suitable for carbide and HSS cutting tools.



KM QUICK CHANGE

Cutting Tool Shank Requirements
inch (industry standard)

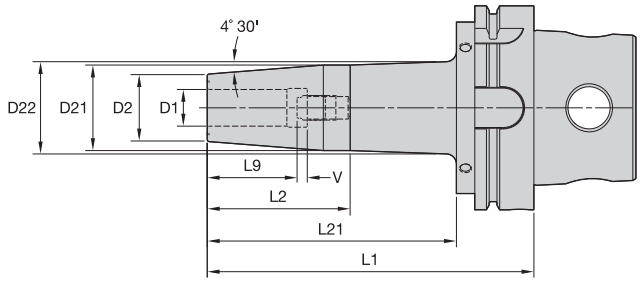
cutting tool shank diameter	tolerance
1/4, 5/16, & 3/8	-.0001/-.0004
7/16, 1/2, 9/16, 5/8, & 11/16	.0000/-.0004
3/4, 7/8, 1, 1-1/4, 1-1/2, & 2	.0000/-.0005

TT GP HPV IN-KM4X • Inch

order number	catalog number	D1	D2	D21	D22	L1	L2	L9	L21	V	stop screw	wrench size stop screw
4155746	KM4X100HPVTT025335	1/4	0.83	1.06	—	3.35	2.21	1.02	—	0.39	TTSS05014M	2,5mm
4155747	KM4X100HPVTT025630	1/4	0.83	1.06	1.26	6.30	1.97	1.02	4.81	0.39	TTSS05014M	2,5mm
4155748	KM4X100HPVTT031335	5/16	0.83	1.06	—	3.35	2.21	1.02	—	0.39	TTSS06014M	3mm
4155749	KM4X100HPVTT031630	5/16	0.83	1.06	1.26	6.30	1.97	1.02	4.81	0.39	TTSS06014M	3mm
4155750	KM4X100HPVTT038354	3/8	0.95	1.24	—	3.54	2.40	1.22	—	0.39	TTSS08014M	4mm
4155751	KM4X100HPVTT038630	3/8	0.95	1.26	1.42	6.30	2.48	1.22	4.81	0.39	TTSS08014M	4mm
4155752	KM4X100HPVTT050374	1/2	0.95	1.26	—	3.74	2.60	1.42	—	0.39	TTSS10014M	5mm
4156153	KM4X100HPVTT050630	1/2	0.95	1.26	1.42	6.30	2.48	1.42	4.81	0.39	TTSS10014M	5mm
4156154	KM4X100HPVTT062394	5/8	1.06	1.34	—	3.94	2.80	1.54	—	0.39	TTSS12014M	6mm
4156155	KM4X100HPVTT062630	5/8	1.06	1.34	1.51	6.30	2.24	1.54	4.81	0.39	TTSS12014M	6mm
4156156	KM4X100HPVTT075413	3/4	1.30	1.65	—	4.13	2.99	1.61	—	0.39	TTSS16014M	8mm
4156157	KM4X100HPVTT075630	3/4	1.30	1.65	1.8	6.30	2.72	1.61	4.81	0.39	TTSS16014M	8mm
4156158	KM4X100HPVTT088413	7/8	1.30	1.65	—	4.13	2.99	1.61	—	0.39	TTSS16014M	8mm
4156159	KM4X100HPVTT088630	7/8	1.30	1.65	1.8	6.30	2.72	1.61	4.81	0.39	TTSS16014M	8mm
4156160	KM4X100HPVTT100453	1	1.73	2.08	—	4.53	3.39	1.85	—	0.39	TTSS16014M	8mm
4156161	KM4X100HPVTT100630	1	1.73	2.08	2.23	6.30	2.72	1.85	4.81	0.39	TTSS16014M	8mm
4156162	KM4X100HPVTT125472	1 1/4	1.73	2.08	—	4.72	3.59	2.01	—	0.39	TTSS16014M	8mm
4156163	KM4X100HPVTT125630	1 1/4	1.73	2.08	2.23	6.30	2.72	2.01	4.81	0.39	TTSS16014M	8mm
4156164	KM4X100HPVTT150531	1 1/2	2.36	2.75	—	5.31	4.18	2.01	—	0.39	TTSS20014M	10mm

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
Supplied with stop screw.
Optional M6~1.0P x 5 lg fine-balancing screw set (10 pieces) available. Order number: MS1276PKG. Must be ordered separately.

- 30–50% higher clamping torque compared to GP line.
- Balanceable — fine tune with optional M6 set screws.
- Suitable for carbide only, designated by groove in front face.
- 10 kW power or greater Shrink Fit device must be used.



KM QUICK CHANGE

Cutting Tool Shank Requirements
metric (ISO standard)

cutting tool shank diameter	tolerance	
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013
32, 40, & 50	h6	0,000/-0,016

TT HT HPV MM-KM4X • Metric

order number	catalog number	D1	D2	D21	L1	L2	L9	V	stop screw	wrench size stop screw
4156182	KM4X100HPVTTHT12095M	12	24	31,9	95	66	36	10	TTSS10014M	5mm
4156193	KM4X100HPVTTHT14095M	14	27	33,9	95	66	36	10	TTSS10014M	5mm
4156194	KM4X100HPVTTHT16100M	16	27	33,9	100	71	39	10	TTSS12014M	6mm
4156195	KM4X100HPVTTHT18100M	18	33	41,9	100	71	39	10	TTSS12014M	6mm
4156196	KM4X100HPVTTHT20105M	20	33	41,9	105	76	41	10	TTSS16014M	8mm
4156197	KM4X100HPVTTHT25115M	25	44	52,9	115	86	47	10	TTSS16014M	8mm
4156198	KM4X100HPVTTHT32120M	32	44	52,9	120	91	51	10	TTSS16014M	8mm

(continued)

(TT HT HPV KM4X continued)

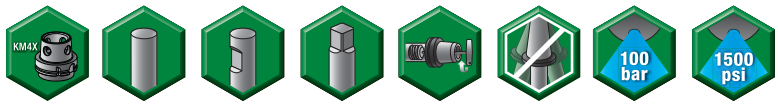
Cutting Tool Shank Requirements inch (industry standard)	
cutting tool shank diameter	tolerance
1/2 & 5/8	.0000/-.0004
3/4, 7/8, 1, 1-1/4, & 1-1/2	.0000/-.0005

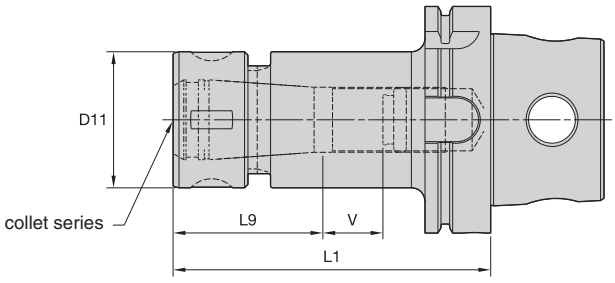
■ TT HT HPV IN-KM4X • Inch

order number	catalog number	D1	D2	D21	D22	L1	L2	L9	L21	V	stop screw	wrench size stop screw
4156166	**KM4X100HPVTTHT050374**	1/2	0.95	1.26	—	3.74	2.60	1.42	—	0.39	**TTSS10014M**	5mm
4156167	**KM4X100HPVTTHT050630**	1/2	0.95	1.26	1.42	6.30	2.48	1.42	4.81	0.39	**TTSS10014M**	5mm
4156168	**KM4X100HPVTTHT062394**	5/8	1.06	1.34	—	3.94	2.80	1.54	—	0.39	**TTSS12014M**	6mm
4156169	**KM4X100HPVTTHT062630**	5/8	1.06	1.34	1.51	6.30	2.24	1.54	4.81	0.39	**TTSS12014M**	6mm
4156170	**KM4X100HPVTTHT075413**	3/4	1.30	1.65	—	4.13	2.99	1.61	—	0.39	**TTSS16014M**	8mm
4156171	**KM4X100HPVTTHT075630**	3/4	1.30	1.65	1.8	6.30	2.72	1.61	4.81	0.39	**TTSS16014M**	8mm
4156172	**KM4X100HPVTTHT088413**	7/8	1.30	1.65	—	4.13	2.99	1.61	—	0.39	**TTSS16014M**	8mm
4156203	**KM4X100HPVTTHT088630**	7/8	1.30	1.65	1.8	6.30	2.72	1.61	4.81	0.39	**TTSS16014M**	8mm
4156204	**KM4X100HPVTTHT100453**	1	1.73	2.08	—	4.53	3.39	1.85	—	0.39	**TTSS16014M**	8mm
4156205	**KM4X100HPVTTHT100630**	1	1.73	2.08	2.23	6.30	2.72	1.85	4.81	0.39	**TTSS16014M**	8mm
4156206	**KM4X100HPVTTHT125472**	1 1/4	1.73	2.08	—	4.72	3.59	2.01	—	0.39	**TTSS16014M**	8mm
4156207	**KM4X100HPVTTHT125630**	1 1/4	1.73	2.08	2.23	6.30	2.72	2.01	4.81	0.39	**TTSS16014M**	8mm
4156208	**KM4X100HPVTTHT150531**	1 1/2	2.36	2.75	—	5.31	4.18	2.01	—	0.39	**TTSS20014M**	10mm

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
Supplied with stop screw.
Optional M6~1.0P x 5 lg fine-balancing screw set (10 pieces) available. Order number: MS1276PKG. Must be ordered separately.

• Tremendous Grip (3:1 advantage).





	Collet Capacity			
	mm		inch	
TG collet series	min	max	min	max
TG50	1,1	13,5	1/32	17/32
TG75	2,6	20,0	3/64	3/4
TG100	2,6	25,5	5/64	1
TG150	11,6	40,0	23/64	1-1/2

KM

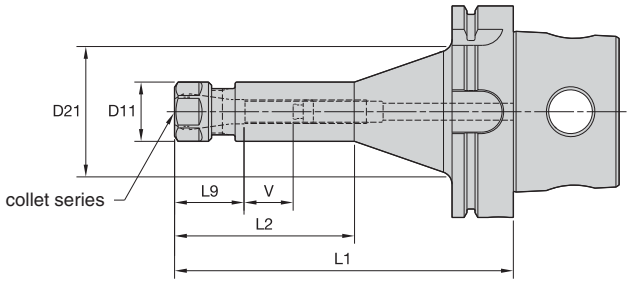
TG Round-KM4X



order number	catalog number	collet series	D11	L1	L9	V	locknut	locknut wrench	Nm	stop screw	wrench size stop screw
4156445	**KM4X100TG050105M**	TG50	38	105	42	40	**LNA050M**	**HSW34M**	68	**SS056041G**	4mm & 5/32
4156446	**KM4X100TG050160M**	TG50	38	160	42	58	**LNA050M**	**HSW34M**	68	**SS056041G**	4mm & 5/32
4156447	**KM4X100TG075120M**	TG75	50	120	54	46	**LNA075M**	**HSW45M**	136	**SS081041G**	4mm & 5/32
4156448	**KM4X100TG100140M**	TG100	60	140	70	45	**LNA100M**	**HSW58M**	203	**SS112041G**	4mm & 5/32
4156449	**KM4X100TG150165M**	TG150	85	165	84	46	**LNA150M**	**HSW80M**	271	**SS162062G**	4mm & 5/32

NOTE: First, load collet into locknut. Before loading into the chuck body, insert cutting tool, then tighten to recommended tightening torque.
Supplied with locknut and stop screw.
Locknut wrench must be ordered separately.

• Grip (2:1 advantage).

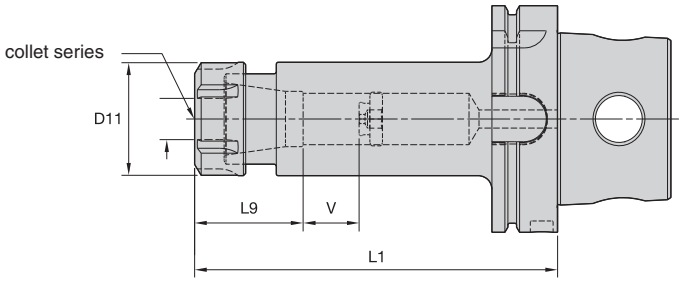


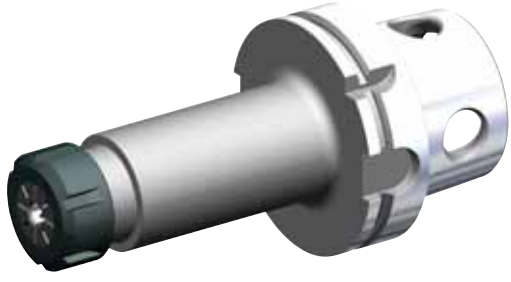
ER collet series	Collet Capacity mm min	mm max	inch min	inch max
ER16	0,5	10,0	.02	.41
ER20	0,5	13,0	.02	.50
ER25	1,0	16,0	.04	.63
ER32	2,0	20,0	.08	.81
ER40	3,0	26,0	.12	1.00

KM

ER Hex-KM4X

order number	catalog number	collet series	D11	D21	L1	L2	L9	V	locknut	locknut wrench	Nm	stop screw	wrench size stop screw
4159999	**KM4X100ER16100M**	ER16	28	—	100	—	32	53	**LNHSER16M**	**OEW25M**	56	**SS044038G**	4mm & 5/32
4160000	**KM4X100ER16160M**	ER16	28	60	160	85	32	68	**LNHSER16M**	**OEW25M**	56	**SS044038G**	4mm & 5/32
4160001	**KM4X100ER20100M**	ER20	34	—	100	—	36	35	**LNHSER20M**	**OEW30M**	80	**SS056041G**	4mm & 5/32

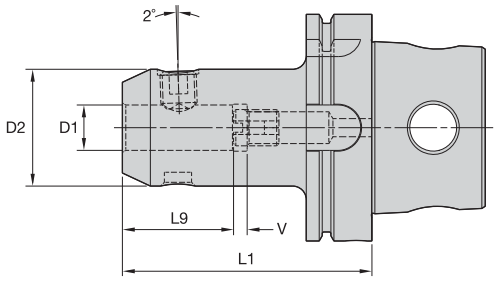




ER Round-KM4X

order number	catalog number	collet series	D11	L1	L9	V	locknut	locknut wrench	Nm	stop screw	wrench size stop screw
4160002	**KM4X100ER25100M**	ER25	42	100	40	33	**LNSER25M**	**ER25WM**	104	**SS075041G**	4mm & 5/32
4160043	**KM4X100ER32100M**	ER32	50	100	45	32	**LNSER32M**	**ER32WM**	136	**SS094041G**	4mm & 5/32
4160044	**KM4X100ER32160M**	ER32	50	160	45	92	**LNSER32M**	**ER32WM**	136	**SS094041G**	4mm & 5/32
4160045	**KM4X100ER40120M**	ER40	63	120	52	38	**LNSER40M**	**ER40WM**	175	**SS112041G**	4mm & 5/32

NOTE: First, load collet into locknut. Before loading into the chuck body, insert cutting tool, then tighten to recommended tightening torque.
Supplied with locknut and stop screw.
Locknut wrench must be ordered separately.



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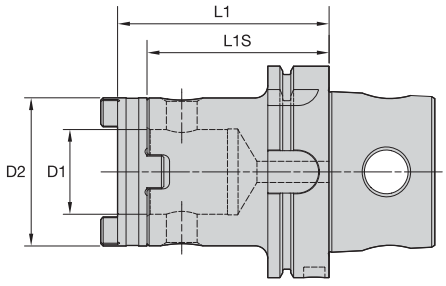
■ WN MM-KM4X • Metric

order number	catalog number	D1	D2	L1	L9	V	clamp screw	wrench size clamp screw	Nm	stop screw	wrench size stop screw
4160047	**KM4X100WN06090M**	6	24,5	90	30	10	**SS03M012**	3mm	7	**571.060**	2,5mm
4160048	**KM4X100WN08090M**	8	27,5	90	30	10	**SS03M014**	4mm	15	**571.067**	3mm
4160049	**KM4X100WN10090M**	10	34,5	90	35	10	**SS03M018**	5mm	25	**571.068**	4mm
4160050	**KM4X100WN12100M**	12	41,5	100	40	10	**SS03M023**	6mm	35	**571.074**	5mm
4160051	**KM4X100WN14100M**	14	43,5	100	40	10	**SS03M023**	6mm	35	**571.074**	5mm
4160052	**KM4X100WN16100M**	16	47,5	100	43	10	**SS03M025**	6mm	50	**571.069**	6mm
4160073	**KM4X100WN18100M**	18	49,5	100	43	10	**SS03M025**	6mm	50	**571.069**	6mm
4160074	**KM4X100WN20110M**	20	51,5	110	45	10	**SS03M026**	8mm	95	**571.076**	6mm
4160075	**KM4X100WN25120M**	25	64,5	120	50	10	**SS03M027**	10mm	135	**571.077**	6mm
4160076	**KM4X100WN32120M**	32	71,5	120	54	10	**SS03M029**	10mm	160	**571.077**	6mm

NOTE: Do not overtighten clamp screw; use torque recommendations above.
Supplied with clamp screw and stop screw.
Clamp screw and stop screw wrenches not included.



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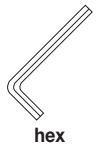
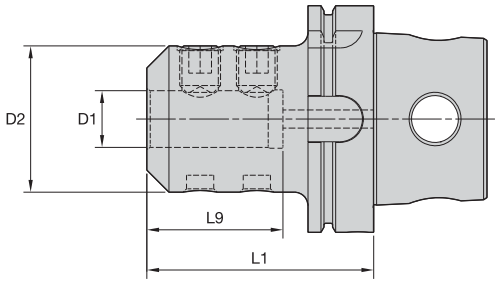
HTS-KM4X


order number	catalog number	D1	D2	L1	L1S	clamp screw	hex wrench	drive ring	ft. lbs.	kg
4159439	**KM4X100HTS40085M**	40	70	99	85	**191.728**	**170.008**	**192.424**	26	3.80
4159440	**KM4X100HTS50090M**	50	80	106	90	**191.728**	**170.008**	**192.425**	26	4.27

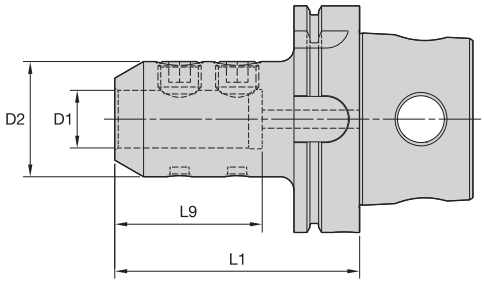
NOTE: Shipped with drive ring and clamping screw.
Assemble components using recommended torque values.

KM™



EM MM-KM4X • Metric

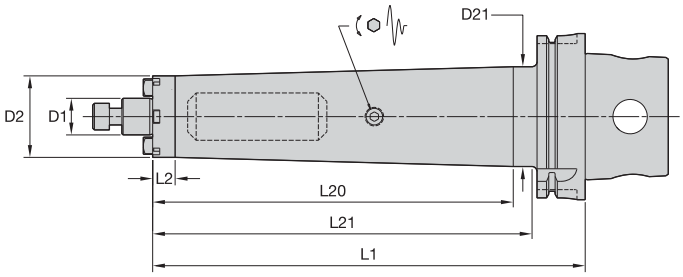
order number	catalog number	D1	D2	L1	L9	clamp screw	wrench size clamp screw	Nm
4160510	KM4X100EM06080M	6	24,5	80	52	SS03M012	3mm	7
4160511	KM4X100EM08080M	8	27,5	80	52	SS03M014	4mm	15
4160512	KM4X100EM10080M	10	34,5	80	52	SS03M018	5mm	25
4160533	KM4X100EM12080M	12	41,5	80	49	SS03M023	6mm	35
4160534	KM4X100EM14080M	14	43,5	80	49	SS03M023	6mm	35
4160535	KM4X100EM16100M	16	47,5	100	53	SS03M025	6mm	50
4160536	KM4X100EM18100M	18	49,5	100	53	SS03M025	6mm	50
4160537	KM4X100EM20100M	20	51,5	100	55	SS03M026	8mm	95
4160538	KM4X100EM25100M	25	64,5	100	60	SS03M027	10mm	135
4160539	KM4X100EM32100M	32	71,5	100	65	SS03M029	10mm	160
4160540	KM4X100EM40120M	40	89,5	120	75	SS03M032	10mm	160
4160541	KM4X100EM50130M	50	99,5	130	85	SS03M030	12mm	200



EM IN-KM4X • Inch

order number	catalog number	D1	D2	L1	L9	clamp screw	wrench size clamp screw	ft. lbs.
4160518	KM4X100EM025300	1/4	1.000	3.000	1.89	ELS025025	1/8	8
4160519	KM4X100EM038300	3/8	1.000	3.000	1.89	ELS038031	3/16	15
4160520	KM4X100EM050325	1/2	1.375	3.250	1.97	ELS044038	7/32	20
4160521	KM4X100EM062375	5/8	1.625	3.750	2.09	ELS056050	1/4	40
4160522	KM4X100EM075375	3/4	1.750	3.750	2.22	ELS062050	5/16	70
4160573	KM4X100EM100425	1	2.000	4.250	2.46	ELS075056	3/8	110
4160574	KM4X100EM125425	1 1/4	2.500	4.250	2.51	ELS075062	3/8	110
4160575	KM4X100EM150450	1 1/2	2.750	4.500	2.93	ELS075069	3/8	110
4160576	KM4X100EM200550	2	3.750	5.500	3.53	ELS100088	1/2	150
4160577	KM4X100EM250575	2 1/2	4.188	5.750	3.63	ELS100088	1/2	150

NOTE: Do not overtighten clamp screw; use torque recommendations above.
Supplied with clamp screw.
Clamp screw wrench not included.



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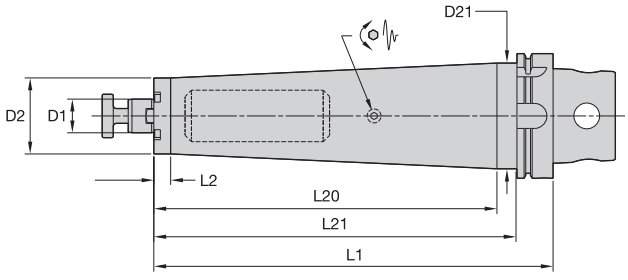
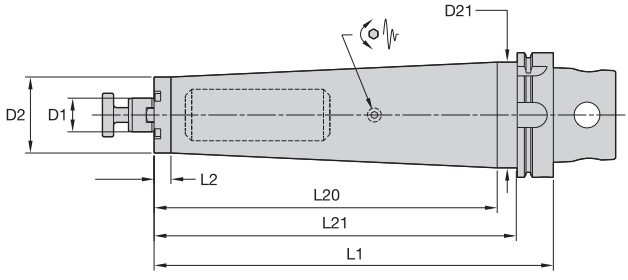
SMC TD CAP MM-KM4X • Metric

order number	catalog number	D1	D2	D21	L1	L2	L20	L21	lock screw	wrench size lock screw
4169583	KM4X100TDSMC22260M	22	49	65	260	13,5	215	231	MS-1234	8mm



SMC TD Lock MM-KM4X • Metric

order number	catalog number	D1	D2	D21	L1	L2	L20	L21	lock screw	wrench size lock screw
4169584	KM4X100TDSMC27320M	27	61	85	320	13,5	275	291	KLSS27M	10mm
4169585	KM4X100TDSMC32330M	32	78	—	330	299	—	—	KLSS32M	14mm

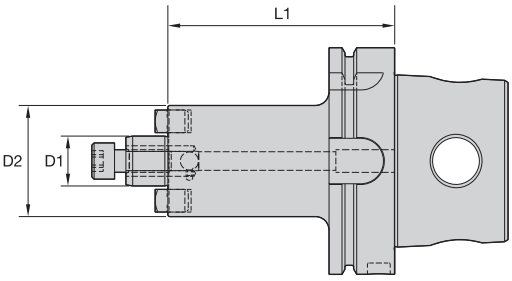


SMC TD Lock IN-KM4X • Inch

order number	catalog number	D1	D2	D21	L1	L2	L20	L21	clamp screw	wrench size clamp screw
4169586	KM4X100TDSMC0751050	3/4	1.75	2.56	10.5	.53	8.73	9.24	KLS07	1/4
4169587	KM4X100TDSMC1001250	1	2.75	3.33	12.5	.53	10.73	11.36	KLS10	5/16
4169588	KM4X100TDSMC1251300	1 1/4	2.88	3.33	13	.63	11.23	11.86	KLS12	5/16

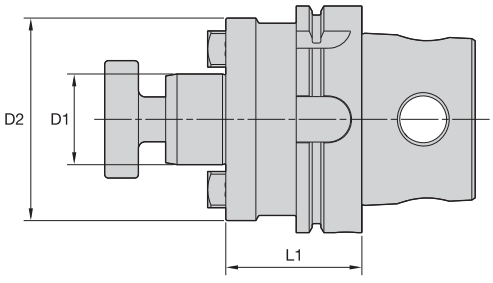
NOTE: Do not overtighten lock screw; use torque recommendations above.
Supplied with lock screw and drive keys.
Lock screw wrench not included.

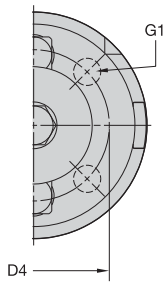
KM

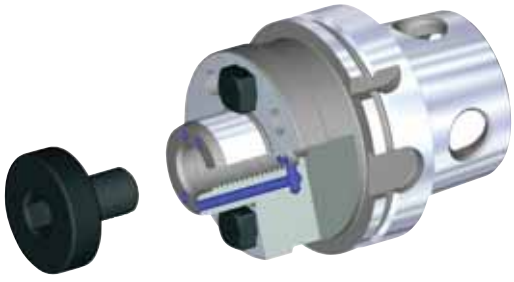


SMC CAP MM-KM4X • Metric

order number	catalog number	D1	D2	L1	lock screw	wrench size lock screw
4160335	KM4X100SMC22050M	22	49	50	MS1234	8mm
4160337	KM4X100SMC22100M	22	49	100	MS1234	8mm
4160338	KM4X100SMC22160M	22	49	160	MS1234	8mm

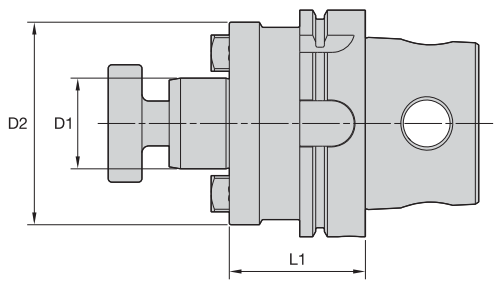


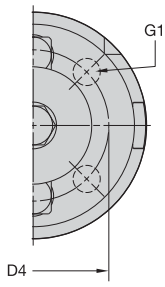


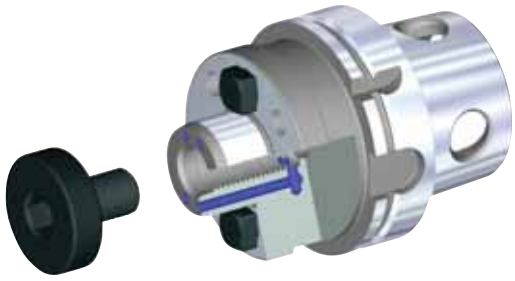


SMC Lock MM-KM4X • Metric

order number	catalog number	D1	D2	D4	G1	L1	lock screw	wrench size lock screw
4160340	KM4X100SMC27050M	27	60	–	–	50	KLSS27M	10mm
4160341	KM4X100SMC27100M	27	60	–	–	100	KLSS27M	10mm
4160342	KM4X100SMC27160M	27	60	–	–	160	KLSS27M	10mm
4160343	KM4X100SMC32050M	32	78	–	–	50	KLSS32M	14mm
4160344	KM4X100SMC32100M	32	78	–	–	100	KLSS32M	14mm
4160345	KM4X100SMC32160M	32	78	–	–	160	KLSS32M	14mm
4160346	KM4X100SMC40060M	40	89	67	M12x1,75	60	KLSS40M	17mm
4160347	KM4X100SMC40100M	40	89	67	M12x1,75	100	KLSS40M	17mm
4160348	KM4X100SMC40160M	40	89	67	M12x1,75	160	KLSS40M	17mm
4160350	KM4X100SMC50070M	50	98	–	–	70	KLS50M	SMW50M
4160351	KM4X100SMC50100M	50	98	–	–	100	KLS50M	SMW50M
4160352	KM4X100SMC50160M	50	98	–	–	160	KLS50M	SMW50M
4160353	KM4X100SMC60070M	60	129	102	M16x2,0	70	–	–
4160354	KM4X100SMC60100M	60	129	102	M16x2,0	100	–	–
4160355	KM4X100SMC60160M	60	129	102	M16x2,0	160	–	–



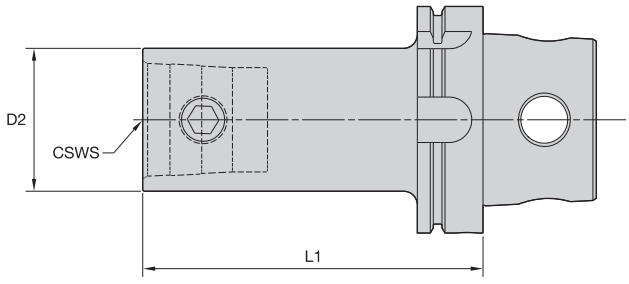




SMC Lock IN-KM4X • Inch

order number	catalog number	D1	D2	D4	G1	L1	lock screw	wrench size lock screw
4160286	**KM4X100SMC075400**	3/4	1.75	—	—	4.00	**KLS07**	1/4
4160287	**KM4X100SM2C075400**	3/4	1.46	—	—	4.00	**KLS07**	1/4
4160289	**KM4X100SMC075600**	3/4	1.75	—	—	6.00	**KLS07**	1/4
4160290	**KM4X100SM2C075600**	3/4	1.46	—	—	6.00	**KLS07**	1/4
4160291	**KM4X100SMC100400**	1	2.75	—	—	4.00	**KLS10**	5/16
4160292	**KM4X100SM2C100400**	1	2.19	—	—	4.00	**KLS10**	5/16
4160313	**KM4X100SMC100600**	1	2.75	—	—	6.00	**KLS10**	5/16
4160314	**KM4X100SM2C100600**	1	2.19	—	—	6.00	**KLS10**	5/16
4160315	**KM4X100SMC125400**	1 1/4	2.88	—	—	4.00	**KLS12**	5/16
4160316	**KM4X100SMC125600**	1 1/4	2.88	—	—	6.00	**KLS12**	5/16
4160317	**KM4X100SMC150400**	1 1/2	3.81	—	—	4.00	**KLS15**	3/8
4160318	**KM4X100SMC150600**	1 1/2	3.81	—	—	6.00	**KLS15**	3/8
4160319	**KM4X100SMC200400**	2	4.88	4.00	5/8 - 11	4.00	**KLS20**	9/16
4160320	**KM4X100SMC200600**	2	4.88	4.00	5/8 - 11	6.00	**KLS20**	9/16
4160321	**KM4X100SMC250400**	2 1/2	4.88	4.00	5/8 - 11	4.00	**—**	1/2
4160322	**KM4X100SMC250600**	2 1/2	4.88	4.00	5/8 - 11	6.00	**—**	1/2

NOTE: Do not overtighten lock screw; use torque recommendations above.
Supplied with lock screw and drive keys.
Lock screw wrench not included.

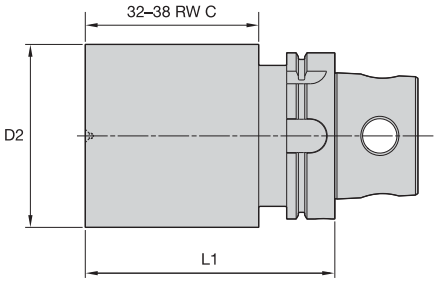


KM-KM4X

order number	catalog number	CSWS	D2	L1	spare parts package	wrench size actuation screw	Nm
4161856	**KM4X100KM32075M**	32	32	75	**KM32PKGS**	5mm	8 - 11
4161858	**KM4X100KM40080M**	40	40	80	**KM40PKGS**	6mm	12 - 16
4161859	**KM4X100KM40100M**	40	40	100	**KM40PKGS**	6mm	12 - 16
4161860	**KM4X100KM40150M**	40	40	150	**KM40PKGS**	6mm	12 - 16
4161861	**KM4X100KM50100M**	50	50	100	**KM50PKGS**	10mm	27 - 34
4161862	**KM4X100KM50150M**	50	50	150	**KM50PKGS**	10mm	27 - 34
4161863	**KM4X100KM50200M**	50	50	200	**KM50PKGS**	10mm	27 - 34
4161864	**KM4X100KM63100M**	63	63	100	**KM63PKGS**	12mm	47 - 54
4161865	**KM4X100KM63150M**	63	63	150	**KM63PKGS**	12mm	47 - 54
4161866	**KM4X100KM63200M**	63	63	200	**KM63PKGS**	12mm	47 - 54
4161867	**KM4X100KM80100M**	80	80	100	**KM80PKGS**	14mm	79 - 85
4161868	**KM4X100KM80150M**	80	80	150	**KM80PKGS**	14mm	79 - 85
4161869	**KM4X100KM80200M**	80	80	200	**KM80PKGS**	14mm	79 - 85

NOTE: Do not overtorque actuation screw; use torque recommendations above.
Supplied with KM actuation mechanism.

• Machinable front 32–38 RW C.

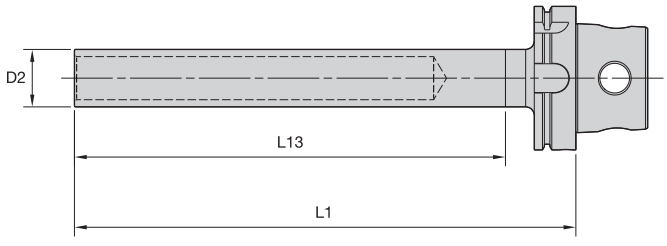


KM

BB-KM4X

order number	catalog number	D2	L1
4160571	**KM4X100BN080150M**	80	150
4160572	**KM4X100BN110150M**	110	150
4160613	**KM4X100BN130200M**	130	200

• For acceptance testing on machine tool spindles.
• 0,003mm (.0001") maximum TIR.
• Precision ground.



KM

GB-KM4X

order number	catalog number	D2	L1	L13
4160529	**KM4X100GB40349M**	40	349	330

Our complete portfolio. Your complete satisfaction.

From turning, holemaking, and indexable milling to solid carbide end milling, solid carbide drilling, and tapping, the most powerful tools in the business now proudly wear WIDIA™ brands. When you buy WIDIA products, you're not just purchasing speed, power, and precision, you're investing in quality and complete satisfaction.

Match the most expansive portfolio of precision-engineered products and engineered solution services available today with a global, specialized network of Authorized Distributor partners, and you have the tools you need — and the power that only comes from WIDIA brands. For product information, or to schedule an onsite demonstration, visit www.widia.com.

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

WIDIA™

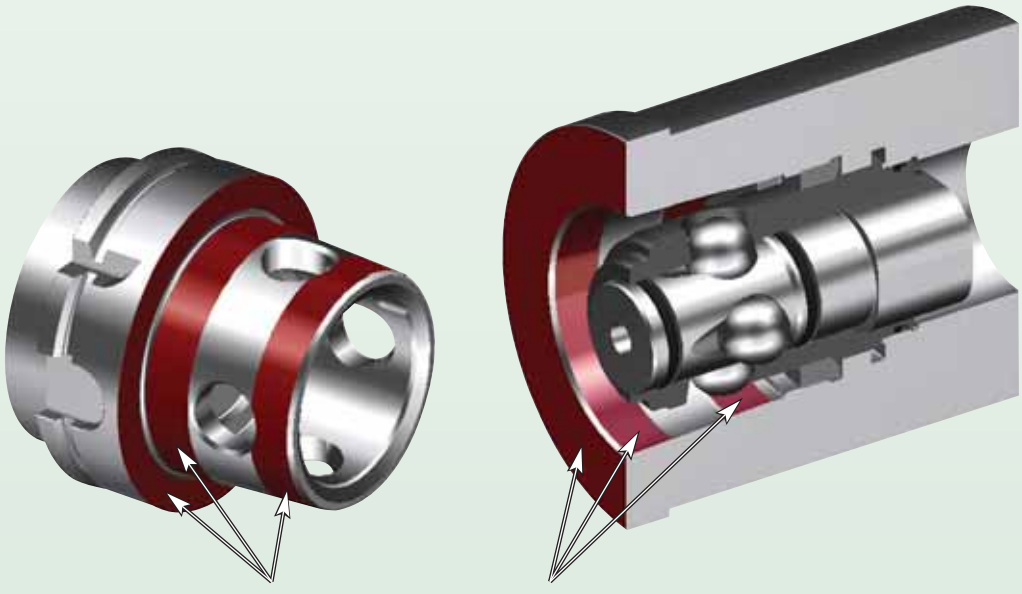
KM4X™ — The Next Generation Spindle Connection System

As a global tooling supplier and a true customer support partner, we recognize the need to offer tooling products for all spindle interfaces and make available solutions to provide the best cutting edges to gain maximum productivity at the spindle system connection.

KM4X is the latest version of the KM™ spindle interface targeted at heavy-duty machining operations and is a top choice for machining large, structural tough-to-machine materials like titanium for the aerospace industry.

The Latest Innovation in Spindle Interface Technology

- KM4X offers the most rigid connection able to withstand extremely high bending due to a combination of high interference and high clamping forces.
- KM4X provides 3x more bending capacity than comparable face contact systems.
- KM is the only connection that maintains stiffness at elevated rotational speeds and is suitable for a range of applications from low speeds with high torque to very high spindle speeds with low torque.
- KM4X maintains a better balance between bending and torsion capabilities.
- The ability to retrofit KM4X to an existing machine tool offers the added advantage of increasing throughput.
- Heavy-duty, rigid configuration with evenly distributed clamping force.
- Simple design enables front-loaded spindle configuration.
- Balanced-by-design for high spindle speed capacity.



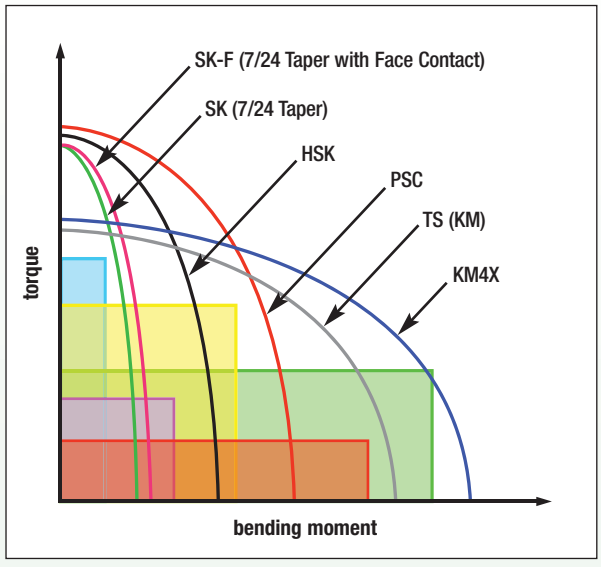
**KM4X three-surface contact for improved stability and accuracy.
Optimized clamping force distribution and interference fit provides higher stiffness.**

Why Bending Load Capacity Is Important

When machining tough materials like titanium, cutting speeds are relatively low due to thermal effects on cutting tools. Over the years, machine tool builders responded to this issue by improving stiffness and damping on spindles and machine structures. Spindles have been designed with abundant torque at low rotational speeds. Nevertheless, the spindle connection has remained the weak link in the system.

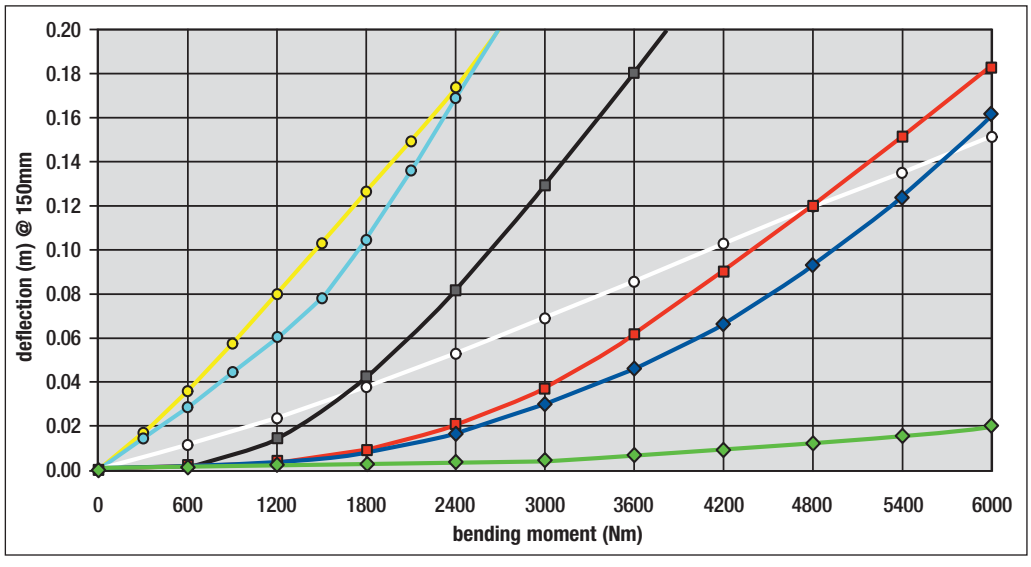
The spindle connection must provide torque and bending load capacity compatible with the machine tool specifications and the requirements for higher productivity. It becomes obvious that in end-milling applications where the projection lengths are typically greater, the limiting factor is the bending load capacity of the spindle interface.

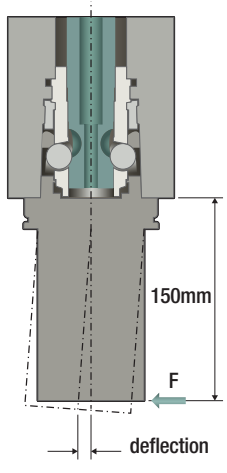
The lines on the chart to the right represent the load capacity of HSK, PSC, and KM4X. The shaded areas represent the typical requirements for heavy-duty applications in various machining processes. KM4X is the only system that can deliver the torque and bending capacity required for achieving high-performance machining. Some systems may be able to transmit considerable amounts of torque, but the cutting forces also generate bending moments that exceed the interface's limits before torque limits are exceeded.



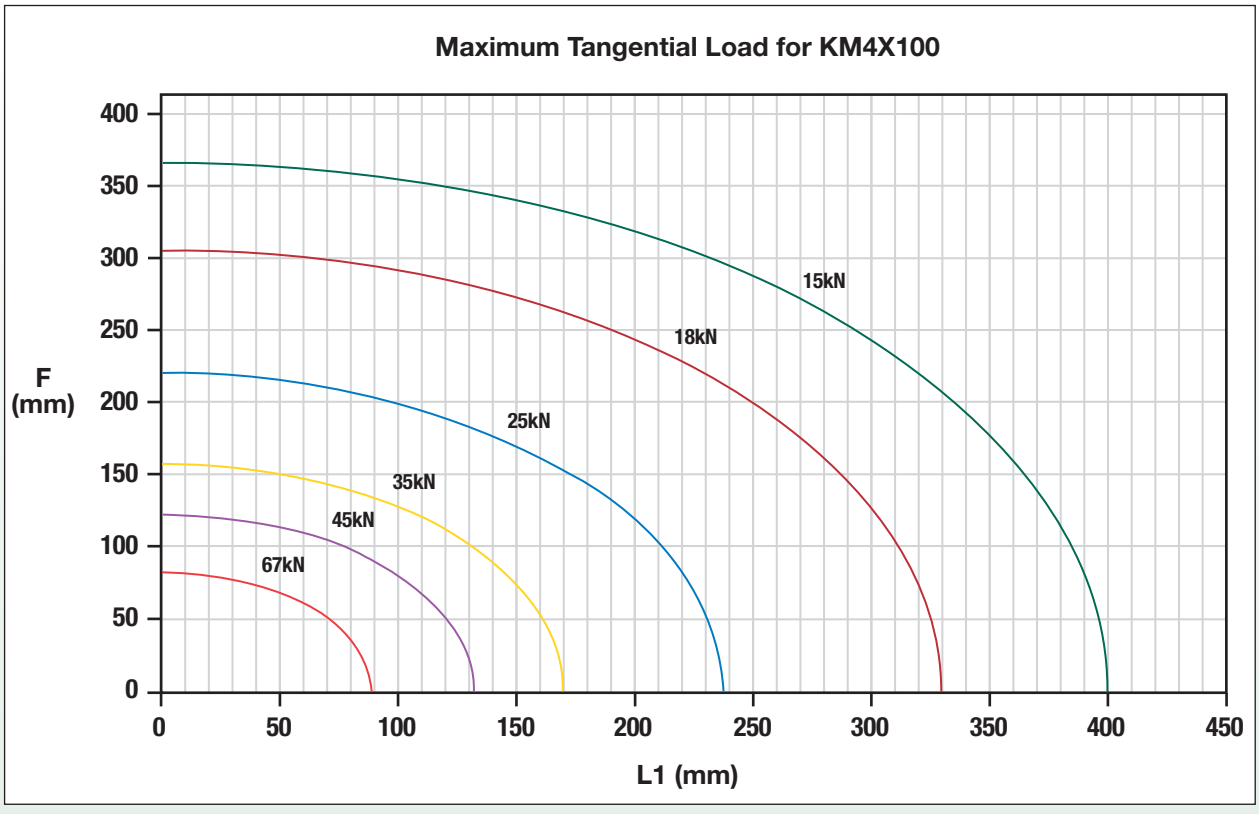
IMPORTANT
Information shown on the following charts was developed exclusively for use with KM™ tooling in static conditions. Do not use for any other tooling system because the results will not apply. To account for cutting force fluctuations in dynamic conditions, a reduction of 20–30% should be applied to the loads shown in charts.

Chart shows load-deflection comparison of steep taper with and without face contact — HSK and KM4X.





7/24 Taper — Size 50
7/24 Taper — Size 50 with Face Contact
7/24 Taper — Size 60
HSK100A
KM4X100
HSK125A
KM4X125



The KM4X system is the best large, heavy-duty connection. A weak connection can fail to deliver the desired cutting edge performance. KM4X superior rigidity equals maximum productivity.

IMPORTANT
Information shown on the following charts was developed exclusively for use with KM™ tooling in static conditions. Do not use for any other tooling system because the results will not apply. To account for cutting force fluctuations in dynamic conditions, a reduction of 20–30% should be applied to the loads shown in charts.

High-Performance Solid Carbide End Mills • **SAFE-LOCK™**

In High-Performance Cutting (HPC), slow microcreeping can cause the cutting tool to be pulled out of the chuck, turning high-quality workpieces to scrap.

Be on the Safe Side with SAFE-LOCK™ in High-Performance Cutting (HPC).

- Highly accurate clamping due to positive connection.
- No loss of accuracy.
- No pull out or spinning of the tool.
- No damage to the workpiece or machine.
- Groove on tool shank is directed so the tool will be pulled into the chuck (depending on direction of rotation).

Order Information

WIDIA™ high-performance end mills with a shank diameter of 1/2" (12mm) and larger are available with **SAFE-LOCK**™ technology, as a special tool, upon request. Please contact your local customer service location to receive a quote.

Features

- Form-closed clamping.
- High accuracy clamping.
- Helical grooves.

Functions

- No pullout.
- Excellent runout.
- Adjustable clamping length.

Benefits

- Reduce scrap rate.
- Higher tool life.
- No need to change NC program after regrinding.

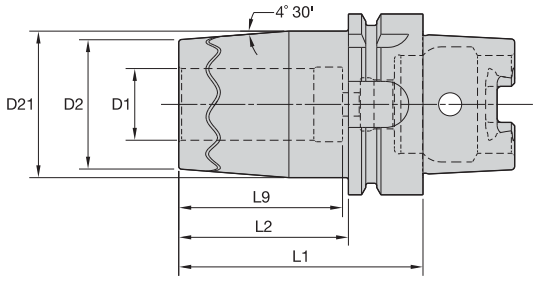
Example for Highest Metal Removal Rates

The VariMill II™ ER proprietary design with **unequal flute spacing** and unique core geometry for chatter-free machining enables slotting operations in titanium up to 1 x D.

SAFE-LOCK™

The safety belt for high-performance solid carbide end mills provides a form-closed clamping with high accuracy and helical grooves for length adjustment.

- **SAFE-LOCK**™, innovative and unique non-slip system.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 10 kW shrink unit.



Cutting Tool Shank Requirements metric (ISO standard)

cutting tool shank diameter	tolerance	
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013
32	h6	0,000/-0,016

ERICKSON™

TT SF MM-HSK Form A

order number	catalog number	D1	D2	D21	L1	L2	L9	kg
5090218	HSK63ASFTT12070M	12	27	33	70	44	46	0,84
5090219	HSK63ASFTT14075M	14	30	37	75	49	48	0,91
5090220	HSK63ASFTT16075M	16	30	37	75	49	49	0,89
5090221	HSK63ASFTT18075M	18	36	43	75	49	49	1,00
5090222	HSK63ASFTT20075M	20	36	43	75	49	49	0,97
5090223	HSK63ASFTT25085M	25	45	51	85	59	57	1,27
5090224	HSK63ASFTT32085M	32	45	51	85	59	59	1,12

Cutting Tool Shank Requirements inch (industry standard)

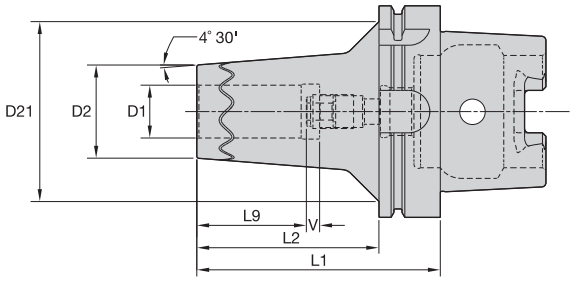
cutting tool shank diameter	tolerance
7/16, 1/2, 9/16, & 5/8	.0000/-.0004
3/4, 7/8, 1, & 1-1/4	.0000/-.0005

TT SF IN-HSK Form A

order number	catalog number	D1	D2	D21	L1	L2	L9	lbs
5090233	HSK63ASFTT050276	1/2	1.04	1.32	2.76	1.73	1.81	1.84
5090234	HSK63ASFTT062295	5/8	1.16	1.47	2.95	1.93	1.93	1.96
5090235	HSK63ASFTT075295	3/4	1.40	1.70	2.95	1.93	1.93	2.16
5090236	HSK63ASFTT100335	1	1.77	2.01	3.35	2.32	2.24	2.78
5090237	HSK63ASFTT125335	1 1/4	1.77	2.01	3.35	2.32	2.32	2.49

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder. HSK coolant unit and wrench are available and must be ordered separately; see Tooling Systems catalog A-09-02122.

- **SAFE-LOCK**™, innovative and unique.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 10 kW shrink unit.



SAFE-λOCK™
by HAIMER

Cutting Tool Shank Requirements metric (ISO standard)

cutting tool shank diameter	tolerance	
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013
32	h6	0,000/-0,016

ERICKSON™

TT SF MM-HSK Form A

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5090056	HSK100ASFTT12095M	12	27	73	95	66	37	10	2,45
5090057	HSK100ASFTT14095M	14	33	60	95	66	37	10	2,54
5090058	HSK100ASFTT16100M	16	33	78	100	71	40	10	2,60
5090059	HSK100ASFTT18100M	18	44	76	100	71	40	10	2,98
5090210	HSK100ASFTT20105M	20	44	85	105	76	42	10	3,07
5090211	HSK100ASFTT25115M	25	44	85	115	86	48	10	3,16

Cutting Tool Shank Requirements inch (industry standard)

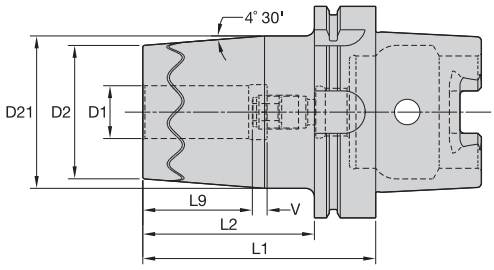
cutting tool shank diameters	tolerance
1/4, 5/16, & 3/8	.0000/-.0004
1/2 & 5/8	.0000/-.0004
3/4, 7/8, 1, 1-1/4, & 1-1/2	.0000/-.0005

TT SF IN-HSK Form A

order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
5090225	HSK100ASFTT050374	1/2	1.06	2.87	3.74	2.60	1.46	.39	5.40
5090226	HSK100ASFTT062394	5/8	1.30	3.07	3.94	2.80	1.57	.39	5.64
5090227	HSK100ASFTT075413	3/4	1.73	3.35	4.13	2.99	1.65	.39	6.81
5090228	HSK100ASFTT100453	1	1.73	3.35	4.53	3.39	1.89	.39	6.94

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder. HSK coolant unit and wrench are available and must be ordered separately; see Tooling Systems catalog A-09-02122.

- **SAFE-LOCK™**, innovative and unique.
- Ultra short and heavy-duty design.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 20 kW shrink unit.



Cutting Tool Shank Requirements metric (ISO standard)

cutting tool shank diameter	tolerance	
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013
32	h6	0,000/-0,016

ERICKSON

TT SF HD MM-HSK Form A

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5090212	HSK100ASFHDTT16100M	16	51	62	100	71	40	10	3,27
5090213	HSK100ASFHDTT20100M	20	58	67	100	71	42	10	3,57
5090214	HSK100ASFHDTT25110M	25	63	72	110	81	48	10	4,06
5090215	HSK100ASFHDTT32110M	32	70	78	110	81	52	10	4,37
5090216	HSK100ASFHDTT40140M	40	82	94	140	111	77	10	6,36
5090217	HSK100ASFHDTT50140M	50	82	94	140	111	77	10	5,90

Cutting Tool Shank Requirements inch (industry standard)

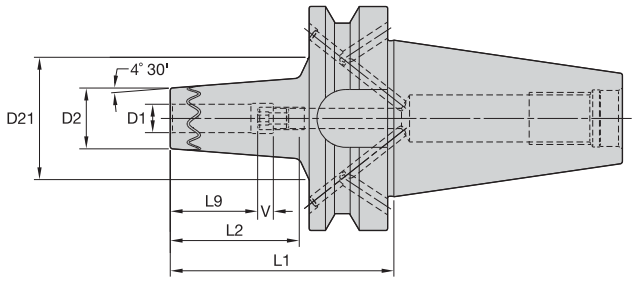
cutting tool shank diameters	tolerance
1/4, 5/16, & 3/8	.0000/-.0004
1/2 & 5/8	.0000/-.0004
3/4, 7/8, 1, 1-1/4, & 1-1/2	.0000/-.0005

TT SF HD IN-HSK Form A

order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
5090229	HSK100ASFHDTT100433	1	2.48	2.83	4.33	3.19	1.89	.39	8.90
5090230	HSK100ASFHDTT125433	1 1/4	2.76	3.07	4.33	3.19	2.05	.39	9.64
5090231	HSK100ASFHDTT150551	1 1/2	3.23	3.70	5.51	4.37	3.03	.39	14.15
5090232	HSK100ASFHDTT200551	2	3.23	3.70	5.51	4.37	3.03	.39	12.90

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder. HSK coolant unit and wrench are available and must be ordered separately; see Tooling Systems catalog A-09-02122.

- **SAFE-LOCK™**, innovative and unique non-slip system.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 10 kW shrink unit.



Cutting Tool Shank Requirements metric (ISO standard)

cutting tool shank diameter	tolerance	
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013
32	h6	0,000/-0,016

ERICKSON

TT SF MM-BT Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5090264	BT40BSFTT12070M	12	27	33	70	43	37	10	1,14
5090265	BT40BSFTT14075M	14	30	37	75	48	37	10	1,21
5090266	BT40BSFTT16075M	16	30	37	75	48	40	10	1,18
5090267	BT40BSFTT18075M	18	36	43	75	48	40	10	1,29
5090268	BT40BSFTT20075M	20	36	43	75	48	42	10	1,24
5090269	BT40BSFTT25085M	25	46	55	85	58	48	10	1,59
5090270	BT40BSFTT32085M	32	46	55	85	58	48	10	1,43

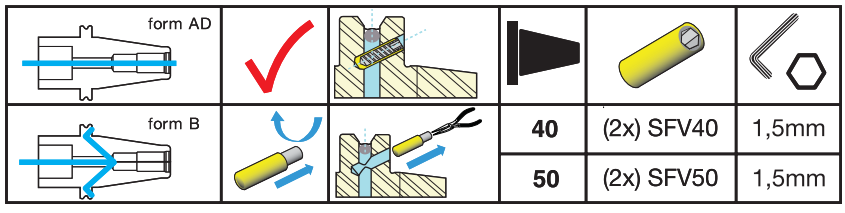
Cutting Tool Shank Requirements inch (industry standard)

cutting tool shank diameters	tolerance
1/2 & 5/8	.0000/-.0004
3/4, 1	.0000/-.0005

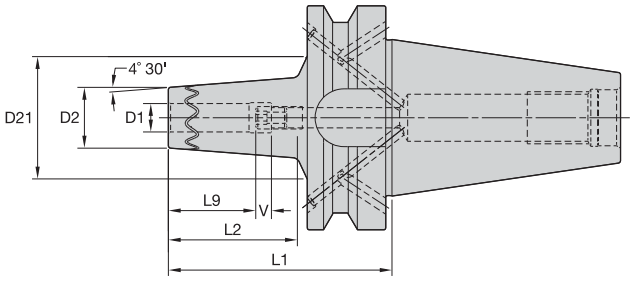
TT SF IN-BT Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
5129960	BT40BSFTT050276	1/2	1.04	1.31	2.76	1.69	1.46	.39	2.50
5129962	BT40BSFTT062295	5/8	1.16	1.46	2.95	1.89	1.58	.39	2.61
5129963	BT40BSFTT075295	3/4	1.40	1.70	2.95	1.89	1.65	.39	2.77
5129964	BT40BSFTT100335	1	1.79	2.15	3.35	2.28	1.89	.39	3.48

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
For retention knobs, see Tooling Systems catalog A-09-02122.



- **SAFE-LOCK™**, innovative and unique non-slip system.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 10 kW shrink unit.



Cutting Tool Shank Requirements metric (ISO standard)

cutting tool shank diameter	tolerance	
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013

ERICKSON™

TT SF HPV MM-BT Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5090277	BT50BSFTT12100M	12	27	55	100	62	37	10	3,98
5090278	BT50BSFTT14100M	14	33	43	100	62	37	10	4,11
5090279	BT50BSFTT16100M	16	33	43	100	62	40	10	4,08
5090280	BT50BSFTT18100M	18	45	54	100	62	40	10	4,44
5090281	BT50BSFTT20100M	20	45	54	100	62	42	10	4,39
5090282	BT50BSFTT25100M	25	45	54	100	62	48	10	4,29

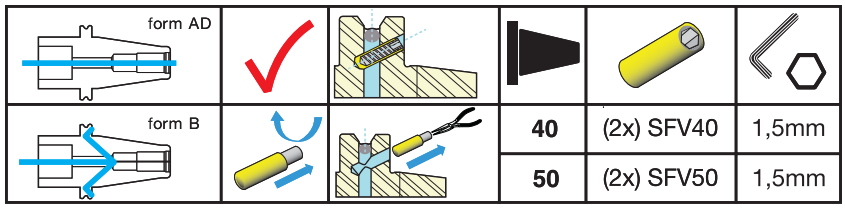
Cutting Tool Shank Requirements inch (industry standard)

cutting tool shank diameters	tolerance
1/2 & 5/8	.0000/-.0004
3/4, 1	.0000/-.0005

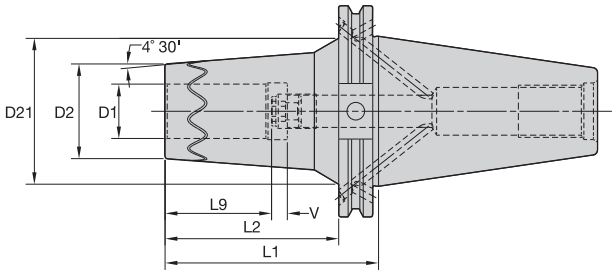
TT SF HPV IN-BT Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
5129965	BT50BSFTT050394	1/2	1.06	2.17	3.94	2.44	1.46	.39	8.76
5129966	BT50BSFTT062394	5/8	1.31	1.70	3.94	2.44	1.58	.39	8.99
5129967	BT50BSFTT075394	3/4	1.76	2.14	3.94	2.44	1.65	.39	9.71
5129968	BT50BSFTT100394	1	1.76	2.14	3.94	2.44	1.89	.39	9.45

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder. HSK coolant unit and wrench are available and must be ordered separately; see Tooling Systems catalog A-09-02122.



- **SAFE-LOCK**™, innovative and unique non-slip system.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 10 kW shrink unit.



Cutting Tool Shank Requirements metric (ISO standard)

cutting tool shank diameter	tolerance	
12, 16	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013

ERICKSON

TT SF MM-CV Z Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5089582	CV40ZBSFTT12M256	12	27	34	65	46	37	10	1,00
5089583	CV40ZBSFTT16M256	16	30	37	65	46	40	10	1,01
5089584	CV40ZBSFTT20M256	20	36	43	65	46	42	10	1,06
5089585	CV40ZBSFTT25M295	25	46	51	75	56	48	10	1,29

Cutting Tool Shank Requirements inch (industry standard)

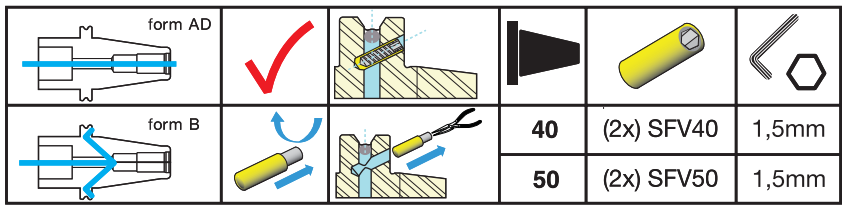
cutting tool shank diameters	tolerance
1/2 & 5/8	.0000/-.0004
3/4, 1	.0000/-.0005

TT SF IN-CV Z Form B/AD

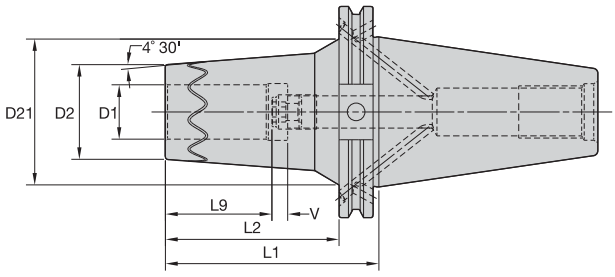
order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
5089586	CV40ZBSFTT050256	1/2	1.04	1.33	2.56	1.81	1.46	.39	2.20
5089587	CV40ZBSFTT062256	5/8	1.16	1.45	2.56	1.81	1.58	.39	2.22
5089588	CV40ZBSFTT075256	3/4	1.40	1.68	2.56	1.81	1.65	.39	2.37
5089589	CV40ZBSFTT100295	1	1.79	2.03	2.95	2.20	1.89	.39	2.82

CV40Z toolholders deviate from ANSI-B5.50 standard. The 1.750" hub in front of the V-flange has been eliminated to achieve short gage lengths.

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
HSK coolant unit and wrench are available and must be ordered separately;
see Tooling Systems catalog A-09-02122.



- **SAFE-LOCK™**, innovative and unique non-slip system.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 10 kW shrink unit.



Cutting Tool Shank Requirements metric (ISO standard)

cutting tool shank diameter	tolerance	
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013

ERICKSON

TT SF MM-CV Z Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5089650	CV50ZBSFTT12M315	12	27	55	80	61	37	10	2,95
5089651	CV50ZBSFTT14M315	14	33	43	80	61	37	10	3,08
5089652	CV50ZBSFTT16M315	16	33	43	80	61	37	10	3,04
5089653	CV50ZBSFTT18M315	18	45	54	80	61	40	10	3,39
5089654	CV50ZBSFTT20M315	20	45	54	80	61	42	10	3,35
5089655	CV50ZBSFTT25M394	25	44	68	100	81	48	10	3,63

Cutting Tool Shank Requirements inch (industry standard)

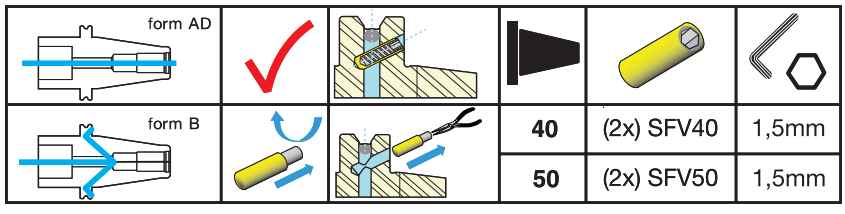
cutting tool shank diameters	tolerance
1/2 & 5/8	.0000/-.0004
3/4, 7/8, 1	.0000/-.0005

TT SF IN-CV Z Form B/AD

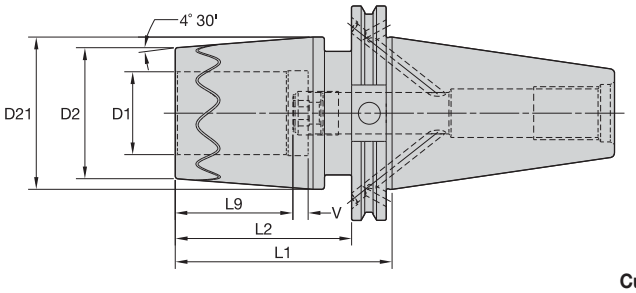
order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
5089656	CV50ZBSFTT050315	1/2	1.06	2.17	3.15	2.40	1.46	.39	6.49
5089657	CV50ZBSFTT062315	5/8	1.31	1.69	3.15	2.40	1.46	.39	6.71
5089658	CV50ZBSFTT075315	3/4	1.76	2.14	3.15	2.40	1.65	.39	7.41
5089659	CV50ZBSFTT100394	1	1.73	2.68	3.94	3.19	1.89	.39	7.33

CV50Z toolholders deviate from ANSI-B5.50 standard. The 1.750" hub in front of the V-flange has been eliminated to achieve short gage lengths.

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
HSK coolant unit and wrench are available and must be ordered separately;
see Tooling Systems catalog A-09-02122.



- **SAFE-LOCK**™, innovative and unique non-slip system.
- Ultra short and heavy-duty design.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 20 kW shrink unit.



SAFE-λOCK™
by HAIMER

Cutting Tool Shank Requirements metric (ISO standard)

cutting tool shank diameter	tolerance	
25	h6	0,000/-0,013
32, 40, & 50	h6	0,000/-0,016

ERICKSON

TT SF HD MM-CV Z Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5089660	**CV50ZBSFHDTT25M354**	25	63	71	90	71	48	10	4,29
5089661	**CV50ZBSFHDTT32M354**	32	70	78	90	71	51	10	4,44
5089662	**CV50ZBSFHDTT40M394**	40	82	90	100	81	78	10	5,07
5089663	**CV50ZBSFHDTT50M551**	50	82	94	140	121	78	10	6,77

Cutting Tool Shank Requirements inch (industry standard)

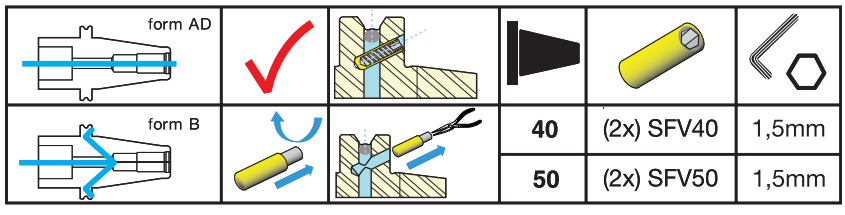
cutting tool shank diameters	tolerance
1, 1-1/4, 1-1/2, & 2	.0000/-.0005

TT SF HD IN-CV Z Form B/AD

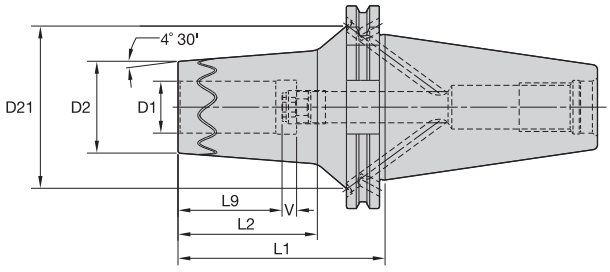
order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
5089664	**CV50ZBSFHDTT100354**	1	2.48	2.81	3.54	2.79	1.89	.39	9.44
5089665	**CV50ZBSFHDTT125354**	1 1/4	2.76	3.07	3.54	2.79	2.01	.39	9.81
5089666	**CV50ZBSFHDTT150394**	1 1/2	3.23	3.54	3.94	3.19	3.07	.39	11.35
5089667	**CV50ZBSFHDTT200551**	2	3.23	3.70	5.51	4.76	3.07	.39	14.84

CV50Z toolholders deviate from ANSI-B5.50 standard. The 2.750" hub in front of the V-flange has been eliminated to achieve short gage lengths.

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
HSK coolant unit and wrench are available and must be ordered separately;
see Tooling Systems catalog A-09-02122.



- **SAFE-LOCK™**, innovative and unique non-slip system.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 10 kW shrink unit.



Cutting Tool Shank Requirements
metric (ISO standard)

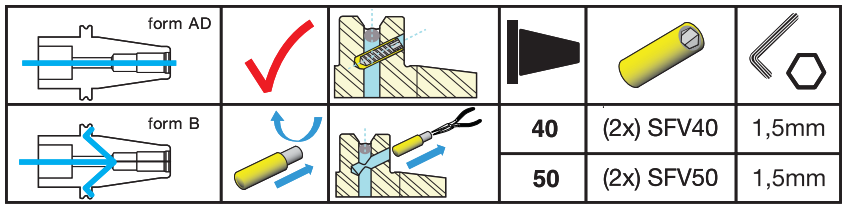
cutting tool shank diameter	tolerance	
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013
32	h6	0,000/-0,016

ERICKSON™

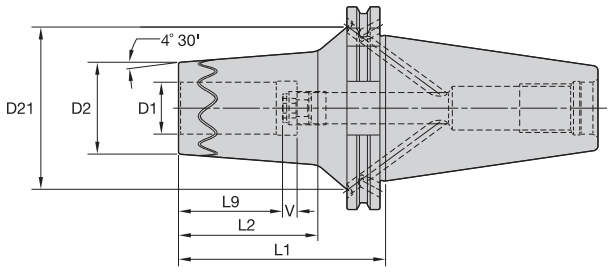
■ TT SF HPV MM-DV Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5129969	**DV40BSFTT12065M**	12	27	34	65	46	37	10	1,00
5129970	**DV40BSFTT14065M**	14	30	37	65	46	37	10	1,04
5090239	**DV40BSFTT16065M**	16	30	37	65	46	40	10	1,01
5090260	**DV40BSFTT18065M**	18	36	43	65	46	40	10	1,10
5090261	**DV40BSFTT20065M**	20	36	43	65	46	42	10	1,07
5090262	**DV40BSFTT25075M**	25	46	52	75	56	48	10	1,35
5090263	**DV40BSFTT32080M**	32	46	53	80	61	48	10	1,27

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
HSK coolant unit and wrench are available and must be ordered separately;
see Tooling Systems catalog A-09-02122.



- **SAFE-LOCK**™, innovative and unique non-slip system.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 10 kW shrink unit.



Cutting Tool Shank Requirements
metric (ISO standard)

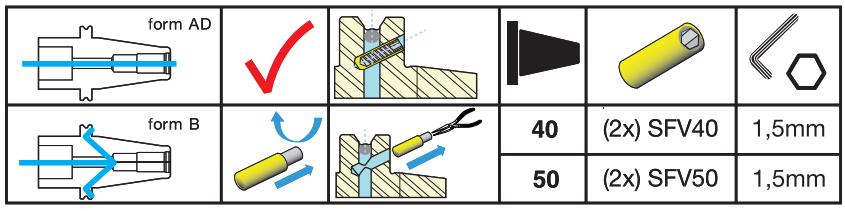
cutting tool shank diameter	tolerance	
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013

ERICKSON™

■ TT SF HPV MM-DV Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5090271	**DV50BSFTT12080M**	12	27	55	80	61	37	10	2,97
5090272	**DV50BSFTT14080M**	14	33	43	80	61	37	10	3,10
5090273	**DV50BSFTT16080M**	16	33	43	80	61	40	10	3,06
5090274	**DV50BSFTT18080M**	18	45	54	80	61	40	10	3,41
5090275	**DV50BSFTT20080M**	20	45	54	80	61	42	10	3,37
5090276	**DV50BSFTT25100M**	25	44	78	100	81	48	10	3,72

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
HSK coolant unit and wrench are available and must be ordered separately;
see Tooling Systems catalog A-09-02122.



SAFE-LOCK™

SAFE-LOCK™ is a pullout protection system for end mill cutters and holder systems that benefits security, in particular for heavy-duty cutting. This is achieved by helical grooves that are ground into the shank of the end mill tool shank. These, together with the respective pin drivers in a shrink fit holder, prevent the tool from being pulled out, even during extreme machining conditions. By locking the cutting tool in the holder, this pullout security ensures optimum process reliability in conjuction with shrink fit runout accuracies and rigidity for longer tool life and maintains higher productivity and part accuracies for our customers.

WIN WITH WIDIA™

Best-in-Class Service and Support

With WIDIA™, you get it all — superior products, reliable performance, and unsurpassed support and program services.

- Highly qualified Customer Service and Customer Application Support (CAS) teams support clients through strong product and market knowledge.
- Advanced engineering teams specialize in specific product groups to help customers optimize application productivity.
- Field Application Specialists work directly with distributors to recommend the best tools and provide training and support.

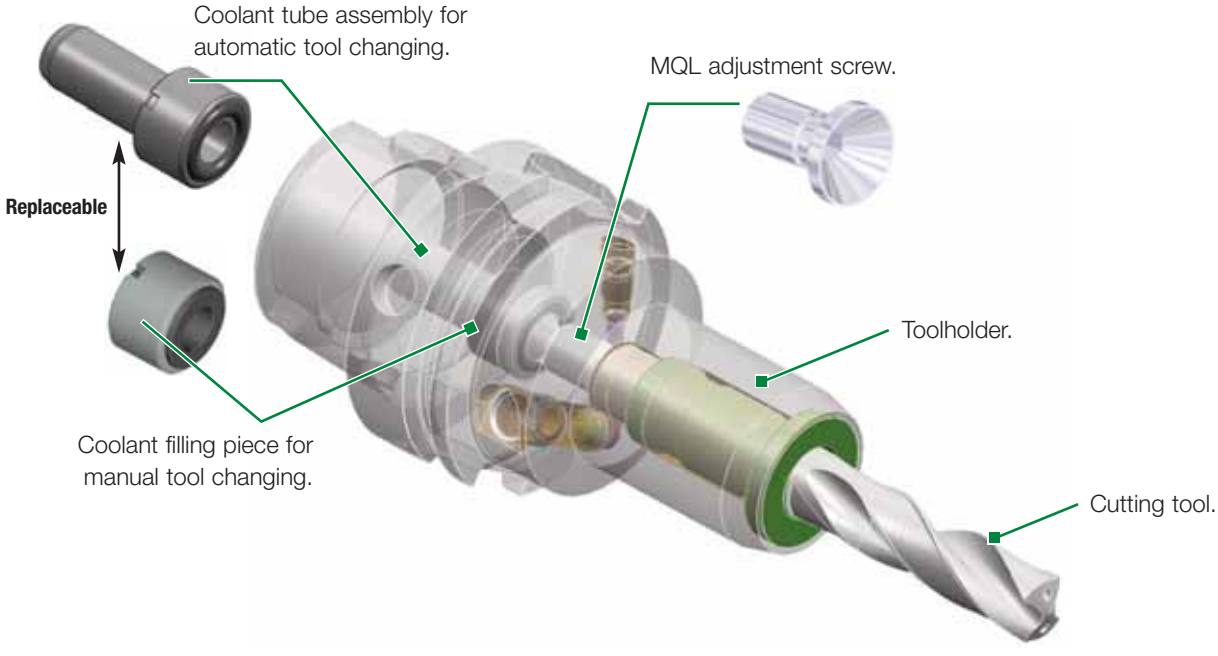
To learn more about our innovations, contact your local Authorized Distributor or visit **www.widia.com**.

ERICKSON™ HSK Shank Tooling System • **HSK63A Series**

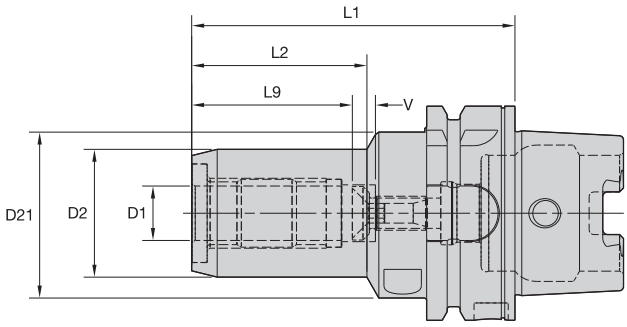
WIDIA™ has further developed their successful products, hydraulic chucks, and Shrink Fit toolholders, by replacing the individual components for use in wet, dry, and MQL (Minimum Quantity Lubrication) machining applications.

The HSK63A Series, well known in the automotive industry, is mainly used for holemaking applications. In dry/MQL machining, more than 70% of the heat is dissipated by the chips, creating less abrasive wear.

HSK63A

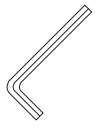


- DIN 69090 1–3 standard.
- Open-source solution.
- Universal for wet, MQL, or dry machining.
- Designed for all straight shanks.
- Equal dimensions for wet and MQL tools.



ERICKSON

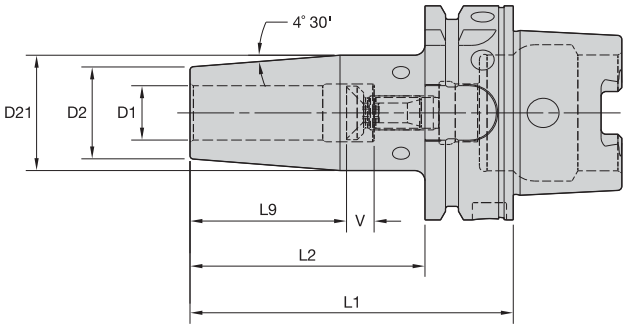
■ HCT • MQL • Metric



order number	catalog number	D1	D2	D21	L1	L2	L9	V	actuation wrench	wrench size actuation screw	length adjustment wrench	wrench size stop screw	kg
5006410	**HSK63AHCTMQL1C06080M**	6	25,7	50	80	34	27	10	**170.135**	5 mm	**170.002**	2.5 mm	1,00
5006411	**HSK63AHCTMQL1C08080M**	8	27,7	50	80	34	27	10	**170.135**	5 mm	**170.003**	3 mm	1,02
5006413	**HSK63AHCTMQL1C10085M**	10	29,7	50	85	39	31	10	**170.135**	5 mm	**170.004**	4 mm	1,06
5006414	**HSK63AHCTMQL1C12090M**	12	31,6	50	90	45	36	10	**170.135**	5 mm	–	5 mm	1,09
5006415	**HSK63AHCTMQL1C14090M**	14	33,6	50	90	46	36	10	**170.135**	5 mm	–	5 mm	1,11
5006416	**HSK63AHCTMQL1C16095M**	16	37,6	50	95	52	39	10	**170.135**	5 mm	–	5 mm	1,21
5006417	**HSK63AHCTMQL1C18095M**	18	39,6	50	95	52	39	10	**170.135**	5 mm	–	5 mm	1,24
5006418	**HSK63AHCTMQL1C20100M**	20	41,6	50	100	58	41	10	**170.135**	5 mm	–	5 mm	1,31
5006419	**HSK63AHCTMQL1C25120M**	25	49,8	70	120	53	47	10	**170.136**	6 mm	**170.005**	5 mm	2,10
5006430	**HSK63AHCTMQL1C32125M**	32	59,8	75	125	59	51	10	**170.136**	6 mm	**170.005**	5 mm	2,45

NOTE: Do not overtorque actuation screw. Tighten by hand until stop is felt.
Wrenches must be ordered separately.
Supplied with adjusting stop screw.
Reduction sleeves are available and must be ordered separately.
HSK coolant unit and wrench are available and must be ordered separately.
Shank of the cutting tool according to DIN 69090.

- Balanceable — fine tune with optional M6 set screws.
- Suitable for carbide and HSS cutting tools (requirements below).



Cutting Tool Shank Requirements metric (ISO standard)

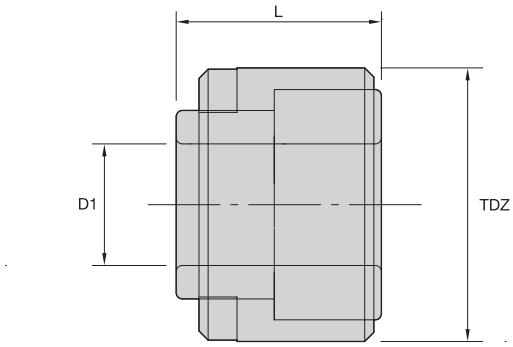
cutting tool shank diameter	tolerance	
3	h4	0,000/-0,003
4	h4	0,000/-0,004
5	h5	0,000/-0,005
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013
32	h6	0,000/-0,016

ERICKSON

■ HPVTT • MQL • Metric

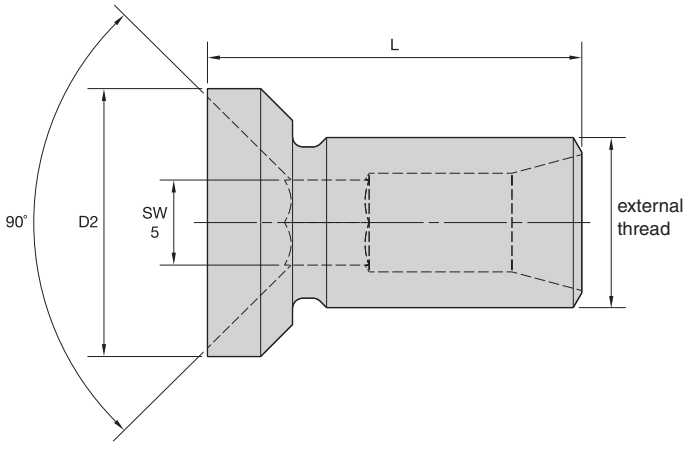
order number	catalog number	D1	D2	D21	L1	L2	L9	V	screw	wrench size stop screw	kg
5008181	HSK63AHPVTTMQL1C06080M	6	21	27	80	54	26	10,0	06ASMQL1C05170M	2.5 mm	0,82
5008182	HSK63AHPVTTMQL1C08080M	8	21	27	80	54	26	10,0	08ASMQL1C06180M	3 mm	0,82
5008183	HSK63AHPVTTMQL1C10085M	10	24	32	85	59	31	10,0	10ASMQL1C08180M	4 mm	0,90
5008184	HSK63AHPVTTMQL1C12090M	12	24	32	90	64	36	10,0	12ASMQL1C10180M	5 mm	0,91
5008185	HSK63AHPVTTMQL1C14090M	14	27	34	90	64	36	10,0	14ASMQL1C10195M	5 mm	0,96
5008186	HSK63AHPVTTMQL1C16095M	16	27	34	95	69	39	10,0	16ASMQL1C10220M	5 mm	0,97
5008187	HSK63AHPVTTMQL1C18095M	18	33	42	95	69	39	10,0	18ASMQL1C10220M	5 mm	1,14
5008188	HSK63AHPVTTMQL1C20100M	20	33	42	100	74	41	10,0	20ASMQL1C10235M	5 mm	1,16
5008189	HSK63AHPVTTMQL1C25115M	25	44	53	115	89	47	10,0	25ASMQL1C10275M	5 mm	1,73
5008210	HSK63AHPVTTMQL1C32120M	32	44	53	120	94	51	10,0	32ASMQL1C10305M	5 mm	1,61

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
Supplied with adjusting stop screw.
Optional M6~1.0P x 5mm lg fine-balancing screw set (10 pieces) is available.
Order number is MS1276PKG and must be ordered separately.
HSK coolant unit and wrench are available and must be ordered separately.
Shank of the cutting tool according to DIN 69090.



FP • MQL

order number	catalog number	D1 mm	D1 in	L mm	L in	TDZ
5086819	HSK40AFPMQL1C050095M	5,00	.197	9,50	.374	M12 X 1.0
5086840	HSK50AFPMQL1C064115M	6,40	.252	11,50	.453	M16 X 1.0
5086841	HSK63AFPMQL1C080135M	8,00	.315	13,50	.532	M18 X 1.0
5086842	HSK80AFPMQL1C080155M	8,00	.315	15,50	.610	M20 X 1.5
5086843	HSK100AFPMQL1C080175M	8,00	.315	17,50	.689	M24 X 1.5



AS • MQL

order number	catalog number	D2 mm	D2 in	L mm	L in	external thread size	I.D. drive size
5086710	06ASMQL1C05170M	6	.226	17,00	.669	M5	2.5 mm
5086711	08ASMQL1C06180M	8	.305	18,00	.709	M6	3 mm
5086712	10ASMQL1C08180M	10	.384	18,00	.709	M8 X 1	4 mm
5086713	12ASMQL1C10180M	12	.463	18,00	.709	M10 X 1	5 mm
5086714	14ASMQL1C10195M	14	.541	19,50	.768	M10 X 1	5 mm
5086715	16ASMQL1C10220M	16	.620	22,00	.866	M10 X 1	5 mm
5086716	18ASMQL1C10220M	18	.699	22,00	.866	M10 X 1	5 mm
5086717	20ASMQL1C10235M	20	.778	23,50	.925	M10 X 1	5 mm
5086718	25ASMQL1C10275M	25	1.026	27,50	1.083	M10 X 1	5 mm
5086719	32ASMQL1C10305M	32	1.250	30,50	1.201	M10 X 1	5 mm

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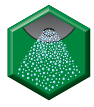
Solid End Milling Icons

 Plunge Milling	 Ramping: Blank	 Slotting: Ball Nose	 Slotting: Ball Nose with AP Dimension
 Slotting: Square End	 Slotting: Square End with AP Dimension	 Side Milling/Shoulder Milling: Ball Nose	 Side Milling/Shoulder Milling: Ball Nose with AE/AP Dimension
 Side Milling/Shoulder Milling: Square End	 Side Milling/Shoulder Milling: Square End with AE/AP Dimension	 3D Profiling	 HSS-M42
 Corner Style: Ball Nose	 Corner Style: Corner Chamfer	 Corner Style: Corner Radius	 Corner Style: Square End
 Shank: Cylindrical Plain	 Shank: Cylindrical Weldon®	 Shank: **SAFE-LOCK**™	 Shank: NAS986 5.4D
 Helix Angle: 38°	 Helix Angle: 43°	 Tool Dimensions: Flute Configuration: 4	 Tool Dimensions: Flute Configuration: 5
 Tool Dimensions: Flute Configuration: 6			

Indexable Milling Icons

 Face Milling	 Helical Milling	 Plunge Milling	 Ramping: Blank
 Slotting: Square End	 Side Milling/Shoulder Milling: Ball Nose	 Side Milling/Shoulder Milling: Square End	 3D Profiling
 Pocketing	 Shank: Cylindrical Plain	 Shank: Cylindrical Plain Weldon® 2 Flat	 Shank: Screw-On
 Shank: Shell Mill			

Tooling Systems Icons

 Shank: Cylindrical Plain	 Shank: Cylindrical Plain ≤H6	 Shank: Cylindrical Weldon®	 Shank: Weldon ≤H6
 Shank: Whistle Notch™	 Shank: Whistle Notch ≤H6	 Shank: SK BT (MAS-403-BT)	 Shank: SK DV (DIN 69871)
 Shank: SK CAT Drawbar Thread	 Shank: HSK A/DIN 69893	 Shank: Shell Mill	 Shank: KM-TS™ (ISO 26622)
 Shank: Square	 Shank: KM4X™	 Shank: **SAFE-LOCK**™ h6	 Axial Adjustments: End
 Axial Adjustments: Side	 Balance-by-Design	 Balance: G 2.5@15,000 min^{-1}	 Balance: G 2.5@15,000 min^{-1}
 Balance: G2.5@15,000 min^{-1}	 Tap Dimensions: DIN 1835/E	 Tap Dimensions: DIN 1835/B	 Collet: ER DIN 6499
 Runout ≤3	 Through Coolant: Radial: Drilling	 Through Coolant: Radial: Indexable Milling	 MLQ (Minimum Quantity Lubricant): Axial Drilling
 Axial: Drilling	 Through Coolant: 100 bar	 Through Coolant: 1500 psi	 Through Adapter Face
 ISO 26622	 Tunable Bar/Milling		

DIN — German Institute for Standardization

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WIDIA™

DIN ISO 513	VDI 3323	Material		Condition	Rm N/mm²	Hardness HB 30	Examples
P	1	Unalloyed steel/cast steel	C<0,25%	G	420	125	9 SMn 28, St 37.3, C 10, Ck 22, GS-16 Mn 5
	2		0,25≤C<0,55%	G	650	190	35 S 20, GS-45, GS-52, St 52.3, C 25, C 45, Ck 45, Cf 53
	3	Free cutting steel		V	850	250	35 S 20, GS-45, GS-52, St 52.3, C 25, C 45, Ck 45, Cf 53
	4		0,55%≤C	G	750	220	GS-60, 60 S 20, C 60, Ck 67, C 60 W, Ck 75, C 105 W 1, C 110 W
	5			V	1000	300	GS-60, 60 S 20, C 60, Ck 67, C 60 W, Ck 75, C 105 W 1, C 110 W
	6	Low-alloyed steel/cast steel		G	600	180	15 Cr 3, 16 MnCr 5, 17 CrNiMo 6, 25 CrMo 4, 29 CrMoV 9, 30 CrNiMo8
	7			V	930	275	31 CrV 3, 42 CrMo 4, 51 CrV 4, 62 SiMnCr 4, 100 Cr 6, G-105 W 1,
	8			V	1000	300	105 WCr 6
	9			V	1200	350	105 WCr 6
	10	High-alloyed steel/cast steel		G	680	200	X 210 Cr 12, X 40 CrMoV 5 1, X 30 WCrV 9 3, X 85 CrMoV 18 2,
	11	Tool steel		V	1100	325	X 38 CrMoV 5 3, X 23 CrNi 17, X 155 CrVMo 12 1, S 6-5-2-5
	12	Stainless steel/cast steel		FE/MA	680	200	1.4000, 1.4005, 1.4021, 1.4109, 1.4119, 1.4120, 1.4313, 1.4510, 1.4512, 1.4523
	13.1			MA	820	240	1.4000, 1.4002, 1.4005, 1.4006, 1.4024, 1.4119, 1.4120, 1.4313, 1.4510, 1.4512, 1.4523
	13.2			MA-PH	1060	330	1.4542, 1.4548, 1.4923
M	14.1	Stainless steel/cast steel		AU	600	180	1.4301, 1.4401, 1.4436, 1.4541, 1.4550, 1.4568, 1.4571, 1.4573, 1.4580
	14.2			DU	740	230	1.4362, 1.4417, 1.4410, 1.4460, 1.4462, 1.4575, 1.4582
	14.3			S-AU	680	200	1.4465, 1.4505, 1.4506, 1.4529 (254SMO), 1.4539, 1.4563, 1.4577, 1.4586, 654SMO
	14.4			AU-PH	1060	330	1.4504, 1.4568
K	15	Gray iron GG		FE/PE		180	GG-10, GG-15, GG-170 HB
	16			PE		260	GG20, GG-25, GG-30, GG-25Cr
	17	Nodular iron GGG		FE		160	GGG-35.3, GGG-40, GGG-50, GGV-30
	18			PE		250	≥GGG-60, GGV-40
	19	Malleable iron GTS/GTW		FE		130	GTS-35-10, GTS-45-06, GTW-S-38-12
	20			PE		230	GTW-35-04, GTS-55-04, GTS-65-02
N	21	Wrought aluminum alloys		NAG		60	Al 99,5, AlMg 1
	22			AG		100	AlCuMg 1, AlMgSiPb, AlMgSi 1
	23	Cast aluminum alloys	Si<12%	NAG		75	G-AlSi 10 Mg, G-AlSi12
	24			AG		90	G-AlCu 5 Si 3
	25		Si>12%			130	G-AlSi 17, G-AlSi 23
	26	Copper/copper alloys	Pb>1%			110	Free cutting brass, CuNi 18 Zn 19 Pb
	27					90	Brass, red brass, CuZn33, CuZn-/CuSnZn-alloys
	28					100	Bronze, electrolytic copper, CuNi 3 Si, CuSn-alloys
	29	Non-metals					Thermosetting plastics, FVK, Fiber reinforced plastics, Bakelit
	30						Hard rubber
S	31	High-temperature alloys	Fe-based	G		200	1.4864, 1.4865, 1.4876
	32			AG		280	1.4864, 1.4865, 1.4876
	33		Ni-/Co-based	G		250	INCONEL® 718, NIMONIC® 80 A, Hastelloy®, UDIMET®
	34			AG		350	INCONEL® 718, NIMONIC® 80 A, Hastelloy®, UDIMET®
	35			GO		320	INCONEL® 718, NIMONIC® 80 A, Hastelloy®, UDIMET®
	36	Titanium/titanium alloys, Alpha-/Beta-alloys			400		Titanium
	37			AG	1050		TiAl 6 V 4
H	38.1	Steel		H		45 HRC	90 MnV 8, Hardox 400
	38.2			H		55 HRC	Hardox 500
	39.1			H		60 HRC	HSS, 90 MnV 8
	39.2			H		>62 HRC	HSS, 90 MnV 8
	40.1	Chilled cast iron		GO		400	G-X 260 Cr 27, G-X 260 NiCr 42, G-X 300 CrNiSi 9 5 2, G-X 330 NiCr 42
	40.2			GO		>440	G-X 260 Cr 27, G-X 260 NiCr 42, G-X 300 CrNiSi 9 5 2, G-X 330 NiCr 42
	41.1	Cast iron		H		55 HRC	G-X 300 NiMo 3 Mg
	41.2			H		>57 HRC	G-X 300 NiMo 3 Mg

Material Groups and Conditions

Many materials — mostly steels — can be available in various microstructures that differ in their machinability significantly. Those materials are part of several material groups depending on their actual conditions.

AG — Aged
AU — Austenitic
BF — Heat treated to specified strength
BG — Heat treated to specified microstructure
BY — Heat treated to improved machinability
DU — Stainless steel duplex (austenitic-ferritic)
FE — Ferritic
G — Annealed
GG — Gray cast iron
GGG — Nodular cast iron
GO — Cast
H — Hardened
MA — Martensitic
N — Normalized
NAG — Non-aged (non-aging)
PH — Precipitation hardened
S-AU — Superaustenitic
U — Untreated
V — Heat treated
var1 — Variable

Metalcutting Safety

IMPORTANT SAFETY INSTRUCTIONS

Read before using the tools in this catalog!

Projectile and Fragmentation Hazards

Modern metalcutting operations involve high spindle and cutter speeds and high temperatures and cutting forces. Hot metal chips may fly off the workpiece during metalcutting. Although cutting tools are designed and manufactured to withstand high cutting forces and temperatures, they can sometimes fragment, particularly if they are subjected to over-stress, severe impact, or other abuse.

To avoid injury:

- Always wear appropriate personal protective equipment, including safety goggles, when operating metalcutting machines or working nearby.
- Always make sure all machine guards are in place.

Breathing and Skin Contact Hazards:

Grinding carbide or other advanced cutting tool materials produce dust or mist containing metallic particles. Breathing this dust or mist — especially over an extended period — can cause temporary or permanent lung disease or make existing medical conditions worse. Contact with this dust or mist can irritate eyes, skin, and mucous membranes and may make existing skin conditions worse.

To avoid injury:

- Always wear breathing protection and safety goggles when grinding.
- Provide ventilation control and collect and properly dispose of dust, mist, or sludge from grinding.
- Avoid skin contact with dust or mist.

For more information, read the applicable Material Safety Data Sheet provided by Kennametal and consult General Industry Safety and Health Regulations, Part 1910, Title 29 of the Code of Federal Regulations.

These safety instructions are general guidelines. Many variables affect machining operations. It is impossible to cover every specific situation. The technical information included in this catalogue and recommendations on machining practices may not apply to your particular operation. For more information, consult Kennametal's Metalcutting Safety booklet, available free from Kennametal at 724.539.5747 or fax 724.539.5439. For specific product safety and environmental questions, contact our Corporate Environmental Health and Safety Office at 724.539.5066 or fax 724.539.5372.

DIN ISO 513	VDI 3323	Material		Condition	Rm N/mm²	Hardness HB 30	Examples
P	1	Unalloyed steel/cast steel	C<0.25%	G	420	125	1010, 1015, 1020, 1023, 1102, 1108, 1109, 1213, 1215
	2		0.25≤C<0.55%	G	650	190	1025, 1030, 1035, 1040, 1041, 1045, 1050, 1140, 1141, 1146, 1330
	3	Free cutting steel		V	850	250	1025, 1030, 1035, 1040, 1041, 1045, 1050, 1140, 1141, 1146, 1330
	4		0.55%≤C	G	750	220	1055, 1060,1151
	5			V	1000	300	1055, 1060,1151
	6	Low-alloyed steel/cast steel		G	600	180	4130, 4140, 4150, 4320, 4340, 5120, 5132, 5135, 5140, 5155, 6150, 8620, 8625, 9260, A 355/A, A 355/C, A 355/D, A485/2, A 485/3, E-3310
	7			V	930	275	
	8			V	1000	300	
	9			V	1200	350	
	10	High-alloyed steel/cast steel		G	680	200	440 C, 613, EV 8, M2 regular C, T1
	11	Tool steel		V	1100	325	440 C, 613, EV 8, M2 regular C, T1
M	12	Stainless steel/cast steel		FE/MA	680	200	403, 405, 409, 410, 410 S, 416, 420, 430, 430 Ti, 439, 446,
	13.1			MA	820	240	420, 430 F, 431, 434, 440 B, 440 C
	13.2			MA-PH	1060	330	630, 630
	14.1	Stainless steel/cast steel		AU	600	180	301, 303, 304, 304 L, 304 LN, 305, 309 S, 316, 316 L, 316 LN, 317 L, 317 LN
	14.2			DU	740	230	201, 329, 2205
	14.3			S-AU	680	200	310 mod
	14.4			AU-PH	1060	330	17-7 PH, 630
K	15	Gray iron GG		FE/PE		180	Class 20 B, Class 25 B,
	16			PE		260	Class 30 B, Class 40 B, Class 45 B, Class 50 B
	17	Nodular iron GGG		FE		160	Class 50 B, Grade 60-40-18, Grade 65-45-12
	18			PE		250	Grade 80-55-06, Grade 100-70-03, Grade120-90-02
	19	Malleable iron GTS/GTW		FE		130	Grade 22010, 32510
	20			PE		230	GTW-35-04, GTS-55-04, GTS-65-02
N	21	Wrought aluminum alloys		NAG		60	6061, 2014-T6, 2011-T3, 2024-T4, A2, 7075, 1000, AlMg 1, AlCuMg 1, AlMgSiPb, AlMgSi 1
	22			AG		100	6061, 2014-T6, 2011-T3, 2024-T4, A2, 7075, 1000, AlMg 1, AlCuMg 1, AlMgSiPb, AlMgSi 1
	23	Cast aluminum alloys	Si<12%	NAG		75	A380-1, A280, A390-1, G-AlSi 10 Mg, G-AlSi12, G-AlCu 5 Si 3, G-AlSi 17, G-AlSi 23
	24			AG		90	A380-1, A280, A390-1, G-AlSi 10 Mg, G-AlSi12, G-AlCu 5 Si 3, G-AlSi 17, G-AlSi 23
	25		Si>12%			130	A380-1, A280, A390-1, G-AlSi 10 Mg, G-AlSi12, G-AlCu 5 Si 3, G-AlSi 17, G-AlSi 23
	26	Copper/copper alloys	Pb>1%			110	Free cutting brass, CuNi 18 Zn 19 Pb
	27					90	Brass, red brass, CuZn33, CuZn-/CuSnZn-alloys
	28					100	Bronze, electrolytic copper, CuNi 3 Si, CuSn-alloys
	29	Non-metals					Thermosetting plastics, FVK, Fiber reinforced plastics, Bakelit
	30						Hard rubber
S	31	High-temperature alloys	Fe-based	G		200	A-286, 321, 321 H, 330, 409, EV 9, EV11, HNV3
	32			AG		280	A-286, 321, 321 H, 330, 409, EV 9, EV11, HNV3
	33		Ni-/Co-based	G		250	INCONEL® 601/617/625/700/706/718, NIMONIC® 80 A, Hastelloy®, UDIMET®, Haynes® 25, Waspaloy, Rene41, Stelite®
	34			AG		350	INCONEL® 601/617/625/700/706/718, NIMONIC® 80 A, Hastelloy®, UDIMET®, Haynes® 25, Waspaloy, Rene41, Stelite®
	35			GO		320	INCONEL® 601/617/625/700/706/718, NIMONIC® 80 A, Hastelloy®, UDIMET®, Haynes® 25, Waspaloy, Rene41, Stelite®
	36	Titanium/titanium alloys, Alpha-/Beta-alloys			400		Titanium
	37			AG	1050		TiAl 64 V
H	38.1	Steel		H		45 HRC	90 MnV 8, Hardox® 400
	38.2			H		55 HRC	Hardox 500
	39.1			H		60 HRC	HSS, 90 MnV 8
	39.2			H		>62 HRC	HSS, 90 MnV 8
	40.1	Chilled cast iron		GO		400	G-X 260 Cr 27, G-X 260 NiCr 42, G-X 300 CrNiSi 9 5 2, G-X 330 NiCr 42
	40.2			GO		>440	G-X 260 Cr 27, G-X 260 NiCr 42, G-X 300 CrNiSi 9 5 2, G-X 330 NiCr 42
	41.1	Cast iron		H		55 HRC	G-X 300 NiMo 3 Mg
	41.2			H		>57 HRC	G-X 300 NiMo 3 Mg

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BG — Heat treated to specified microstructure
BY — Heat treated to improved machinability
DU — Stainless steel duplex (austenitic-ferritic)
FE — Ferritic, AISI 400
G — Annealed
GG — Gray cast iron
GGG — Nodular cast iron
GO — Cast
H — Hardened
MA — Martensitic, AISI 400
N — Normalized
NAG — Non-aged (non-aging)
PH — Precipitation hardened
S-AU — Superaustenitic, AISI 300
U — Untreated
V — Heat treated
var1 — Variable

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World and Corporate Headquarters
Kennametal Inc.
WIDIA Products Group
1600 Technology Way
Latrobe, PA 15650 USA
Phone: 800.979.4342
E-mail: w-na.service@widia.com

European Headquarters
Kennametal Europe GmbH
WIDIA Products Group
Rheingoldstrasse 50
CH 8212 Neuhausen am Rheinfall
Switzerland
Phone: (41) 52.6750.100
E-mail: w-ch.service@widia.com

Asia-Pacific Headquarters
Kennametal (Singapore) Pte. Ltd.
WIDIA Products Group
3A International Business Park
Unit #01-02/03/05, ICON@IBP
Singapore 609935
Phone: 65.6265.9222
E-mail: w-sg.service@widia.com

India Headquarters
Kennametal India Limited
WIDIA Products Group
8/9th Mile, Tumkur Road
Bangalore - 560 073
Phone: +91 (80) 2839 4321
E-mail: w-in.service@widia.com

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