ADVANCES 2014

TURNING | SOLID END MILLING | INDEXABLE MILLING | TOOLING SYSTEMS

METRIC

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 Authorised 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 Authorised 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 Authorised 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 utilisation.
- 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 Authorised Distributors in the industry, selected for their specialised 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, 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 Authorised 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, minimising 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 Authorised 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 customisable 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 Authorised Distributor or visit ***www.widia.com****.*

Recondition

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

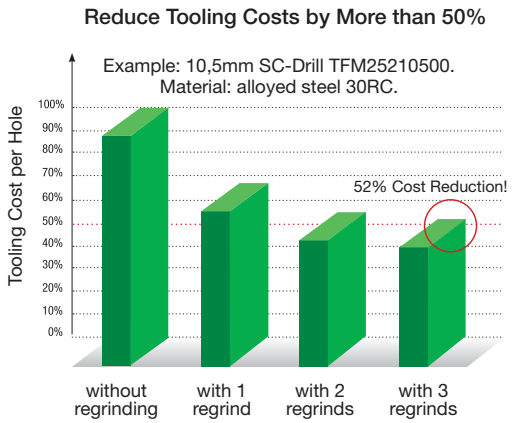
Why recondition?
Our Reconditioning Services help optimise the total value of your metalcutting tools throughout their entire life cycle by giving them “like-new” performance characteristics — with rapid turnaround time — so the tools you need are always on-hand and perform just like new.

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%.



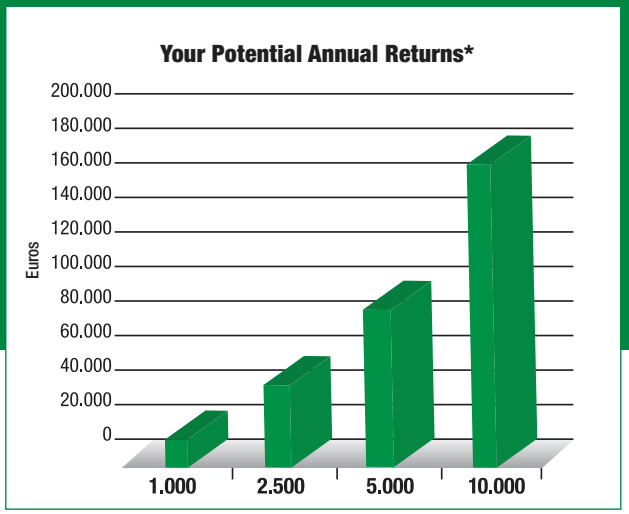
To learn more about our Reconditioning Program, contact your local Authorised Distributor or visit ***www.widia.com****.*

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 authorised 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 Authorised 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 customised 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 Authorised 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 Authorised 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 Authorised 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 optimisation.
- Hardware support.

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

WIDIA™ Branded Merchandise

SHOP. BUY. PROMOTE.

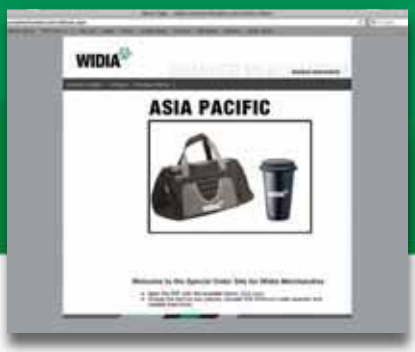
New WIDIA Branded Merchandise Available! Place Your Order Today!

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

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

Global online ordering made simple.

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



- Browse through the WIDIA 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 Authorised 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://www.facebook.com/WIDIAProductGrp

https://twitter.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 catalogue.

Throughout the WIDIA Advances 2014 Catalogue, 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 catalogue 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 catalogue 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.

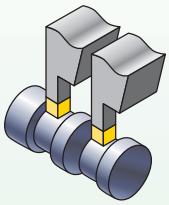
- With your scanner, centre the QR code in the camera window of your application.
- When the scanner locks onto the image, you will be on your way to the embedded information in the QR code.
- Once the webpage, video, or other information linked to the QR code opens or loads, you can freely interact.

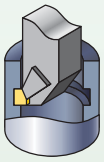
When you need information quickly on a product or an extended product catalogue, skip the web search and long website URLs, and scan the provided QR codes in this catalogue.

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

Turning

Grooving





WMT™

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

Pages: A4–A28

TopGroove™

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

Pages: A30–A71

ProGroove™

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

Pages: A72–A84

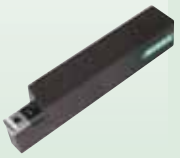
S-LOC™

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

Pages: A112–A117

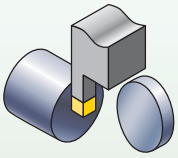
LG

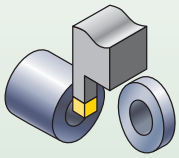
- Insert cutting widths: 8–16mm.
- O.D. cutting depths: 20–32mm.
- Wedge-clamping integral shanks tooling available.



Pages: A72–A84

Cut-Off





WMT™

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

Pages: A4–A28

Separator™

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

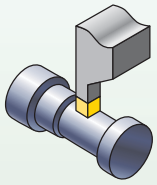
Pages: A86–A103

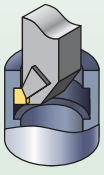
ProGroove™

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

Pages: A72–A84

Plunge and Turn





WMT™

Heavy Stock Removal in Turning Applications

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

Pages: A4–A28

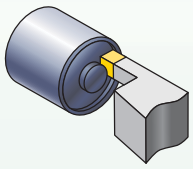
ProGroove™

For Light-Cutting Inserts

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

Pages: A72–A84

Face Grooving



WMT™

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

Pages: A4–A28

Ranger™

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

Pages: A104–A111

S-LOC™

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

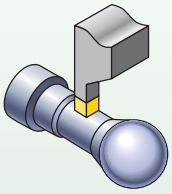
Pages: A112–A117

TopGroove™

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

Pages: A30–A71

Profiling



WMT™

For Heavy Stock Removal

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

Pages: A4–A28

TopGroove™

Moderate/Heavy Stock Removal at Shallow Profile Depths

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

Pages: A30–A71

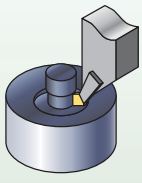
ProGroove™

For Light Cutting

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

Pages: A72–A84

Undercutting



TopGroove™

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

Pages: A30–A71

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.

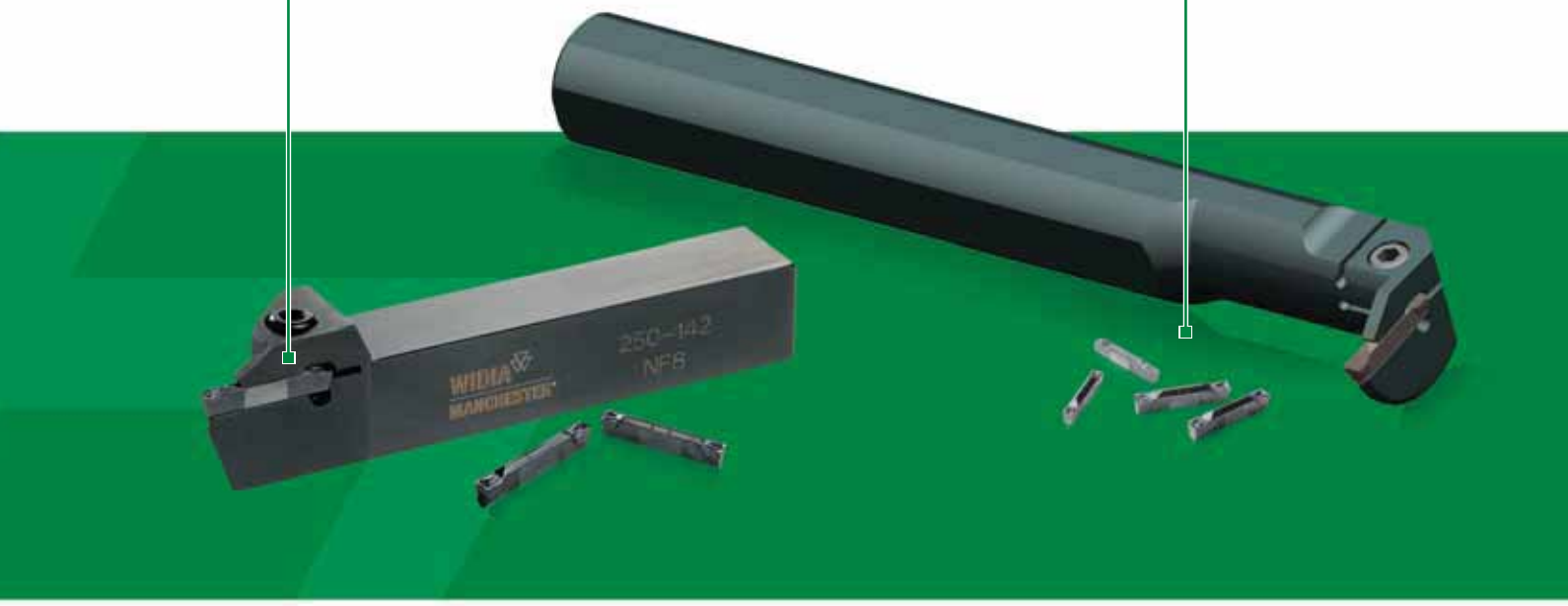
WMT

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!

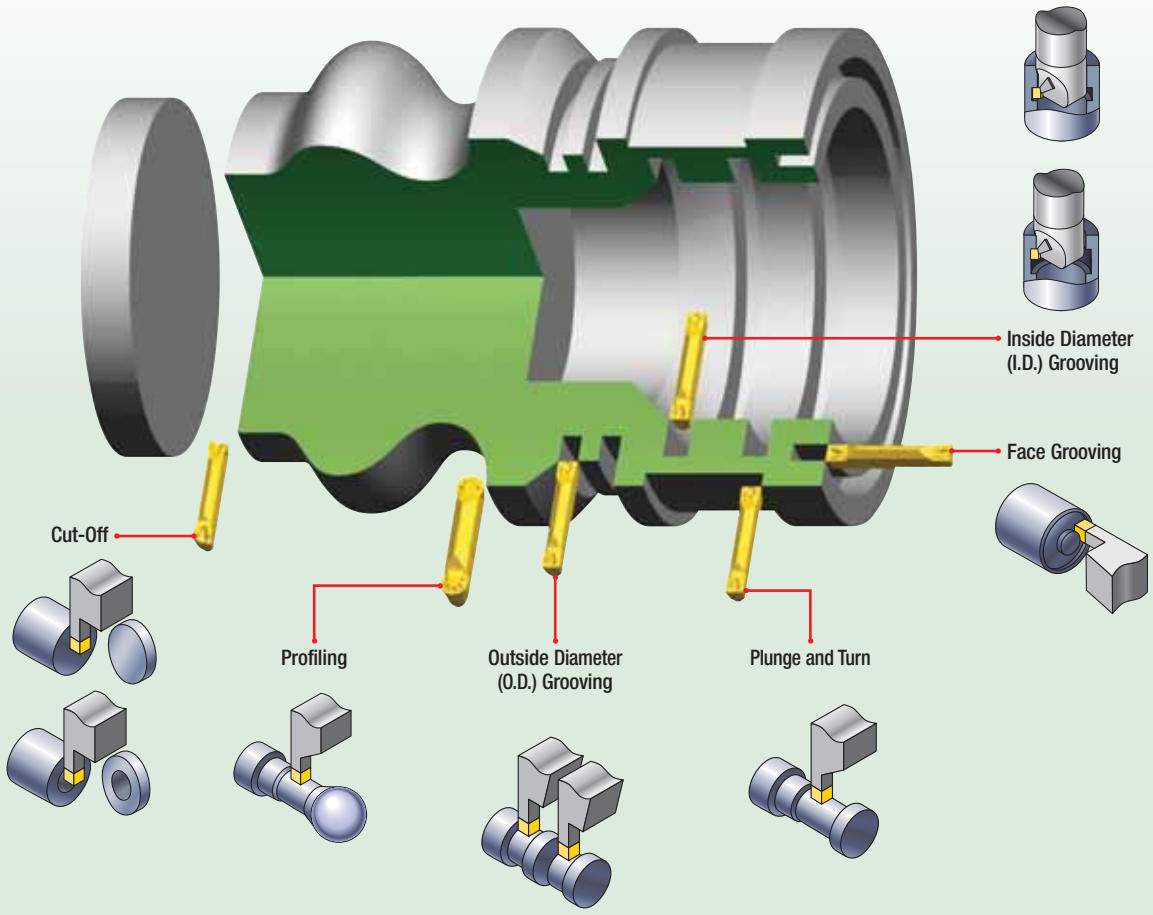
The WMT system, with its extra-long clamping area and precise insert positioning, ensures exceptionally fast and accurate machining, all-in-one tool, for your most demanding grooving, cut-off, turning, and profiling applications.

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

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

1 Choose the application to be performed:

Groove depth, width, and profile.



2 Identify the material to be machined:

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

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

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

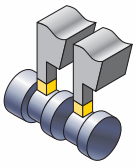
A Choose the appropriate width "W" required for the application.

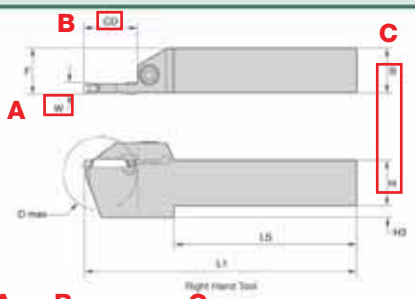
B Choose the shortest cutting depth "CD" dimension for increased tool rigidity.

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

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

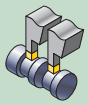
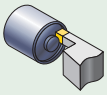
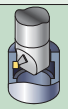
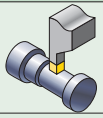
WIDIA





■ O.D. Grooving and Cut-Off

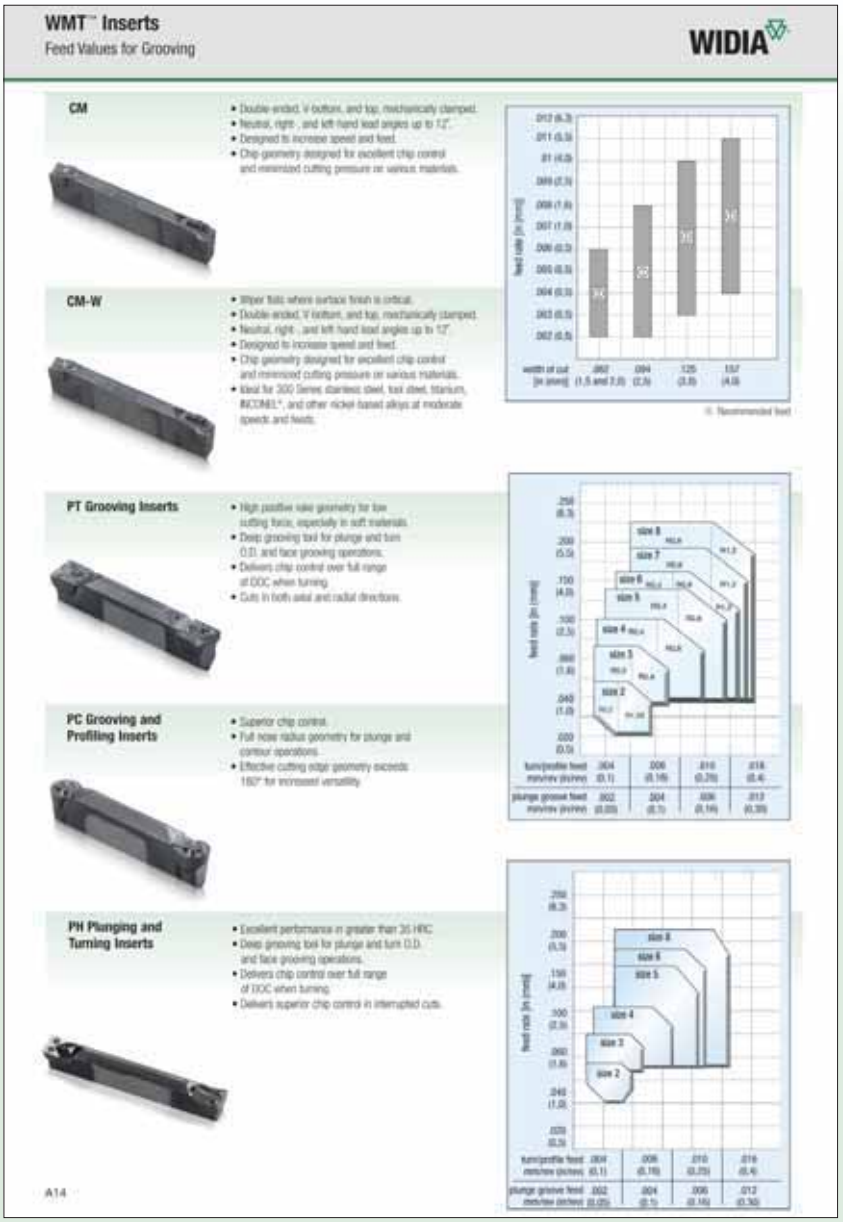
order number	new catalog number	old catalog number right hand	C H	A W	B CD	D max	F	C B	H3	L1	LS	clamp screw
3655938	WMTCR62053	250301	.375	.079	–	1.062	.375	.369	.125	4.500	3.410	606249
3655888	WMTCR62B053	250109	.375	.094	–	1.062	.375	.365	.125	4.500	3.410	606249
3655840	WMTCR82062	250303	.500	.079	–	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	3.305	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	WMTSR122B075	250-115	.750	.094	.750	–	.750	.719	.250	5.000	3.480	619205
3655934	WMTSR122S042	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	250308	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

	application	conventional toolholders	modular blades
 	O.D. Grooving and Cut-Off	pages A20–A22	page A27
	Face Grooving	pages A23–A24	page A28
	I.D. Grooving	page A25	—
	Plunge and Turn	pages A20–A22	page A27

4 Select chipbreaker style for the application:

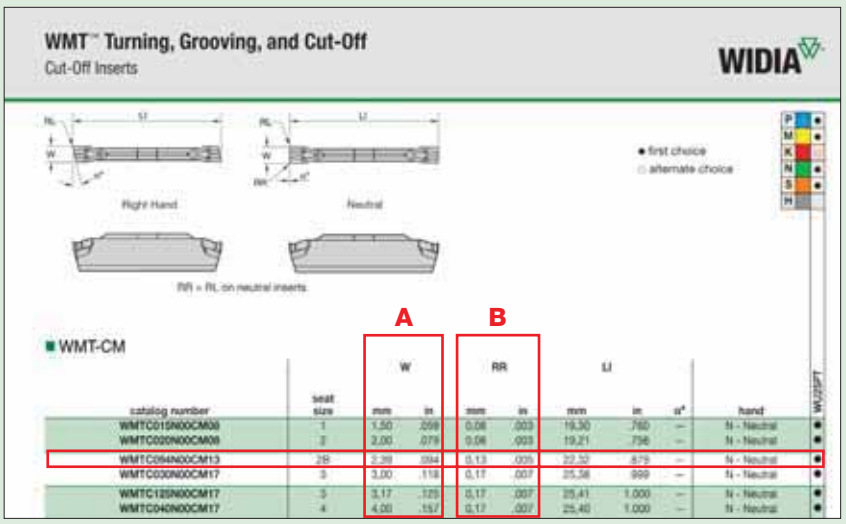
CM	Cut-off
CM-W	Cut-off with wipers
PT	Plunging and turning
PC	Profiling and turning
PH	Plunging and turning

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**.

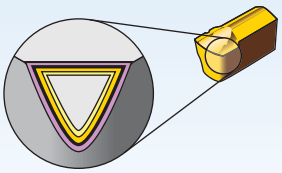
NOTE: See page A12 for cutting data.

WMT™ Turning, Grooving, and Cut-Off

Speed and Feed Chart • Metric

WIDIA

ANSI ISO S13	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		100	**100**	110	170	**175**	180	140	**150**	160	190	**200**	210	170	**175**	180
	4	A	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

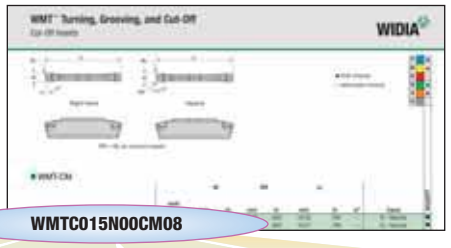
wear resistance ⟷ toughness

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			P	P	P				
			M			M	M	M				
			K			K	K	K				
			N			N	N	N				
			S			S	S	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				P	P	P				
			M				M	M	M				
			K				K	K	K				
			N				N	N	N				
			S				S	S	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		M	M	M					
			K	K	K	K	K					
			N		N	N	N					
			S		S	S	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		P	P	P					
			K		K	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, minimises 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			P	P	P					
			K				K	K	K			

WMT Identification System

Cut-Off

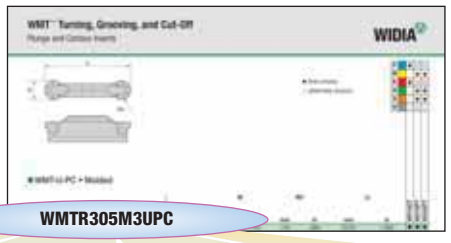


WMT	C	015	N	00	CM	08
Tooling System	Cut-Off	W in mm*10 inch*1000	Hand of Insert	Main Cutting Edge Lead Angle	Chipbreaker Geometry CM = Cut-Off CM-W = Cut-Off with Wiper	Corner Radius in mm* 10

Grooving

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

Plunge • Contour

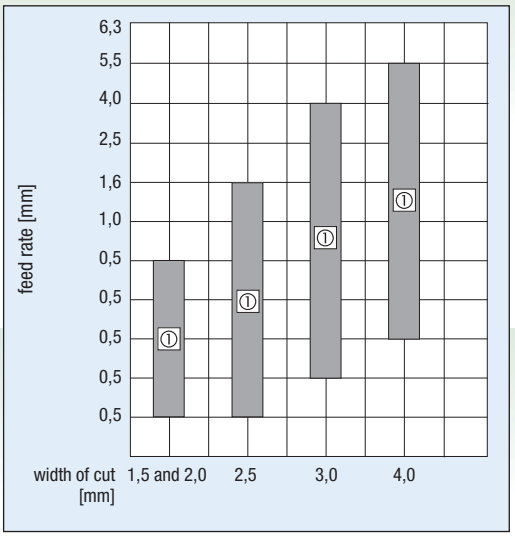


WMT	R	305	M	3	U	PC
Tooling System	Full Radius	mm*10 inch*1000	Unit of Measurement for Width **m** = mm	Seat Size	**U** = Moulded or **P** = Ground	Chipbreaker Geometry

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	—	—	—	—	—	—

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 minimised cutting pressure on various materials.



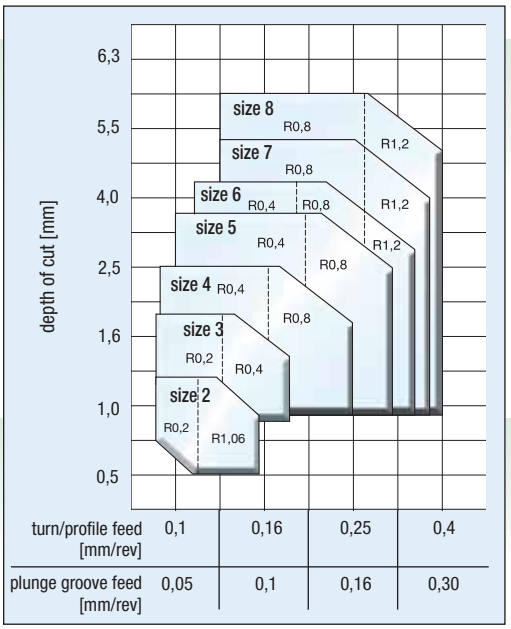
① Recommended feed

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 minimised cutting pressure on various materials.
- Ideal for 300 Series stainless steel, tool steel, titanium, INCONEL®, and other nickel-based alloys at moderate speeds and feeds.

PT Grooving Inserts

- 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.

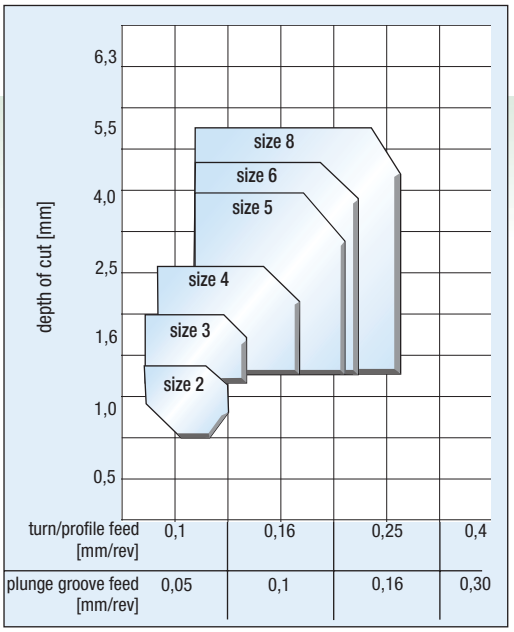


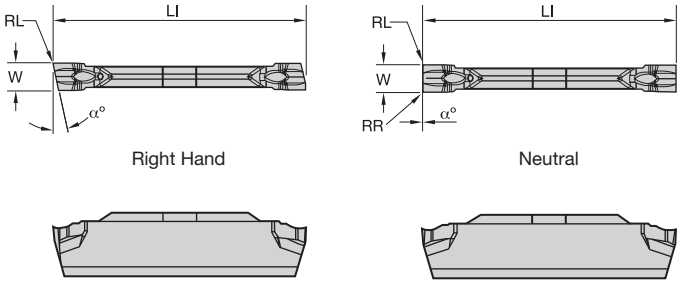
PC Grooving and Profiling Inserts

- 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.





RR = RL on neutral inserts

● first choice
○ alternate choice

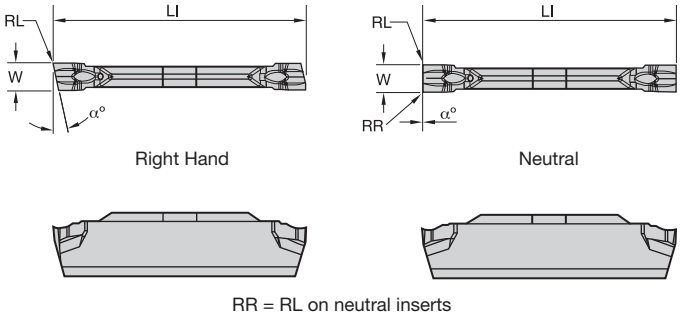
P	●
M	●
K	○
N	●
S	●
H	

WMT-CM

catalogue number	seat size	W mm	RR mm	LI mm	α°	hand	WU25PT
WMTC015N00CM08	1	1,50	0,08	19,30	–	N - Neutral	●
WMTC020N00CM08	2	2,00	0,08	19,21	–	N - Neutral	●
WMTC094N00CM13	2B	2,39	0,13	22,32	–	N - Neutral	●
WMTC030N00CM17	3	3,00	0,17	25,38	–	N - Neutral	●
WMTC125N00CM17	3	3,17	0,17	25,41	–	N - Neutral	●
WMTC040N00CM17	4	4,00	0,17	25,40	–	N - Neutral	●

catalogue number	seat size	W mm	RR mm	LI mm	α°	hand	
WMTC015L05CM08	1	1,50	0,08	19,31	5	L - Left	●
WMTC020L05CM08	2	1,99	0,08	19,21	5	L - Left	●
WMTC020L12CM08	2	2,00	0,08	19,25	12	L - Left	●
WMTC030L05CM17	3	3,00	0,17	25,34	5	L - Left	●
WMTC030L12CM17	3	3,00	0,17	25,40	12	L - Left	●
WMTC040L12CM17	4	4,00	0,17	25,40	12	L - Left	●
WMTC040L05CM17	4	4,00	0,17	25,40	5	L - Left	●

catalogue number	seat size	W mm	RL mm	LI mm	α°	hand	
WMTC015R12CM08	1	1,50	0,08	19,28	12	R - Right	●
WMTC015R05CM08	1	1,50	0,08	19,31	5	R - Right	●
WMTC020R05CM08	2	2,00	0,08	19,26	5	R - Right	●
WMTC020R12CM08	2	2,00	0,08	19,26	12	R - Right	●
WMTC094R12CM13	2B	2,39	0,13	22,28	12	R - Right	●
WMTC094R05CM13	2B	2,39	0,13	22,32	5	R - Right	●
WMTC030R05CM17	3	3,00	0,17	25,34	5	R - Right	●
WMTC030R12CM17	3	3,00	0,17	25,40	12	R - Right	●
WMTC125R05CM17	3	3,17	0,17	25,40	5	R - Right	●
WMTC125R12CM17	3	3,18	0,17	25,40	12	R - Right	●
WMTC040R05CM17	4	4,00	0,17	25,40	5	R - Right	●
WMTC040R12CM17	4	4,00	0,17	25,40	12	R - Right	●



RR = RL on neutral inserts

● first choice
○ alternate choice

P	●
M	●
K	○
N	●
S	●
H	

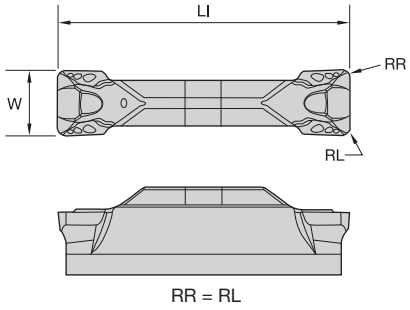
Turning

WMT-CM-W

catalogue number	seat size	W mm	RR mm	LI mm	α°	hand	WU25PT
WMTC015N00CMW08	1	1,50	0,08	19,30	–	N - Neutral	●
WMTC020N00CMW08	2	2,00	0,08	19,21	–	N - Neutral	●
WMTC094N00CMW13	2B	2,39	0,13	22,32	–	N - Neutral	●
WMTC030N00CMW17	3	3,00	0,17	25,38	–	N - Neutral	●
WMTC125N00CMW17	3	3,18	0,17	25,41	–	N - Neutral	●
WMTC040N00CMW17	4	4,00	0,17	25,40	–	N - Neutral	●

catalogue number	seat size	W mm	RR mm	LI mm	α°	hand	
WMTC020L12CMW08	2	2,00	0,08	19,27	12	L - Left	●
WMTC030L05CMW17	3	3,00	0,17	25,35	5	L - Left	●
WMTC030L12CMW17	3	3,00	0,17	25,40	12	L - Left	●

catalogue number	seat size	W mm	RL mm	LI mm	α°	hand	
WMTC020R05CMW08	2	2,00	0,08	19,20	5	R - Right	●
WMTC020R12CMW08	2	2,00	0,08	19,27	12	R - Right	●
WMTC094R12CMW13	2B	2,39	0,13	22,29	12	R - Right	●
WMTC094R05CMW13	2B	2,39	0,13	22,32	5	R - Right	●
WMTC030R05CMW17	3	2,00	0,17	25,35	5	R - Right	●
WMTC030R12CMW17	3	2,00	0,17	25,40	12	R - Right	●
WMTC125R05CMW17	3	3,17	0,17	25,41	5	R - Right	●
WMTC125R12CMW17	3	3,17	0,17	25,41	12	R - Right	●



RR = RL

● first choice
○ alternate choice

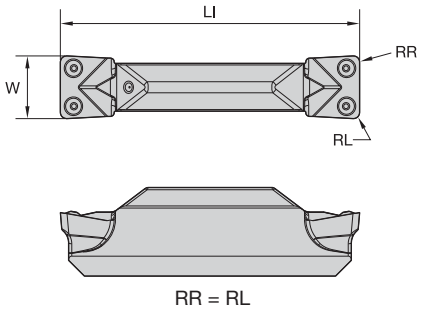
		WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
P		●	●	○	○	
M				●	●	○
K		●	●	○	○	
N				●	●	●
S				●	●	●
H				○		

WMT-U-PT • Moulded

catalogue number	seat size	W mm	RR mm	LI mm	WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
WMTS205M2U02PT	2	2,05	0,15	19,23	●	●	●	●	
WMTS305M3U03PT	3	3,05	0,31	25,81	●	●	●	●	
WMTS305M3U06PT	3	3,05	0,61	25,78	●	●	●	●	
WMTS405M4U03PT	4	4,05	0,31	25,53	●	●	●	●	
WMTS405M4U06PT	4	4,05	0,61	25,53	●	●	●	●	
WMTS505M5U03PT	5	5,05	0,30	28,76	●	●	●	●	
WMTS505M5U06PT	5	5,05	0,61	28,76	●	●	●	●	
WMTS605M6U03PT	6	6,05	0,30	28,76	●	●	●	●	
WMTS605M6U06PT	6	6,05	0,59	28,76	●	●	●	●	
WMTS805M8U06PT	8	8,05	0,61	28,70	●	●	●	●	
WMTS805M8U15PT	8	8,05	1,50	28,71	●	●	●	●	

WMT-P-PT • Precision

catalogue number	seat size	W mm	RR mm	LI mm	WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
WMTS200M2P02PT	2	2,00	0,15	19,10			●	●	
WMTS094I2BP02PT	2B	2,38	0,15	22,15			●	●	
WMTS094I2BP04PT	2B	2,38	0,38	22,14			●	●	
WMTS300M3P03PT	3	3,00	0,31	25,65			●	●	●
WMTS300M3P06PT	3	3,00	0,61	25,65			●	●	
WMTS125I3P03PT	3	3,17	0,23	25,40			●	●	
WMTS125I3P08PT	3	3,17	0,76	25,40			●	●	
WMTS400M4P03PT	4	4,00	0,31	25,40			●	●	●
WMTS400M4P06PT	4	4,00	0,60	25,40			●	●	
WMTS188I5P03PT	5	4,76	0,26	28,63			●	●	
WMTS188I5P08PT	5	4,77	0,76	28,63			●	●	
WMTS500M5P03PT	5	5,00	0,30	28,63			●	●	●
WMTS500M5P06PT	5	5,00	0,61	28,63			●	●	
WMTS600M6P03PT	6	6,00	0,30	28,63			●	●	
WMTS600M6P06PT	6	6,00	0,58	28,63			●	●	
WMTS250I6P08PT	6	6,34	0,76	28,63			●	●	
WMTS250I6P03PT	6	6,35	0,25	28,63			●	●	
WMTS800M8P06PT	8	8,00	0,61	28,57			●	●	
WMTS800M8P15PT	8	8,00	1,50	28,57			●	●	



RR = RL

● first choice
○ alternate choice

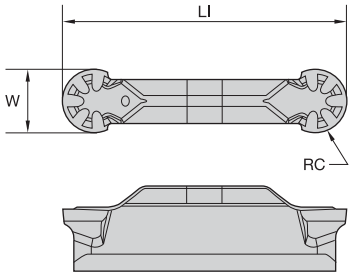
P	●	●	○	○	
M			●	●	○
K	●	●	○	○	
N			●	●	●
S			●	●	●
H			○		

WMT-U-PH • Moulded

catalogue number	seat size	W mm	RR mm	L1 mm	WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
WMTS305M3U03PH	3	3,05	0,30	25,81			●	●	
WMTS305M3U06PH	3	3,05	0,60	25,81			●	●	
WMTS405M4U03PH	4	4,05	0,30	25,53			●	●	
WMTS405M4U06PH	4	4,05	0,60	25,53			●	●	
WMTS505M5U03PH	5	5,05	0,30	28,76			●	●	
WMTS505M5U06PH	5	5,05	0,60	28,76			●	●	
WMTS605M6U03PH	6	6,05	0,30	28,76			●	●	
WMTS605M6U06PH	6	6,05	0,60	28,76			●	●	
WMTS805M8U03PH	8	8,05	0,30	28,70			●	●	
WMTS805M8U06PH	8	8,05	0,60	28,70			●	●	

WMT-P-PH • Precision

catalogue number	seat size	W mm	RR mm	L1 mm	WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
WMTS300M3P03PH	3	3,00	0,30	25,65			●	●	●
WMTS300M3P06PH	3	3,00	0,60	25,65			●	●	●
WMTS125I3P03PH	3	3,18	0,25	25,40			●	●	
WMTS125I3P08PH	3	3,18	0,75	25,40			●	●	
WMTS156I4P03PH	4	3,95	0,30	25,40			●	●	
WMTS156I4P08PH	4	3,96	0,75	25,40			●	●	
WMTS400M4P03PH	4	4,00	0,30	25,40			●	●	●
WMTS400M4P06PH	4	4,00	0,60	25,40			●	●	●
WMTS188I5P03PH	5	4,77	0,25	28,63			●	●	
WMTS188I5P08PH	5	4,77	0,75	28,63			●	●	
WMTS500M5P03PH	5	5,00	0,30	28,63			●	●	●
WMTS500M5P06PH	5	5,00	0,60	28,63			●	●	●
WMTS600M6P03PH	6	6,00	0,30	28,63			●	●	
WMTS600M6P06PH	6	6,00	0,60	28,63			●	●	
WMTS250I6P08PH	6	6,32	0,75	28,63			●	●	
WMTS250I6P03PH	6	6,35	0,25	28,63			●	●	
WMTS312I8P03PH	8	7,92	0,25	28,57			●	●	
WMTS312I8P08PH	8	7,92	0,75	28,57			●	●	
WMTS800M8P03PH	8	8,00	0,30	28,57			●	●	
WMTS800M8P06PH	8	8,00	0,60	28,57			●	●	



● first choice
○ alternate choice

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

WMT-U-PC • Moulded

catalogue number	seat size	W mm	RC mm	LI mm	WP10CT	WU10PT	WU25PT
WMTR305M3UPC	3	3,05	1,53	25,53	●	●	●
WMTR405M4UPC	4	4,05	2,03	25,58	●	●	●
WMTR505M5UPC	5	5,05	2,53	29,01	●	●	●
WMTR605M6UPC	6	6,05	3,03	28,77	●	●	●
WMTR805M8UPC	8	8,05	4,03	29,22	●	●	●

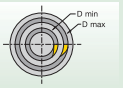
WMT-P-PC • Precision

catalogue number	seat size	W mm	RC mm	L1 mm			
WMTR300M3PPC	3	3,00	1,50	25,40		●	●
WMTR400M4PPC	4	4,00	2,00	25,45		●	●
WMTR188I5PPC	5	4,78	2,39	28,65		●	●
WMTR500M5PPC	5	5,00	2,50	28,88		●	●
WMTR600M6PPC	6	6,00	3,00	28,65		●	●
WMTR250I6PPC	6	6,36	3,18	29,01		●	●
WMTR312I8PPC	8	7,94	3,96	29,00		●	●
WMTR800M8PPC	8	8,00	4,00	29,08		●	●

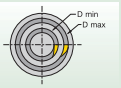
WMT™ System

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	2525	M	6	19	–	070-100
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 Height x Width, in mm	Tool Length H = 100 J = 110 K = 125 L = 140 M = 150 P = 170	Seat Size 1 2 2B 3 4 5 6 8	Max Grooving Depth CD max in mm		Face Grooving Diameter diameters are min and max for outer face groove diameter 999 = unlimited D max D min – D max in mm e.g. 070–100 = 70 mm D min 100 mm D max 

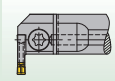
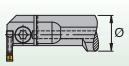
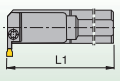
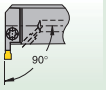
Modular Blades

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

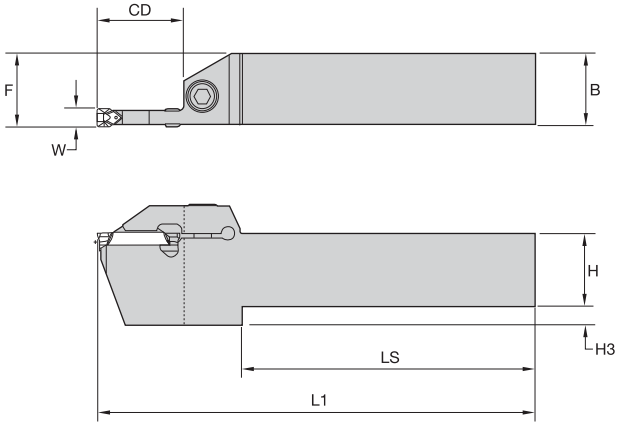
WGM	S	R	2525
Tooling System	Tool Style	Hand R = Right hand L = Left hand	Shank Size

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

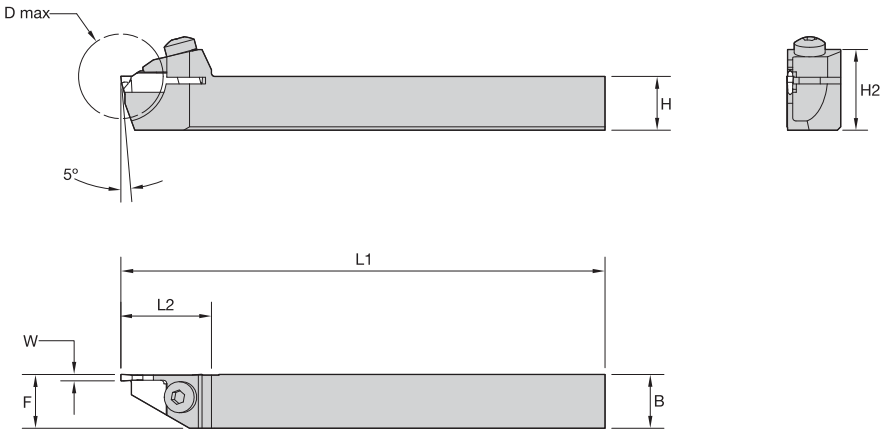
O.D. Cut-Off and Grooving

order number	new catalogue number	old catalogue number	H	W	CD	F	B	H3	L1	LS	clamp screw
		right hand									
3650456	WMTSR1616K216	250205	16,0	2,00	16,5	16,0	15,5	6	125	101	606249
3650460	WMTSR1616K311	250217	16,0	3,00	11,0	16,0	15,6	–	125	93	619205
3650462	WMTSR1616K322	250219	16,0	3,00	22,0	16,0	15,6	5	125	85	619205
3650464	WMTSR1616K422	250221	16,0	4,00	22,0	16,0	15,5	5	125	83	619205
3650502	WMTSR1616411	250281	16,0	4,00	11,0	16,0	15,5	–	125	92	619205
3650466	WMTSR1616K514	250223	16,0	5,00	14,0	16,0	15,2	–	125	88	619168
3650458	WMTSR2020K216	250207	20,0	2,00	16,5	20,0	19,5	–	125	92	606249
3650468	WMTSR2020K311	250227	20,0	3,00	11,0	20,0	19,6	–	125	93	619205
3650470	WMTSR2020K322	250229	20,0	3,00	22,0	20,0	19,6	5	125	85	619205
3653751	WMTSR2020K20	250231	20,0	4,00	22,0	20,0	20,0	5	125	83	619205
3650504	WMTSR2020K411	250283	20,0	4,00	11,0	20,0	19,5	–	125	92	619205
3650473	WMTSR2020K514	250233	20,0	5,00	14,0	20,0	19,2	–	125	88	619168
3650475	WMTSR2020L525	250235	20,0	5,00	15,0	20,0	19,2	5	140	93	619168
3650477	WMTSR2020L614	250237	20,0	6,00	14,0	20,0	19,2	–	140	103	619168
3650516	WMTSR2525M116	250409	25,0	1,50	16,5	25,0	24,5	–	150	116	606249
3650506	WMTSR2525M216	250295	25,0	2,00	16,5	25,0	24,5	–	150	116	606249
3650479	WMTSR2525M311	250241	25,0	3,00	11,0	25,0	24,6	–	150	118	619205
3650481	WMTSR2525M322	250243	25,0	3,00	22,0	25,0	24,6	–	150	110	619205
3650483	WMTSR2525M422	250245	25,0	4,00	22,0	25,0	24,5	–	150	109	619205
3653752	WMTSR2525M11	250285	25,0	4,00	11,0	25,0	24,7	–	150	117	619205
3650485	WMTSR2525M514	250247	25,0	5,00	14,0	25,0	24,1	–	150	115	619168
3650487	WMTSR2525M525	250249	25,0	5,00	25,0	25,0	24,1	–	150	104	619168
3650489	WMTSR2525M614	250251	25,0	6,00	14,0	25,0	24,1	–	150	114	619168
3650491	WMTSR2525M625	250253	25,0	6,00	25,0	25,0	24,1	–	150	104	619168
3650494	WMTSR2525M814	250255	25,0	8,00	14,0	25,0	23,9	–	150	113	619168
3650496	WMTSR2525M825	250257	25,0	8,00	25,0	25,0	23,9	–	150	104	619168
3650498	WMTSR3232M814	250275	32,0	8,00	14,0	32,0	30,9	–	150	113	619168
3650500	WMTSR3232M825	250277	32,0	8,00	25,0	32,0	30,9	–	150	104	619168

(continued)

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

order number	new catalogue number	old catalogue number	H	W	CD	F	B	H3	L1	LS	clamp screw
		left hand									
3650457	WMTSL1616K216	250206	16,0	2,00	16,5	16,0	15,5	6	125	101	606249
3650461	WMTSL1616K311	250218	16,0	3,00	11,0	16,0	15,6	–	125	93	619205
3650463	WMTSL1616K322	250220	16,0	3,00	22,0	16,0	15,6	5	125	85	619205
3650465	WMTSL1616K422	250222	16,0	4,00	22,0	16,0	15,5	5	125	83	619205
3650503	WMTSL1616K411	250282	16,0	4,00	11,0	16,0	15,5	–	125	92	619205
3650467	WMTSL1616K514	250224	16,0	5,00	14,0	16,0	15,2	–	125	88	619168
3650459	WMTSL2020K216	250208	20,0	2,00	16,5	20,0	19,5	–	125	92	606249
3650469	WMTSL2020K311	250228	20,0	3,00	11,0	20,0	19,6	–	125	93	619205
3650471	WMTSL2020K322	250230	20,0	3,00	22,0	20,0	19,6	5	125	85	619205
3650472	WMTSL2020K22	250232	20,0	4,00	22,0	20,0	19,7	5	125	83	619205
3650505	WMTSL2020K411	250284	20,0	4,00	11,0	20,0	19,5	–	125	92	619205
3650474	WMTSL2020K514	250234	20,0	5,00	14,0	20,0	19,2	–	125	88	619168
3650478	WMTSL2020L614	250238	20,0	6,00	14,0	20,0	19,3	–	140	103	619168
3653332	WMTSL2525M116	250410	25,0	1,50	16,5	25,0	24,5	–	150	116	606249
3650507	WMTSL2525M216	250296	25,0	2,00	16,5	25,0	24,5	–	150	116	606249
3650480	WMTSL2525M311	250242	25,0	3,00	11,0	25,0	24,6	–	150	118	619205
3650482	WMTSL2525M322	250244	25,0	3,00	22,0	25,0	24,6	–	150	110	619205
3650484	WMTSL2525M422	250246	25,0	4,00	22,0	25,0	24,5	–	150	109	619205
3653763	WMTSL2525M11	250286	25,0	4,00	11,0	25,0	24,7	–	150	117	619205
3650486	WMTSL2525M514	250248	25,0	5,00	14,0	25,0	24,1	–	150	113	619168
3650490	WMTSL2525M614	250252	25,0	6,00	14,0	25,0	24,1	–	150	114	619168
3650493	WMTSL2525M625	250254	25,0	6,00	25,0	25,0	24,1	–	150	104	619168
3650495	WMTSL2525M814	250256	25,0	8,00	14,0	25,0	23,9	–	150	113	619168
3650497	WMTSL2525M825	250258	25,0	8,00	25,0	25,0	23,9	–	150	104	619168
3650499	WMTSL3232M814	250276	32,0	8,00	14,0	32,0	30,9	–	150	113	619168
3650501	WMTSL3232M825	250278	32,0	8,00	25,0	32,0	30,9	–	150	104	619168

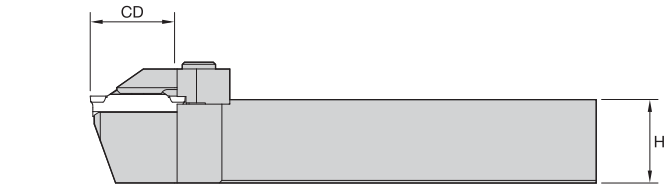


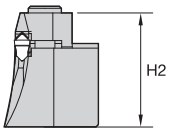
Left Hand Tool

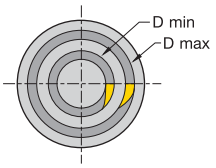
Swiss Grooving and Cut-Off

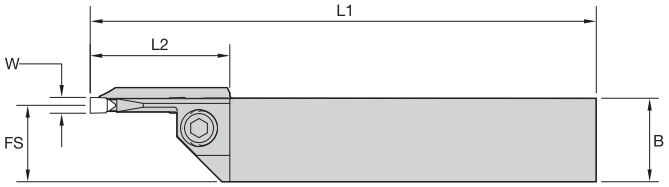
order number	new catalogue number	old catalogue number	W	D max	B	H	H2	F	L1	L2	clamp screw
		right hand									
3650508	WMTCR1010H110	250401	1,50	20,0	10,0	10,0	16	10,0	100	21	606249
3650510	WMTCR1212H110	250403	1,50	20,0	12,0	12,0	18	12,0	100	21	606249
3650512	WMTCR1616K113	250405	1,50	26,0	15,9	16,0	24	16,0	125	24	606266
3650514	WMTCR2020K113	250407	1,50	26,0	19,9	20,0	28	20,0	125	24	606266
3653413	WMTCR1010H210	250411	2,00	20,0	10,0	10,0	16	10,0	100	21	606249
3653415	WMTCR1212H210	250413	2,00	20,0	12,0	12,0	18	12,0	100	21	606249
3653417	WMTCR1616K213	250415	2,00	26,0	15,8	16,0	24	16,0	125	24	606266
3653419	WMTCR2020K213	250417	2,00	26,0	19,8	20,0	28	20,0	125	24	606266
		left hand									
3650509	WMTCL1010H110	250402	1,50	20,0	10,0	10,0	16	10,0	100	21	606249
3650511	WMTCL1212H110	250404	1,50	20,0	12,0	12,0	18	12,0	100	21	606249
3650513	WMTCL1616K113	250406	1,50	26,0	15,9	16,0	24	16,0	125	24	606266
3650515	WMTCL2020K113	250408	1,50	26,0	19,9	20,0	28	20,0	125	24	606266
3653414	WMTCL1010H210	250412	2,00	20,0	10,0	10,0	16	10,0	100	21	606249
3653416	WMTCL1212H210	250414	2,00	20,0	12,0	12,0	18	12,0	100	21	606249
3653418	WMTCL1616K213	250416	2,00	26,0	15,8	16,0	24	16,0	125	24	606266
3653420	WMTCL2020K213	250418	2,00	26,0	19,8	20,0	28	20,0	125	24	606266

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

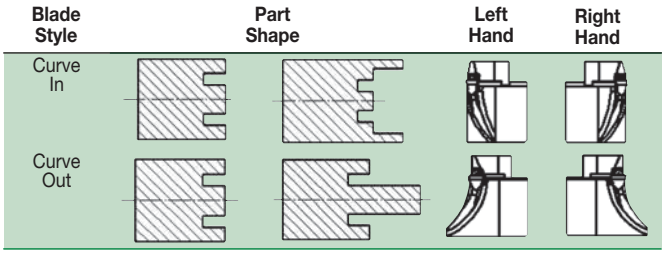








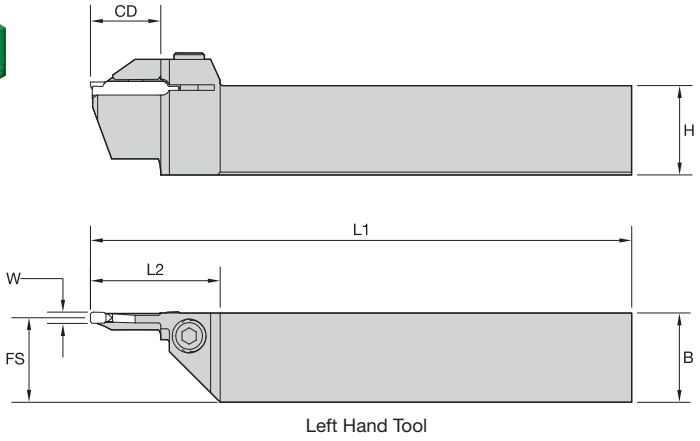
Left Hand Tool



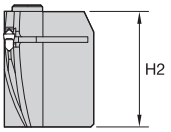
Curve Out

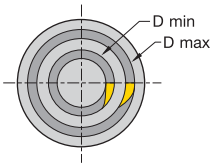
order number	new catalogue number	old catalogue number	W	CD	D max	D min	FS	H2	H	B	L1	L2	clamp	clamp screw
		right hand												
3653421	WMTBR2525M313-038-052	251217	3,00	13,0	52	38	23,5	32	24,8	24,8	150	34	–	619205
3653423	WMTBR2525M316-052-070	251219	3,00	16,0	70	52	23,5	32	24,8	24,8	150	34	–	619205
3653425	WMTBR2525M316-070-100	251221	3,00	16,0	100	70	23,5	32	24,8	24,8	150	34	–	619205
3653427	WMTBR2525M319-100-205	251223	3,00	19,0	205	100	23,5	32	25,0	24,8	150	37	–	619205
3653764	WMTBR2525M412-032-052	251265	4,00	12,5	52	32	23,0	32	24,8	24,8	150	34	–	619205
3653766	WMTBR2525M415-052-070	251267	4,00	15,5	70	52	23,0	32	24,8	24,8	150	34	–	619205
3653770	WMTBR2525M418-100-205	251271	4,00	18,5	205	100	23,0	32	24,8	24,8	150	37	–	619205
3653433	WMTBR2525M519-070-100	251237	5,00	19,0	100	70	22,5	34	24,8	24,8	150	42	446104	619168
3653431	WMTBR2525M519-052-070	251235	5,00	19,0	70	52	22,5	34	24,8	24,8	150	38	446102	619168
3653435	WMTBR2525M525-100-205	251239	5,00	25,0	205	100	22,5	34	24,8	24,8	150	42	446104	619168
3653437	WMTBR2525M616-038-052	251249	6,00	16,0	52	38	22,0	35	24,8	24,8	150	38	446102	619168
3653441	WMTBR2525M619-070-100	251253	6,00	19,0	100	70	22,0	36	24,8	24,8	150	42	446104	619168
3653443	WMTBR2525M625-100-205	251255	6,00	25,0	205	100	22,0	34	24,8	24,8	150	42	446104	619168
		left hand												
3653422	WMTBL2525M313-038-052	251218	3,00	13,0	52	38	23,5	32	24,8	24,8	150	34	–	619205
3653424	WMTBL2525M316-052-070	251220	3,00	16,0	70	52	23,5	32	24,8	24,8	150	34	–	619205
3653426	WMTBL2525M316-070-100	251222	3,00	16,0	100	70	23,5	32	24,8	24,8	150	34	–	619205
3653428	WMTBL2525M319-100-205	251224	3,00	19,0	205	100	23,5	32	24,8	24,8	150	37	–	619205
3653765	WMTBL2525M412-032-052	251266	4,00	12,5	52	32	23,0	32	24,8	24,8	150	34	–	619205
3653767	WMTBL2525M415-052-070	251268	4,00	15,5	70	52	23,0	32	24,8	24,8	150	34	–	619205
3653769	WMTBL2525M415-070-100	251270	4,00	15,5	100	70	23,0	32	24,8	24,8	150	34	–	619205
3653771	WMTBL2525M418-100-205	251272	4,00	18,5	205	100	23,0	32	24,8	24,8	150	37	–	619205
3653434	WMTBL2525M519-070-100	251238	5,00	19,0	100	70	22,5	34	24,8	24,8	150	42	446103	619168
3653432	WMTBL2525M519-052-070	251236	5,00	19,0	70	52	22,5	34	24,8	24,8	150	38	446101	619168
3653436	WMTBL2525M525-100-205	251240	5,00	25,0	205	100	22,5	34	24,8	24,8	150	42	446103	619168
3653438	WMTBL2525M616-038-052	251250	6,00	16,0	52	38	22,0	35	24,8	24,8	150	38	446101	619168
3653442	WMTBL2525M619-070-100	251254	6,00	19,0	100	70	22,0	34	24,8	24,8	150	42	446103	619168
3653444	WMTBL2525M625-100-205	251256	6,00	25,0	205	100	22,0	34	24,8	24,8	150	42	446103	619168

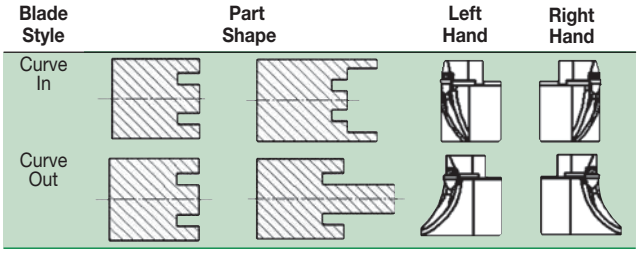
NOTE: Insert cutting edge for WMT Face Grooving system is positioned +0,75mm above centre.
The WMT Face Grooving system is not designed to cut diameters of less than 12,6mm.
Toolholders that accept 3mm width inserts have an integral clamp.
Toolholders that accept 5mm and 6mm width inserts are supplied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



Left Hand Tool



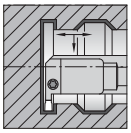




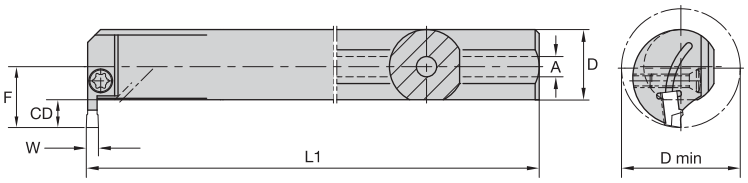
Curve In

order number	new catalogue number	old catalogue number	W	CD	D max	D min	FS	H2	H	B	L1	L2	clamp	clamp screw
		right hand												
3634282	**WMTAR2525M316-070-100**	**252209M**	3,00	15,9	100	70	23,5	32	24,8	24,8	150	34	**–**	**MS326**
3634284	**WMTAR2525M319-100-205**	**252211M**	3,00	19,1	205	100	23,5	32	24,8	24,8	150	37	**–**	**MS326**
3634290	**WMTAR2525M619-070-100**	**252225M**	6,00	19,1	100	70	22,0	34	24,8	24,8	150	42	**446104**	**619168**
		left hand												
3634283	**WMTAL2525M316-070-100**	**252210M**	3,00	15,9	100	70	23,5	32	24,8	24,8	150	34	**–**	**MS326**
3634285	**WMTAL2525M319-100-205**	**252212M**	3,00	19,1	205	100	23,5	32	24,8	24,8	150	37	**–**	**MS326**
3634293	**WMTAL2525M625-100-205**	**252228M**	6,00	25,4	205	100	22,0	34	24,8	24,8	150	42	**446103**	**619168**

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



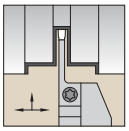
Steel shank with through coolant.

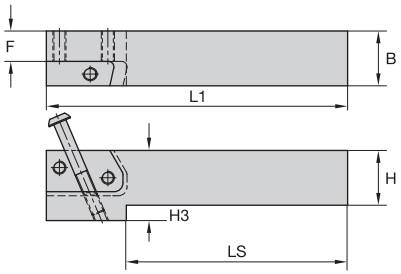


Right Hand Tool

I.D. Boring Bars

order number	catalogue number	seat size	CD	W	D min	D	L1	F	A	insert screw	hex (mm)
	right hand										
5423874	**A25RWMTER0316M**	3	16,00	3,00	41,00	25,00	200,00	26,00	6,40	**619168**	5 mm
5423875	**A32SWMTER0319M**	3	19,00	3,00	47,00	32,00	250,00	29,00	6,40	**619168**	5 mm
5423876	**A25RWMTER0416M**	4	16,00	4,00	41,00	25,00	200,00	26,00	6,40	**619168**	5 mm
5423877	**A32SWMTER0419M**	4	19,00	4,00	47,00	32,00	250,00	29,00	6,40	**619168**	5 mm
5423878	**A32SWMTER0519M**	5	19,00	5,00	47,00	32,00	250,00	29,00	6,40	**619168**	5 mm
5423879	**A40TWMTER0522M**	5	22,00	5,00	54,00	40,00	300,00	31,75	6,40	**619168**	5 mm
5423880	**A32SWMTER0619M**	6	19,00	6,00	47,00	32,00	250,00	29,00	6,40	**619168**	5 mm
5423881	**A40TWMTER0622M**	6	22,00	6,00	54,00	40,00	300,15	31,75	6,40	**619168**	5 mm
	left hand										
5423882	**A25RWMTEL0316M**	3	16,00	3,00	41,00	25,00	200,00	26,00	6,40	**619168**	5 mm
5423883	**A32SWMTEL0319M**	3	19,00	3,00	47,00	32,00	250,00	29,00	6,40	**619168**	5 mm
5423884	**A25RWMTEL0416M**	4	16,00	4,00	41,00	25,00	200,00	26,00	6,40	**619168**	5 mm
5423885	**A32SWMTEL0419M**	4	19,00	4,00	47,00	32,00	250,00	29,00	6,40	**619168**	5 mm
5423886	**A32SWMTEL0519M**	5	19,00	5,00	47,00	32,00	250,00	29,00	6,40	**619168**	5 mm
5423887	**A40TWMTEL0522M**	5	22,00	5,00	54,00	40,00	300,00	31,75	6,40	**619168**	5 mm
5423888	**A32SWMTEL0619M**	6	19,00	6,00	47,00	32,00	250,00	29,00	6,40	**619168**	5 mm
5423889	**A40TWMTEL0622M**	6	22,00	6,00	54,00	40,00	300,00	31,75	6,40	**619168**	5 mm



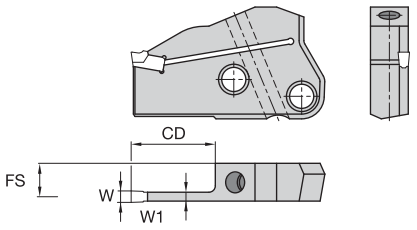


M50
2 blade screws required
Right Hand Tool

Grooving, Cut-Off, and Face Grooving

order number	catalogue number	H	B	L1	LS	F	H3	blade screw	clamp screw
	right hand								
5349628	**WGMSR2020**	20	20	108,00	68,00	8,84	11,56	**MS2002**	**MS1162**
5349629	**WGMSR2525**	25	25	126,00	95,38	13,84	6,56	**MS2002**	**MS1162**
5349641	**WGMSR3232**	32	32	126,00	69,85	20,81	—	**MS2002**	**MS1162**
	left hand								
5349625	**WGMSL1620**	16	20	108,00	68,00	8,84	15,60	**MS2002**	**MS1162**
5349626	**WGMSL2020**	20	20	108,00	68,00	8,84	11,56	**MS2002**	**MS1162**
5349627	**WGMSL2525**	25	25	126,00	95,38	13,84	6,56	**MS2002**	**MS1162**
5349640	**WGMSL3232**	32	32	126,00	69,85	20,81	—	**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.

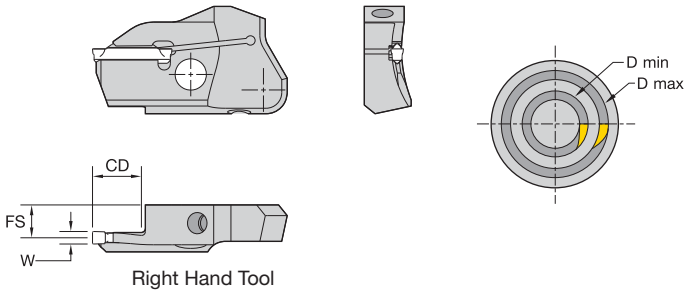


Right Hand Tool

Grooving and Cut-Off

order number	catalogue number	seat size	CD	W	FS	W1
	right hand					
5359127	**WMTWGMR114S**	1	14,00	1,50	11,04	1,22
5359128	**WMTWGMR213S**	2	13,00	2,00	10,81	1,68
5359129	**WMTWGMR2B16S**	2B	16,50	2,39	10,71	1,88
5359130	**WMTWGMR319S**	3	19,00	3,00	10,38	2,54
5359131	**WMTWGMR419S**	4	19,00	4,00	10,00	3,30
5359132	**WMTWGMR522S**	5	22,00	5,00	9,82	3,66
5359133	**WMTWGMR622S**	6	22,00	6,00	9,26	4,78
	left hand					
5359120	**WMTWGML114S**	1	14,00	1,50	11,04	1,22
5359121	**WMTWGML213S**	2	13,00	2,00	10,81	1,68
5359122	**WMTWGML2B16S**	2B	16,50	2,39	10,71	1,88
5359123	**WMTWGML319S**	3	19,00	3,00	10,38	2,54
5359124	**WMTWGML419S**	4	19,00	4,00	10,00	3,30
5359125	**WMTWGML522S**	5	22,00	5,00	9,82	3,66
5359126	**WMTWGML622S**	6	22,00	6,00	9,26	4,78

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



Right Hand Tool

Face Grooving

order number	catalogue number	seat size	CD	W	FS
	right hand				
5359150	**WMTWGMR313B038-052**	3	12,70	3,00	11,00
5359151	**WMTWGMR316B052-070**	3	15,88	3,00	11,00
5359152	**WMTWGMR316B070-100**	3	15,88	3,00	11,00
5359153	**WMTWGMR319B100-205**	3	19,05	3,00	11,00
5359154	**WMTWGMR416B052-070**	4	15,88	4,00	10,50
5359155	**WMTWGMR416B070-100**	4	15,88	4,00	10,50
5359156	**WMTWGMR419B100-205**	4	19,05	4,00	10,50
5359157	**WMTWGMR522B100-205**	5	22,00	5,00	10,00
5359158	**WMTWGMR622B100-205**	6	22,00	6,00	10,00
	left hand				
5359134	**WMTWGML313B038-052**	3	12,70	3,00	11,00
5359135	**WMTWGML316B052-070**	3	15,88	3,00	11,00
5359136	**WMTWGML316B070-100**	3	15,88	3,00	11,00
5359137	**WMTWGML319100-205**	3	19,05	3,00	11,00
5359138	**WMTWGML413B038-052**	4	12,70	4,00	10,50
5359139	**WMTWGML416B052-070**	4	15,88	4,00	10,50
5359140	**WMTWGML416B070-100**	4	15,88	4,00	10,50
5359141	**WMTWGML419B100-205**	4	19,05	4,00	10,50
5359142	**WMTWGML516B038-052**	5	15,88	5,00	10,00
5359143	**WMTWGML519B052-070**	5	19,05	5,00	10,00
5359144	**WMTWGML519B070-100**	5	19,05	5,00	10,00
5359145	**WMTWGML522B100-205**	5	22,00	5,00	10,00
5359146	**WMTWGML616B038-052**	6	15,88	6,00	10,00
5359147	**WMTWGML619B052-070**	6	19,05	6,00	10,00
5359148	**WMTWGML619B070-100**	6	19,05	6,00	10,00
5359149	**WMTWGML622B100-205**	6	22,00	6,00	10,00

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

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

WIDIA™ TopGroove™

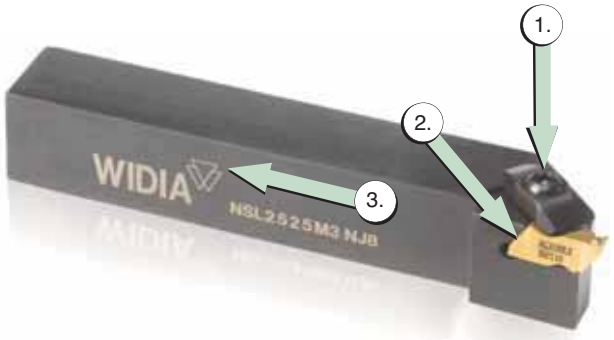
WIDIA has set the industry standard for threading and grooving productivity with the TopGroove clamping design. The TopGroove design provides consistent tool performance, accurate indexing, and superior clamping to provide excellent surface finish and outstanding tool life.

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 moulded into the insert to provide superior resistance to side and radial cutting forces.
- TopGroove inserts are available for shallow grooving, deep grooving, light turning, profiling, shallow and deep face grooving, back turning, undercutting, and custom 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 TIAlN-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.

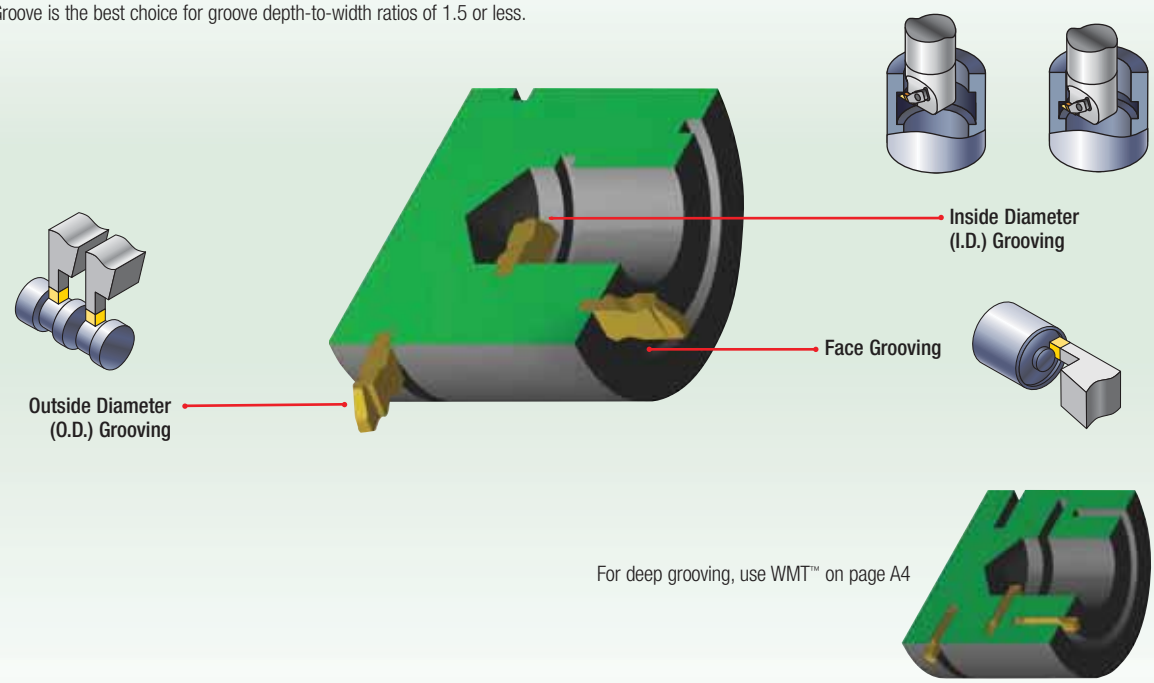
Utilise this comprehensive, easy-to-use guide for the information necessary to identify, choose, and select the appropriate cutting tools for your specific needs.

What you need to know:

- 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	0,50mm	9,53mm
		depth	—	12,7mm
	Face Grooving	width	3,2mm	6,35mm
		depth	—	12,7mm
	Internal Grooving	diameter	11,2mm	—
	Face Grooving Diameter	standard	23,9mm	—
		deep	—	—
	Deep O.D./I.D. Grooving	width	1,50mm	6,35mm
		depth	—	12,7mm
	Deep Face Grooving	width	3,18mm	6,35mm
		depth	—	12,7mm

2 Identify the material to be machined:

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

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

3 Select your toolholder based on the application:

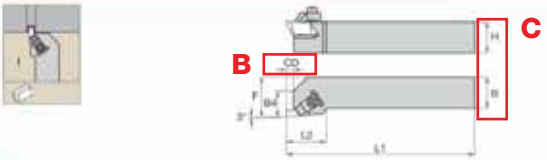
A Choose the appropriate gage insert (width) required for the application.

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

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

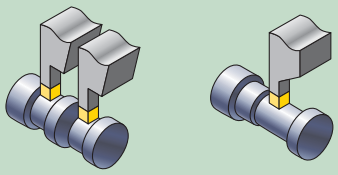
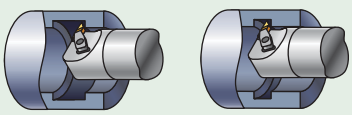
TopGroove™
Toolholders

WIDIA



■ NS

order number	catalog number	C H	C B	F	L1	L2	B4	B CD	A page 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
3637508	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	.81	.415	N.5R	CM80	S352	–	1/4
3637540	NSR245D	1.500	1.500	2.000	6.00	2.00	.81	.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

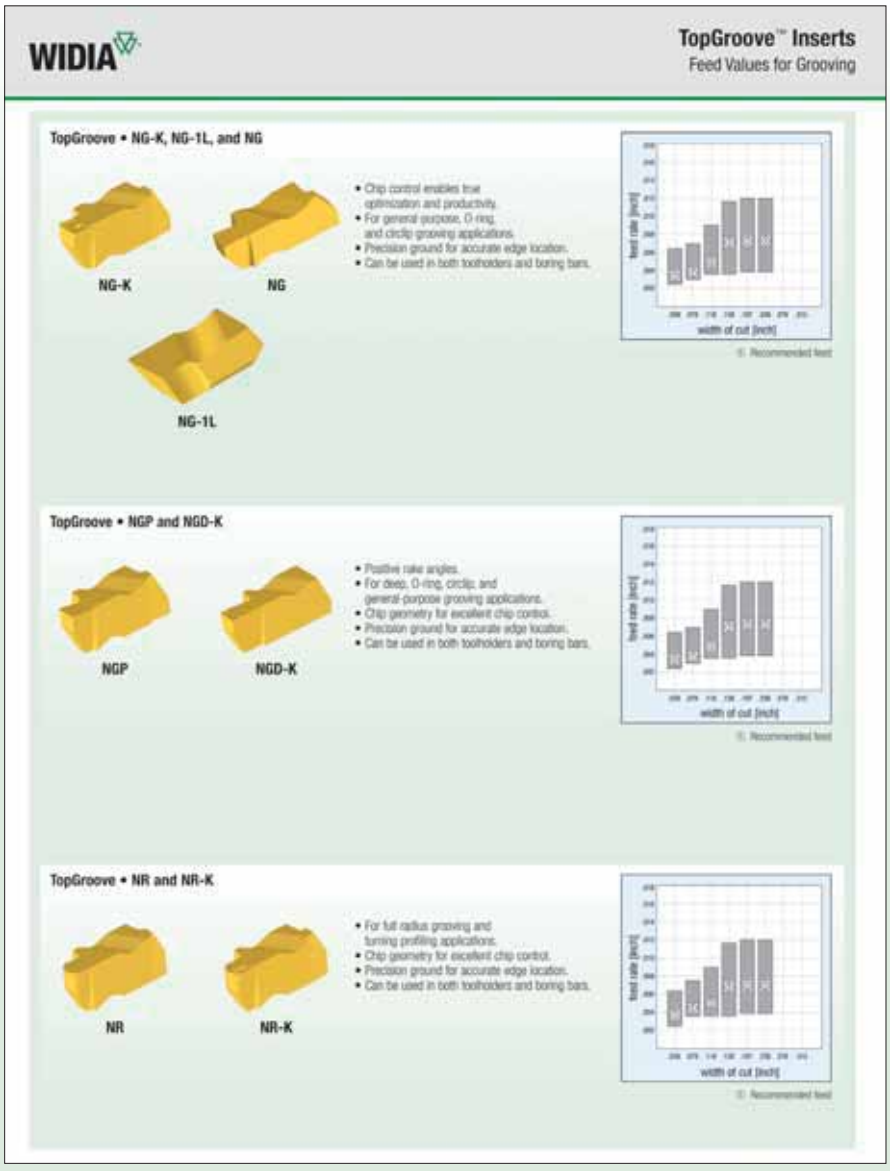
	application	conventional toolholders	modular blades
	O.D. Grooving and Plunge and Turn	pages A38–A40	—
	I.D. Grooving	pages A41–A42	—

4 Select chipbreaker style for the application:

See application guide on page A44 for a complete list of insert styles.

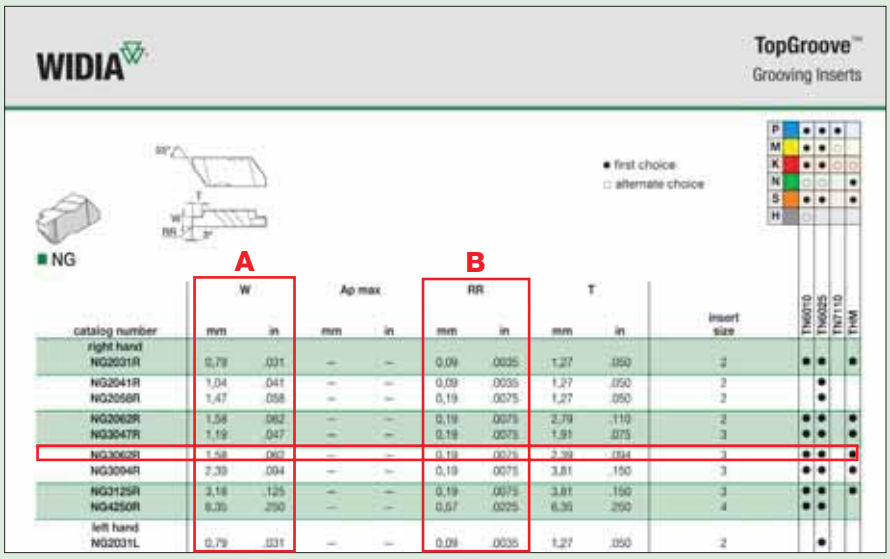
NOTE: Chart shows recommended starting feed rates.

See page A45.



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 A46 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 A48 for cutting data.

TopGroove™

Recommended Cutting Speed Starting Conditions

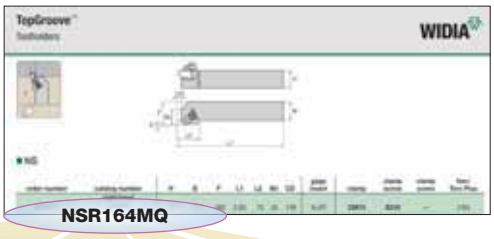
WIDIA

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	495
	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	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

A

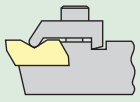
B

TopGroove Holder Identification System



N	S	R		16	4	M	Q
Insert Holding Method	Insert Mounting Location	Hand of Tool	Drop Head	Shank Size	Insert Size	Tool Length	Qualified Surface and Length

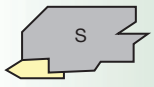
N — TopGroove*



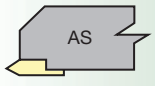
*Proprietary standard only.

End mount

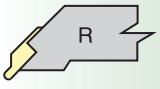
Side mount Offset



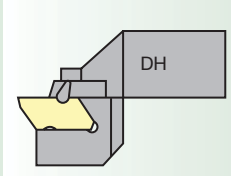
Side mount No offset

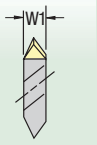


NRR Undercut



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

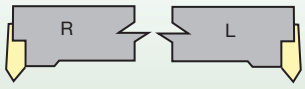




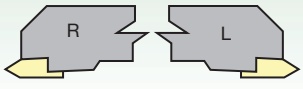
insert size	W1
2	3,81mm
3	4,95mm
4	6,98mm
5	9,65mm
6	9,73mm
8	11,13mm

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

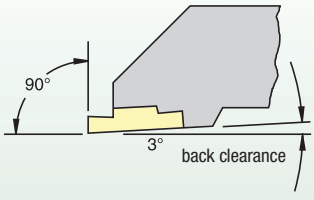
End mount



Side mount

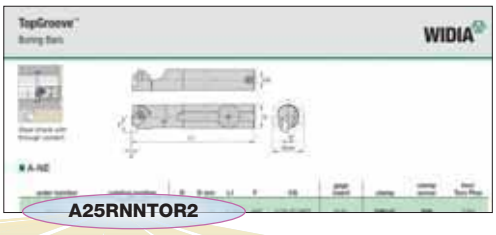


Q –
qualified metric holder



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

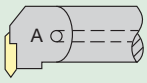
TopGroove
Boring Bar Identification System



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

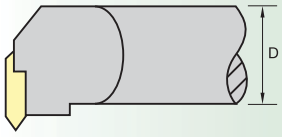
A — Bar Type

Steel with coolant

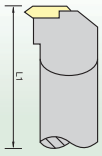


25 — Bar Diameter

Bar diameter in millimetres



R — Bar Length

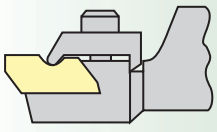


Metric bars:

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

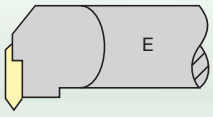
N — Insert Holding Method

N — TopGroove

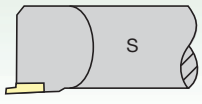


N — Insert Shape

End mount



Side mount

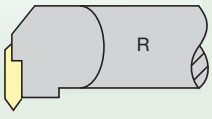


T — Insert Location

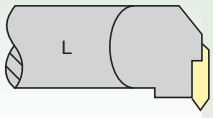
O — Rake Angle

R — Hand of Tool

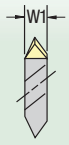
Right hand



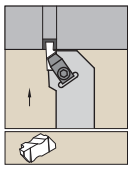
Left hand

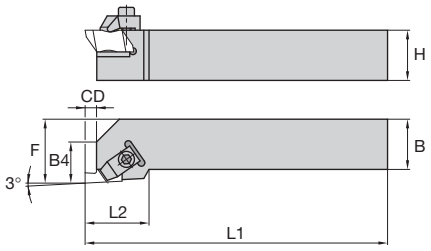


2 — Insert Size



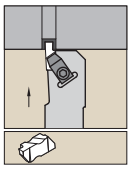
insert size	T
1	3,54mm
2	3,81mm
3	5,35mm
4	6,40mm
5	9,65mm
6	9,73mm
8	11,13mm

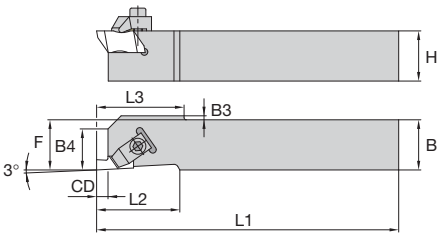




NS

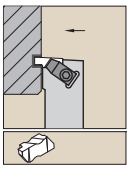
order number	catalogue number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus
	right hand											
3641682	**NSR1010E2**	10,0	10,0	14,0	70	19	9	3,5	N.2R	**CM74**	**MS1200**	T10
3641660	**NSR1212F2**	12,0	12,0	16,0	80	19	9	3,5	N.2R	**CM74**	**MS1200**	T10
3636542	**NSR1616H2**	16,0	16,0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

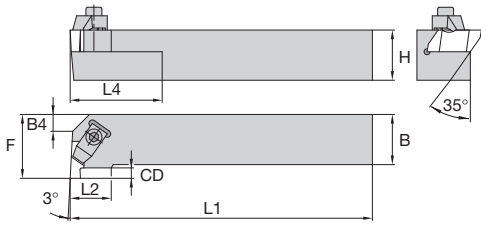




NAS

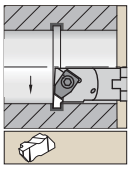
order number	catalogue number	H	B	F	L1	L2	B4	CD	B3	L3	gage insert	clamp	clamp screw	hex/ Torx Plus
	right hand													
3641667	**NASR1010M2Q**	10,0	10,0	10,0	150	19	9	3,5	2,03	19	N.2R	**CM182**	**MS1200**	T10
3641662	**NASR1212M2Q**	12,0	12,0	12,0	150	19	9	3,5	–	–	N.2R	**CM182**	**MS1200**	T10
3639048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



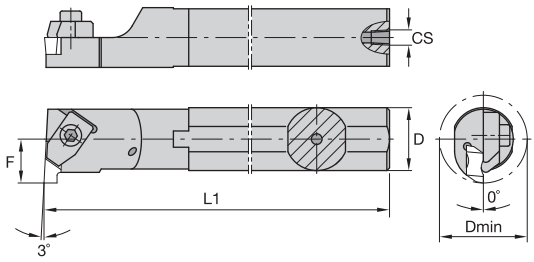


NE

order number	catalogue number	H	B	F	L1	L2	L4	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus
	right hand												
3641674	**NER1616H2**	16,0	16,0	20,0	100	15	25	—	3,5	N.2L	**CM75**	**MS1200**	T10
3641658	**NER2020K2**	20,0	20,0	25,0	125	15	25	6	3,5	N.2L	**CM75**	**MS1200**	T10
3641665	**NER2525M2**	25,0	25,0	32,0	150	15	25	12	3,5	N.2L	**CM75**	**MS1200**	T10
3636541	**NER2525M3**	25,0	25,0	32,0	150	22	51	—	5,3	N.3L	**CM73LP**	**MS2111**	25 IP
3641680	**NER3225P3**	32,0	25,0	32,0	170	22	51	—	3,8	N.3L	**CM73LP**	**MS2111**	25 IP
3641672	**NER2525M4**	25,0	25,0	35,0	150	24	51	—	7,5	N.4L	**CM73LP**	**MS2111**	25 IP
3641689	**NER3225P4**	32,0	25,0	35,0	170	24	51	—	7,5	N.4L	**CM73LP**	**MS2111**	25 IP
3641693	**NER3232P4**	32,0	32,0	40,0	170	24	51	—	6,4	N.4L	**CM73LP**	**MS2111**	25 IP
3641692	**NER3232P5**	32,0	32,0	50,0	170	35	51	—	10,5	N.5L	**CM81**	**MS352**	6 mm
	left hand												
3641684	**NEL1616H2**	16,0	16,0	20,0	100	15	25	—	3,5	N.2R	**CM74**	**MS1200**	T10
3641677	**NEL2020K2**	20,0	20,0	25,0	125	15	25	6	3,5	N.2R	**CM74**	**MS1200**	T10
3641676	**NEL2525M2**	25,0	25,0	32,0	150	15	25	12	3,5	N.2R	**CM74**	**MS1200**	T10
3636543	**NEL2525M3**	25,0	25,0	32,0	150	22	51	—	5,3	N.3R	**CM72LP**	**MS2111**	25 IP
3641685	**NEL3225P3**	32,0	25,0	32,0	170	22	51	—	3,8	N.3R	**CM72LP**	**MS2111**	25 IP
3641668	**NEL2525M4**	25,0	25,0	35,0	150	24	51	—	7,5	N.4R	**CM72LP**	**MS2111**	25 IP
3641694	**NEL3225P4**	32,0	25,0	35,0	170	24	51	—	7,5	N.4R	**CM72LP**	**MS2111**	25 IP
3641696	**NEL3232P4**	32,0	32,0	40,0	170	24	51	—	6,4	N.4R	**CM72LP**	**MS2111**	25 IP
3641695	**NEL3232P5**	32,0	32,0	50,0	170	35	51	—	10,5	N.5R	**CM80**	**MS352**	6 mm



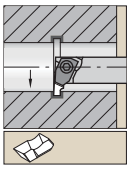
Steel shank with through coolant.



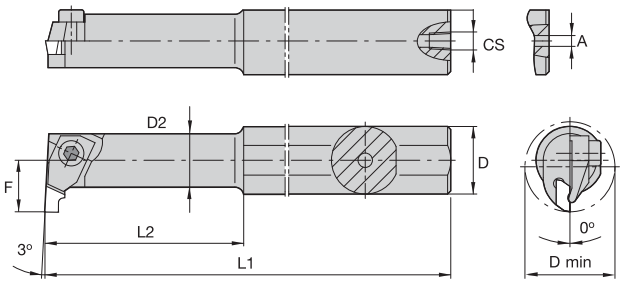
A-NNT

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

NOTE: Minimum bore capability varies with depth of groove. See pages A66–A67 for details.



Necked steel shank with through coolant.



A-NNT-1

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

NOTE: Minimum bore capability varies with depth of groove. See pages A66–A67 for details.

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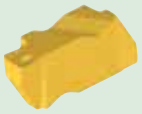
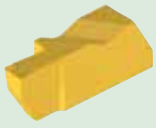
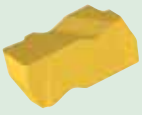
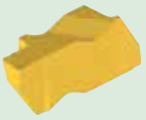
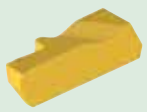
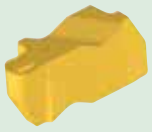
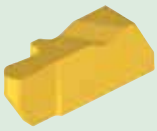
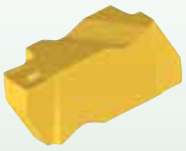
insert style	application	rake angle	page(s)
NG 	• General-purpose grooving. • O-ring grooving. • Circlip grooving.	neutral	**A49**
NG-K 	• Chip control geometry. • General-purpose grooving. • O-ring grooving. • Circlip grooving. • Light turning.	10° positive	**A50**
NGC-K* 	• Combined groove and chamfered 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	**A53**
NGP 	• General-purpose grooving. • O-ring grooving. • Circlip grooving.	5° positive	**A54**
NF* 	• Face grooving. • Additional side clearance.	neutral	—
NF-K 	• Face grooving with chip control. • Additional side clearance.	10° positive	**A55**
NFD-K 	• Deep face grooving with chip control. • Additional side clearance.	10° positive	**A55**

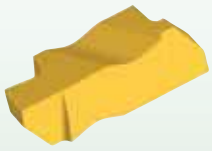
insert style	application	rake angle	page(s)
NFD-KI* 	• Internal deep face grooving with chip control. • For use in boring bars for internal face grooves.	10° positive	—
NP-K 	• Turning. • Back turning positive. • Profiling with chip control.	10° positive	**A56**
NR 	• Full radius grooving. • Turning and profiling.	neutral	**A56**
NR-K 	• Chip control geometry. • Full radius grooving, turning, and profiling.	10° positive	**A58**
NRD 	• Deep grooving. • Full radius end-form.	neutral	**A58**
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.	—	**A59**

*Inserts are available as custom solutions.

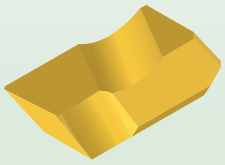
TopGroove • NG-K, NG-1L, and NG



NG-K

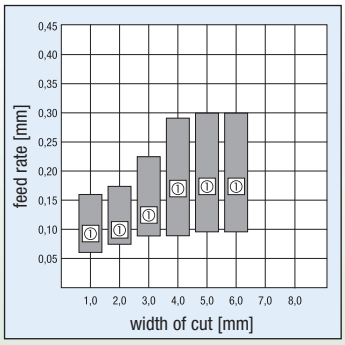


NG



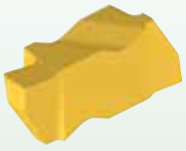
NG-1L

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

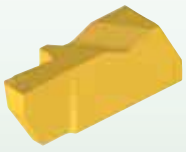


① Recommended feed

TopGroove • NGP and NGD-K

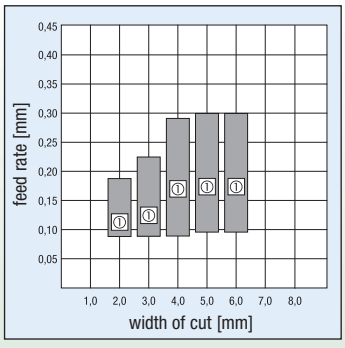


NGP



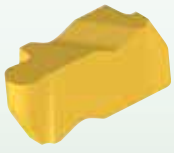
NGD-K

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



① Recommended feed

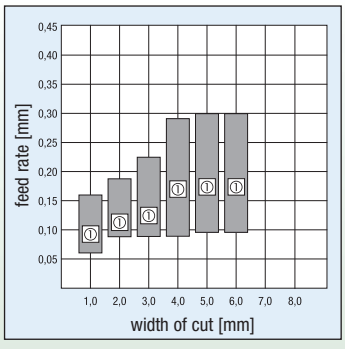
TopGroove • NR and NR-K



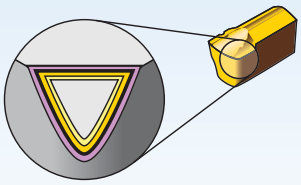
NR

NR-K

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



① Recommended feed



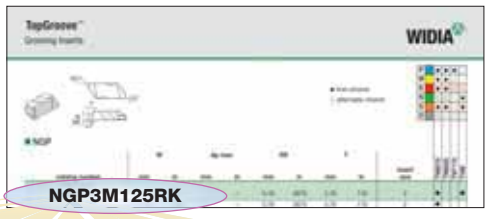
Coatings provide high-speed capability and are engineered for finishing to light roughing.

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

Grade

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

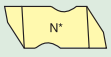
TopGroove
Insert Identification System



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

N Type of Insert

N — TopGroove



G Insert Style

B — Blank (for special forms)

F — Face grooving

G — Grooving

P — Back turning

R — Full radius

U — Undercutting (or relieving)

V — Poly-Vee

P Additional Information

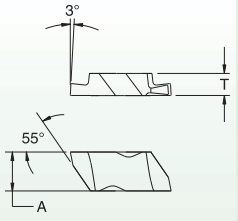
D — Deep grooving

P — Positive

C — Groove and chamfer

3 Insert Size

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



M Size Identification

M — Metric insert groove width

C — Circlip groove insert width is nominal circlip size

Groove width for F-, G-, and U-style inserts; radii for R-style grooving inserts; and circlip size for groove and chamfer inserts. Dimension in 0,01mm.

125 = 1,25mm

Width Tolerance: ±0,025mm unless otherwise specified

125 Groove Size**

**Omit position for TopGroove NB-style blanks.

R Hand of Insert

L — Left hand

R — Right hand

Cutting Depth

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

K Chipbreaker Design

K — Standard chip control

E — Hone only

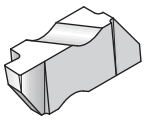
Definition of Inserts

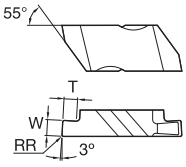
Groove size

J or L — Poly-Vee inserts

I — Internal face grooving

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





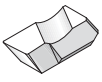
● first choice
○ alternate choice

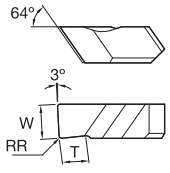
P	●	●	●	
M	●	●	○	
K	●	●	○	○
N	○	○		●
S	●	●		●
H	○			

NG

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

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

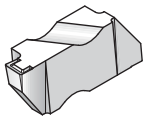


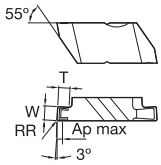


NG-1L

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

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





● first choice
○ alternate choice

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

■ NG-K

catalogue number	W mm	Ap max mm	RR mm	T mm	insert size	TN6010	TN6025	TN7110	THM
right hand									
NG2M050RK	0,50	0,64	0,09	0,64	2	●	●		
NG2031RK	0,79	0,76	0,09	1,27	2	●	●		
NG2M080RK	0,80	0,76	0,09	1,27	2	●	●		
NG2M100RK	1,00	0,76	0,09	1,27	2	●	●		
NG2047RK	1,19	0,76	0,09	1,27	2	●	●		
NG2M120RK	1,20	0,76	0,09	1,27	2	●	●		
NG2M140RK	1,40	0,76	0,09	1,27	2	●	●		
NG2M150RK	1,50	1,09	0,19	2,79	2		●		
NG2062RK	1,58	1,09	0,19	2,79	2	●	●		
NG2M170RK	1,70	1,09	0,19	2,79	2	●	●		
NG2M175RK	1,75	1,09	0,19	2,79	2		●		
NG2M195RK	1,95	1,09	0,19	2,79	2	●	●		
NG2M200RK	2,00	1,09	0,19	2,79	2	●	●		
NG2M220RK	2,20	1,09	0,19	2,79	2		●		
NG2M225RK	2,25	1,09	0,19	2,79	2	●	●		
NG2094RK	2,39	1,09	0,19	2,79	2	●	●		
NG2M250RK	2,50	1,09	0,19	2,79	2		●		
NG2M275RK	2,75	1,09	0,19	2,79	2	●	●		
NG2M300RK	3,00	1,09	0,19	2,79	2	●	●		
NG2125RK	3,18	1,09	0,19	2,79	2	●	●		
NG2M325RK	3,25	1,09	0,19	2,79	2		●		
NG3M100RK	1,00	0,76	0,19	1,91	3		●		
NG3047RK	1,19	0,76	0,19	1,91	3	●	●		
NG3M120RK	1,20	0,76	0,19	1,91	3	●	●		
NG3M150RK	1,50	1,02	0,19	2,39	3		●	●	
NG3062RK	1,58	1,02	0,19	2,39	3	●	●	●	
NG3M175RK	1,75	1,02	0,19	2,39	3		●		
NG3072RK	1,83	1,02	0,19	2,39	3	●	●		
NG3078RK	1,98	1,02	0,19	2,39	3	●	●		
NG3M200RK	2,00	1,02	0,19	2,39	3		●	●	
NG3M220RK	2,20	1,02	0,19	2,39	3		●		
NG3M225RK	2,24	1,02	0,19	2,39	3	●	●	●	
NG3094RK	2,39	1,02	0,19	3,81	3	●	●		
NG3M250RK	2,50	1,02	0,19	3,81	3		●	●	
NG3M275RK	2,75	1,02	0,19	3,81	3	●	●		
NG3M300RK	3,00	1,02	0,19	3,81	3	●	●	●	
NG3125RK	3,18	1,02	0,19	3,81	3	●	●		
NG3M320RK	3,20	1,02	0,19	3,81	3		●		
NG3M325RK	3,25	1,02	0,19	3,81	3		●		
NG3M350RK	3,50	2,92	0,32	3,81	3		●		
NG3156RK	3,96	2,92	0,19	3,81	3	●	●		

(continued)

(NG-K continued)

● first choice
○ alternate choice

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

catalogue number	W mm	Ap max mm	RR mm	T mm	insert size	TN6010	TN6025	TN7110	THM
right hand									
NG3M400RK	3,99	2,92	0,32	3,81	3	●	●	●	
NG3M425RK	4,24	2,92	0,32	3,81	3	●	●		
NG3M450RK	4,50	2,92	0,32	3,81	3		●		
NG3189RK	4,80	2,92	0,57	3,81	3	●	●	●	
NG4M300RK	3,00	1,02	0,19	3,81	4		●		
NG4125RK	3,18	1,06	0,19	3,81	4	●	●		
NG4M350RK	3,50	2,92	0,57	6,35	4		●	●	
NG4M400RK	4,00	2,92	0,57	6,35	4	●	●	●	
NG4M450RK	4,50	2,92	0,57	6,35	4		●		
NG4189RK	4,80	2,92	0,57	6,35	4	●	●		
NG4M500RK	5,00	2,92	0,32	6,35	4	●	●	●	
NG4M550RK	5,50	3,81	0,57	6,35	4		●		
NG4M600RK	6,00	3,81	0,57	6,35	4		●	●	
NG4250RK	6,35	3,81	0,57	6,35	4	●	●		
left hand									
NG2M050LK	0,50	0,64	0,09	0,64	2	●	●		
NG2031LK	0,79	0,76	0,09	1,27	2	●	●		
NG2M080LK	0,80	0,76	0,09	1,27	2	●	●		
NG2M100LK	1,00	0,76	0,09	1,27	2	●	●		
NG2047LK	1,19	0,76	0,09	1,27	2		●		
NG2M120LK	1,20	0,76	0,09	1,27	2	●	●		
NG2M140LK	1,40	0,76	0,09	1,27	2	●	●		
NG2M150LK	1,50	1,09	0,19	2,79	2		●		
NG2062LK	1,58	1,09	0,19	2,79	2	●	●		
NG2M170LK	1,70	1,09	0,19	2,79	2	●	●		
NG2M175LK	1,75	1,09	0,19	2,79	2		●		
NG2M195LK	1,95	1,09	0,19	2,79	2	●	●		
NG2M200LK	2,00	1,09	0,19	2,79	2	●	●		
NG2M220LK	2,20	1,09	0,19	2,79	2		●		
NG2M225LK	2,25	1,09	0,19	2,79	2	●	●		
NG2094LK	2,39	1,09	0,19	2,79	2	●	●		
NG2M250LK	2,50	1,09	0,19	2,79	2		●		
NG2M275LK	2,75	1,09	0,19	2,79	2	●	●		
NG2M300LK	3,00	1,09	0,19	2,79	2	●	●		
NG2125LK	3,18	1,09	0,19	2,79	2	●	●		
NG2M325LK	3,25	1,09	0,19	2,79	2		●		
NG3M100LK	1,00	0,76	0,19	1,91	3		●		
NG3047LK	1,19	0,76	0,19	1,91	3	●	●		
NG3M120LK	1,20	0,76	0,19	1,91	3	●	●		
NG3M150LK	1,50	1,02	0,19	2,39	3		●	●	
NG3062LK	1,58	1,02	0,19	2,39	3	●	●	●	
NG3M175LK	1,75	1,02	0,19	2,39	3		●		

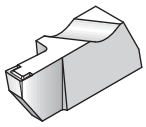
(continued)

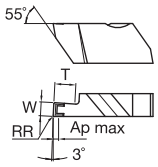
(NG-K continued)

● first choice
○ alternate choice

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

catalogue number	W mm	Ap max mm	RR mm	T mm	insert size	TN6010	TN6025	TN7110	THM
left hand									
NG3072LK	1,83	1,02	0,19	2,39	3	●	●		
NG3078LK	1,98	1,02	0,19	2,39	3	●	●		
NG3M200LK	2,00	1,02	0,19	2,39	3		●	●	
NG3M220LK	2,20	1,02	0,19	2,39	3		●		
NG3M225LK	2,24	1,02	0,19	2,39	3	●	●	●	
NG3094LK	2,39	1,02	0,19	3,81	3	●	●		
NG3M250LK	2,50	1,02	0,19	3,81	3		●	●	
NG3M275LK	2,75	1,02	0,19	3,81	3	●	●		
NG3M300LK	3,00	1,02	0,19	3,81	3	●	●	●	
NG3125LK	3,18	1,02	0,19	3,81	3	●	●		
NG3M320LK	3,20	1,02	0,19	3,81	3		●		
NG3M325LK	3,25	1,02	0,19	3,81	3		●		
NG3M350LK	3,50	2,92	0,32	3,81	3		●		
NG3156LK	3,96	2,92	0,19	3,81	3	●	●		
NG3M400LK	3,99	2,92	0,32	3,81	3	●	●	●	
NG3M425LK	4,24	2,92	0,32	3,81	3	●	●		
NG3M450LK	4,50	2,92	0,32	3,81	3		●		
NG3189LK	4,80	2,92	0,57	3,81	3	●	●	●	
NG4M300LK	3,00	1,02	0,19	3,81	4		●		
NG4125LK	3,18	1,06	0,19	3,81	4	●	●		
NG4M350LK	3,50	2,92	0,57	6,35	4		●	●	
NG4M400LK	4,00	2,92	0,57	6,35	4	●	●	●	
NG4M450LK	4,50	2,92	0,57	6,35	4		●		
NG4189LK	4,80	2,92	0,57	6,35	4	●	●		
NG4M500LK	5,00	2,92	0,32	6,35	4	●	●	●	
NG4M550LK	5,50	3,81	0,57	6,35	4		●		
NG4M600LK	6,00	3,81	0,57	6,35	4		●	●	
NG4250LK	6,35	3,81	0,57	6,35	4	●	●		





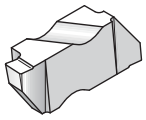
● first choice
○ alternate choice

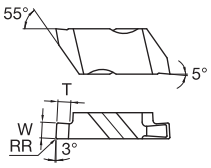
P		●	●	●						
M		●	●	○						
K		●	●	○	○					
N		○	○		●					
S		●	●		●					
H		○								

■ NGD-K

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

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





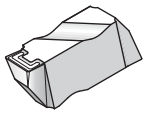
● first choice
○ alternate choice

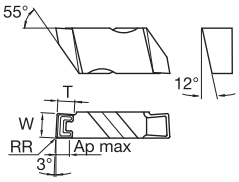
P	●	●	●		
M	●	●	○		
K	●	●	○	○	
N	○	○		●	
S	●	●		●	
H	○				

■ NGP

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

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





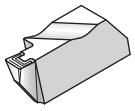
● first choice
○ alternate choice

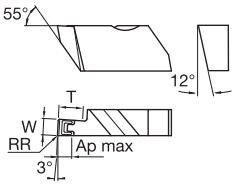
		TN6010	TN6025	TN7110	THM
P		●	●	●	
M		●	●	○	
K		●	●	○	○
N		○	○		●
S		●	●		●
H		○			

NF-K

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

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

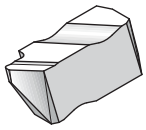


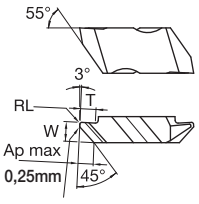


NFD-K

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

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





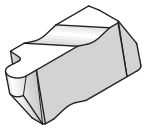
● first choice
○ alternate choice

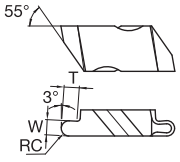
P	●	●	●		
M	●	●	○		
K	●	●	○	○	
N	○	○		●	
S	●	●		●	
H	○				

■ NP-K

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

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





■ NR

catalogue number	W mm	Ap max mm	RC mm	T mm	insert size	TN6010	TN6025	TN7110	THM
right hand									
NR2M050R	1,00	–	0,50	1,27	2	●	●	●	
NR2M075R	1,50	–	0,75	2,79	2	●	●	●	
NR2031R	1,58	–	0,79	2,79	2	●	●		
NR2M100R	2,00	–	1,00	2,79	2	●	●	●	
NR2047R	2,39	–	1,19	2,79	2		●		
NR2M125R	2,50	–	1,25	2,79	2	●	●	●	
NR2M150R	3,00	–	1,50	2,79	2	●	●	●	
NR2M175R	3,50	–	1,75	2,79	2	●	●	●	
NR3031R	1,58	–	0,79	2,39	3	●	●		●
NR3M100R	2,00	–	1,00	2,39	3	●	●	●	
NR3047R	2,39	–	1,19	3,81	3	●	●		●
NR3M125R	2,50	–	1,25	3,81	3	●	●	●	
NR3M150R	3,00	–	1,50	3,81	3	●	●	●	
NR3062R	3,18	–	1,59	3,81	3	●	●		●
NR3M175R	3,50	–	1,75	3,81	3	●	●	●	
NR3M200R	4,00	–	2,00	3,81	3	●	●	●	
NR3M225R	4,50	–	2,25	3,81	3	●	●	●	
NR3094R	4,78	–	2,39	3,81	3	●	●		
NR4M200R	4,00	–	2,00	6,35	4	●	●	●	
NR4M225R	4,50	–	2,25	6,35	4	●	●	●	
NR4M250R	5,00	–	2,50	6,35	4	●	●	●	
NR4125R	6,35	–	3,18	6,35	4	●	●		

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

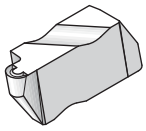
(continued)

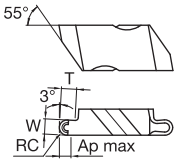
(NR continued)

● first choice
○ alternate choice

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

catalogue number	W mm	Ap max mm	RC mm	T mm	insert size	TN6010	TN6025	TN7110	THM
left hand									
NR2M050L	1,00	–	0,50	1,27	2	●	●	●	
NR2M075L	1,50	–	0,75	2,79	2	●	●	●	
NR2031L	1,58	–	0,79	2,79	2	●	●		
NR2M100L	2,00	–	1,00	2,79	2	●	●	●	
NR2047L	2,39	–	1,19	2,79	2		●		
NR2M125L	2,50	–	1,25	2,79	2	●	●	●	
NR2M150L	3,00	–	1,50	2,79	2	●	●	●	
NR2M175L	3,50	–	1,75	2,79	2	●	●	●	
NR3031L	1,58	–	0,79	2,39	3	●	●		●
NR3M100L	2,00	–	1,00	2,39	3	●	●	●	
NR3047L	2,39	–	1,19	3,81	3	●	●		●
NR3M125L	2,50	–	1,25	3,81	3	●	●	●	
NR3M150L	3,00	–	1,50	3,81	3	●	●	●	
NR3062L	3,18	–	1,59	3,81	3	●	●		●
NR3M175L	3,50	–	1,75	3,81	3	●	●	●	
NR3M200L	4,00	–	2,00	3,81	3	●	●	●	
NR3M225L	4,50	–	2,25	3,81	3	●	●	●	
NR3094L	4,78	–	2,39	3,81	3	●	●		
NR4M200L	4,00	–	2,00	6,35	4	●	●	●	
NR4M225L	4,50	–	2,25	6,35	4	●	●	●	
NR4M250L	5,00	–	2,50	6,35	4	●	●	●	
NR4125L	6,35	–	3,18	6,35	4	●	●		





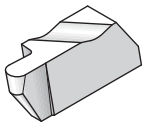
● first choice
○ alternate choice

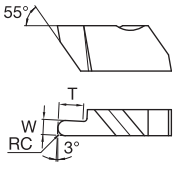
P		●	●	●					
M		●	●	○					
K		●	●	○	○				
N		○	○		●				
S		●	●		●				
H		○							

■ NR-K

catalogue number	W mm	Ap max mm	RC mm	T mm	insert size	TN6010	TN6025	TN7110	THM
right hand									
NR3031RK	1,57	1,97	0,79	2,39	3	●	●		
NR3047RK	2,39	1,91	1,19	3,81	3	●	●		
NR3062RK	3,18	2,92	1,59	3,81	3	●	●		
NR3078RK	3,96	2,54	1,98	3,81	3	●	●		
NR4062RK	3,18	2,92	1,59	3,81	4	●	●		
NR4094RK	4,78	3,81	2,39	6,35	4	●	●		
NR4125RK	6,35	3,81	3,18	6,35	4	●	●		
left hand									
NR3031LK	1,58	1,98	0,79	2,39	3	●	●		
NR3047LK	2,39	1,91	1,19	3,81	3	●	●		
NR3062LK	3,18	2,92	1,59	3,81	3	●	●		
NR3078LK	3,96	2,54	1,98	3,81	3	●	●		
NR4062LK	3,18	2,92	1,59	3,81	4	●	●		
NR4094LK	4,78	3,81	2,39	6,35	4	●	●		
NR4125LK	6,35	3,81	3,18	6,35	4	●	●		

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

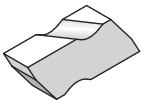


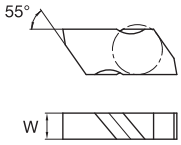


■ NRD

catalogue number	W mm	Ap max mm	RC mm	T mm	insert size	cutting edges	TN6010	TN6025	TN7110	THM
right hand										
NRD3031R	1,58	—	0,79	3,18	3	2	●	●		
NRD3062R	3,18	—	1,59	6,35	3	1	●	●		
NRD4062R	3,18	—	1,59	6,35	4	2	●	●		
NRD4125R	6,35	—	3,18	12,70	4	1	●	●		
left hand										
NRD3031L	1,58	—	0,79	3,18	3	2	●	●		
NRD3062L	3,18	—	1,59	6,35	3	1	●	●		
NRD4062L	3,18	—	1,59	6,35	4	2	●	●		
NRD4125L	6,35	—	3,18	12,70	4	1	●	●		

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





● first choice
○ alternate choice

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

■ NB

catalogue number	W mm	insert size	TN6010	TN6025	TN7110	THM
right hand						
NB2R	3,81	2				●
NB3R	4,95	3				●
left hand						
NB2L	3,81	2				●
NB3L	4,95	3				●

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

TopGroove Inserts: The Best Platform for Customisation

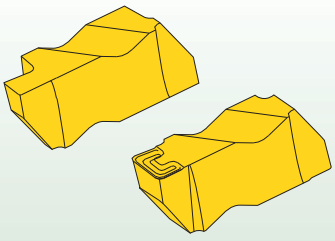
All TopGroove custom order inserts benefit from the superior rigidity of our TopGroove toolholder and clamping system. For added productivity, most custom orders can be incorporated into the double-ended inserts.

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

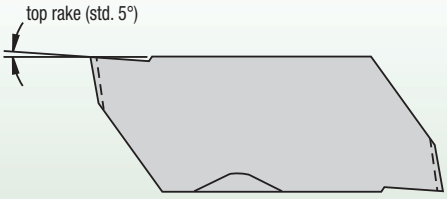
State-of-the-art CAD enables rapid development of your custom insert design. For convenience, a concept drawing is always available to facilitate engineering development of an insert.

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

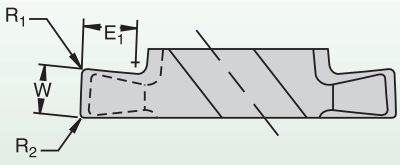
Whatever your special grooving requirements may be, WIDIA can provide an effective solution. We have the technical expertise, resources, and commitment to help you develop insert designs that satisfy your metalcutting application demands.



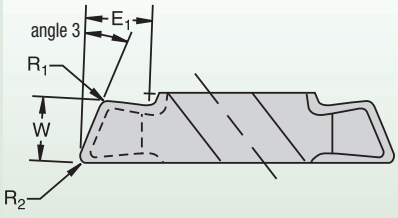
top rake



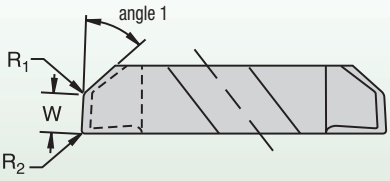
style A



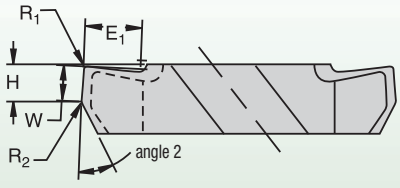
style B1



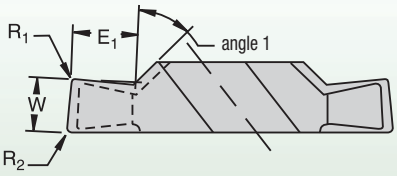
style B2



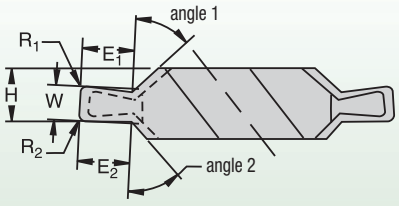
style B3



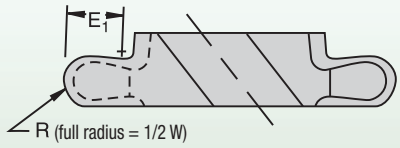
style B4



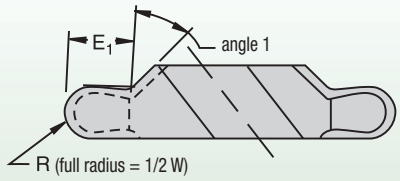
style C1



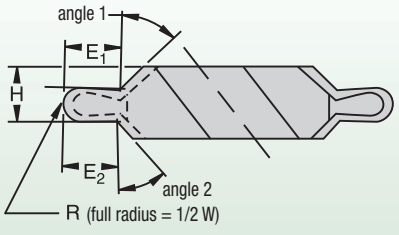
style D



style F



style G



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

TopGroove™ Grooving Systems

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

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

Date / /

Customer-Specified Dimensions

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

Orientation (circle one) left hand right hand

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

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

Closest Catalogue Standard

Customer

Distributor

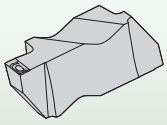
Shipping Requirements

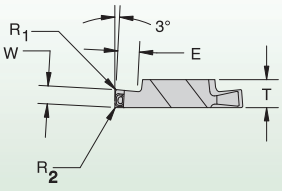
Attention Distributors: Use this worksheet to collect information for your customer.

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

A-SK Specials

- 10° positive cutting action
- Grooving
- Face grooving





insert catalogue number		width range W	corner radii range R_1 and R_2	E	T	grades
right hand	left hand					
NG2-R-SK or NF2-R-SK	**NG2-L-SK or NF2-L-SK**	0,66–1,42 1,45–3,43	0,00–0,18 0,08–0,33	1,27 2,79	3,810	Carbide grades quoted upon request. **See page A46.**
NG3-R-SK or NF3-R-SK	**NG3-L-SK or NF3-L-SK**	1,07–1,70 1,73–1,93 1,96–2,39 2,41–2,67 2,69–3,18 3,20–3,40 3,43–3,96 3,99–4,42 4,67–4,98	0,08–0,33 0,13–0,51 0,13–0,76 0,13–0,51 0,13–0,76 0,13–0,51 0,13–0,76 0,20–0,46 0,46–0,71	2,39 2,39 3,81 3,81 3,81 3,81 3,81 3,81 3,81	4,950	
NG4-R-SK or NF4-R-SK	**NG4-L-SK or NF4-L-SK**	2,54–2,79 2,82–3,18 3,20–3,33 3,35–3,96 3,99–4,11 3,89–4,80 4,83–4,85 4,88–5,18 6,22–6,53	0,13–0,51 0,13–0,76 0,13–0,51 0,13–0,76 0,13–0,51 0,13–0,76 0,46–0,71 0,20–0,46 0,46–0,64	3,81 3,81 3,81 3,81 3,81 6,35 6,35 6,35 6,35	6,480	

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

Order example: NF3R-SK W=2,29; R_1=0,25; R_2=0,25; grade TN6010.

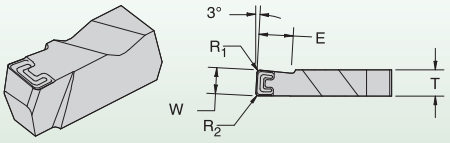
Standard tolerance of ±0,03mm on width (W) will be applied unless specified otherwise. Standard tolerance of ±0,06mm on radii (R_1 and R_2) will be applied unless specified otherwise.

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

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

Specials

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



insert catalogue number		width range W	corner radii range R_1 and R_2	E	T	grades
right hand	left hand					
NGD3-R-SK or NFD3-R-SK	**NGD3-L-SK or NFD3-L-SK**	1,45–1,75 2,26–2,57* 3,05–3,35* 4,67–4,98*	.008–.033 .008–.033 .008–.033 .046–.071	3,18 6,35 6,35 6,35	4,95	Carbide grades quoted upon request. **See page A46.**
NGD4-R-SK or NFD4-R-SK	**NGD4-L-SK or NFD4-L-SK**	3,05–3,35* 4,57–4,98* 6,22–6,53*	.008–.033 .046–.071 .046–.071	6,35 9,53 12,70	6,48	

**One cutting edge.*

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

Order example: NF3R-SK W=2,0; R_1=0,09; R_2=0,09; grade TN6010.

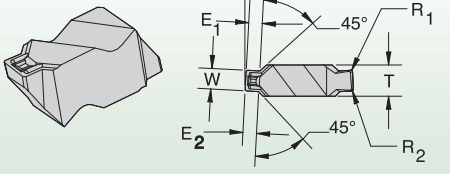
Unless otherwise specified, a standard tolerance of ±0,025mm on width (W) will be applied, and a standard tolerance of ±0,063mm on radii (R_1 and R_2) will be applied.

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

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

C1-SK Specials

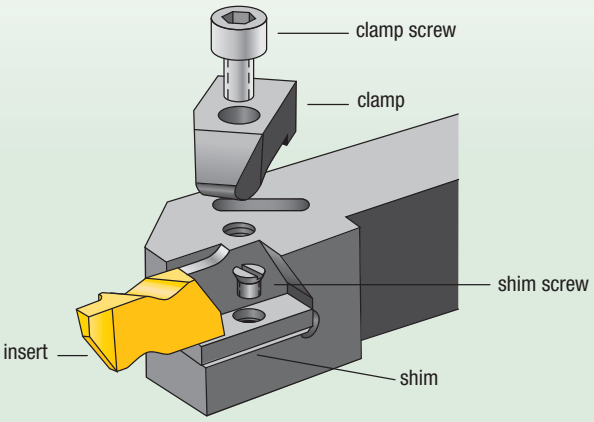
- Groove and chamfer



insert catalogue number		width range W	corner radii range R_1 and R_2	E	T	grades
right hand	left hand					
NB2-R-K	**NB2-L-K**	1,19–3,18	0,13–0,38	2,54	3,81	Carbide grades quoted upon request. **See page A46.**
NB3-R-K	**NB3-L-K**	2,39–4,32	0,13–0,64	3,81	4,95	

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

TopGroove Toolholders and Boring Bars



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

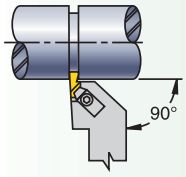
**25mm diameter boring head.*

***Boring head.*

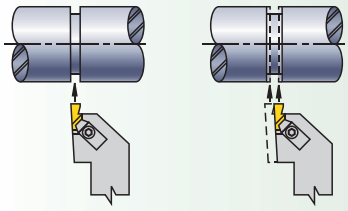
Grooving Tool Failure and Solution Guide

Practical Solutions to Common Grooving Problems

Holder Position for Grooving Operation

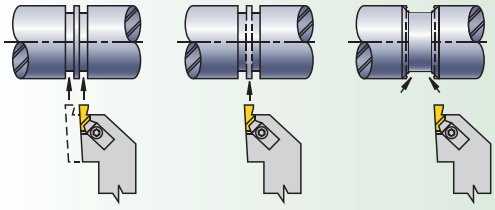


How to Cut a Groove Slightly Wider than the Groove Tool



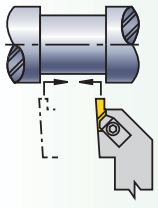
1. Plunge the centre of the groove.
2. Plunge each side of the groove to get the specified width. Use a slower feed rate when cutting groove sides.

How to Cut Wider Grooves



1. Plunge out both sides of groove width.
2. Plunge centre 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.

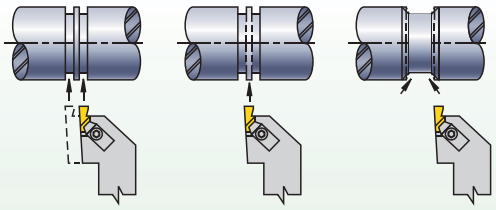
Finish Turning the Groove



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 centre 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 centre 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 centre 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 centre of the workpiece or up to 0,13mm above.
- Dwell time in the bottom of the groove (more than three revolutions) is not recommended.
- Chip control is feed rate related and should be adjusted to fit the particular situation. Recommended feed range is 0,08–0,3 mm/rev.

Machining Guidelines for Chip Control • Turning/Profiling

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

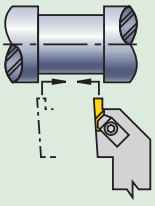
- 0,79mm–1,6mm wide insert can cut up to 0,6mm deep.
- 1,7mm–3,3mm wide insert can cut up to 1mm deep.
- 3,5mm–4,8mm wide insert can cut up to 2mm deep.
- 5,0mm–6,35mm wide insert can cut up to 3mm deep.

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

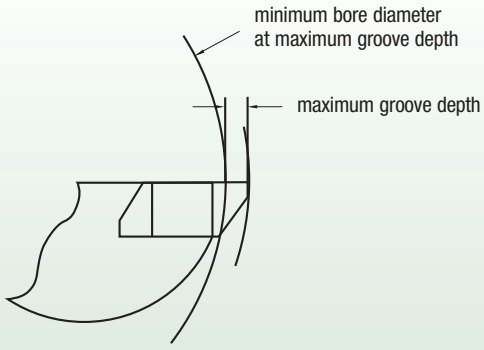
The same internal grooving depth limits are a function of bar clearance versus bore diameters.

Finish Turning the Groove



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

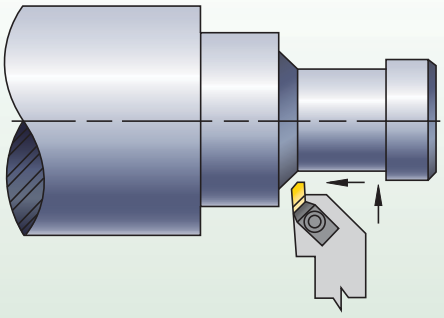
Internal Groove Depth versus Bar Interference



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

Machining Guidelines for Back Turning/Turning/Profiling

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



Machining Guidelines for Using TopGroove Deep Grooving Inserts (NGD)

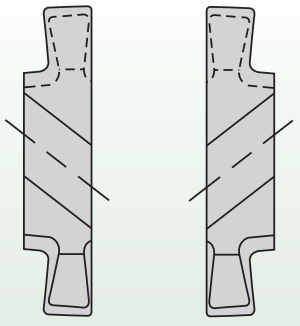
Typically, those NGD- and NRD-style inserts with two cutting edges require no machine offset changes. However, those inserts with only one cutting edge do require offset changes. Refer to the chart here to ensure proper offset adjustments.

insert catalogue number	add to C dimension	add to F dimension
NGD-3062	0,00	0,00
NGD-3094	2,54	2,54
NGD-3125	2,54	2,54
NGD-3189	2,54	2,54
NGD-4125	0,00	0,00
NGD-4189	3,18	3,18
NGD-4250	6,35	6,35
NRD-3031	0,00	0,00
NRD-3062	2,54	2,54
NRD-4062	0,00	0,00
NRD-4094	6,35	6,35
NRD-4125	6,35	6,35

TopGroove Insert Selection Guide

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

See page A46 for carbide grade selection and more technical information.

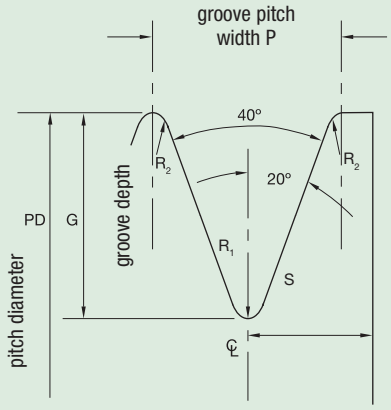


left-hand insert right-hand insert

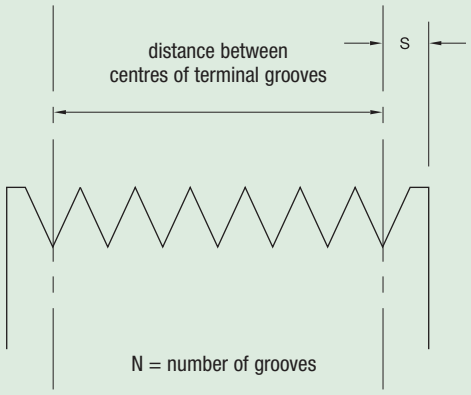
Machining Guidelines for Poly-Vee Grooving with Custom Solution and TopGroove NV Inserts (NV3-J and NV4-L)

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

Section J



Section L

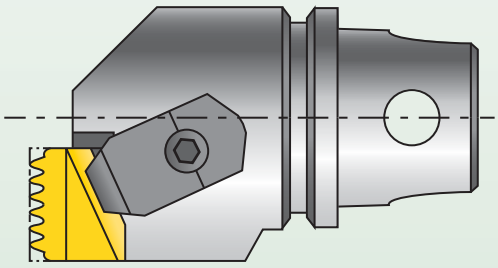


Groove Dimensions and Tolerances for Sheaves

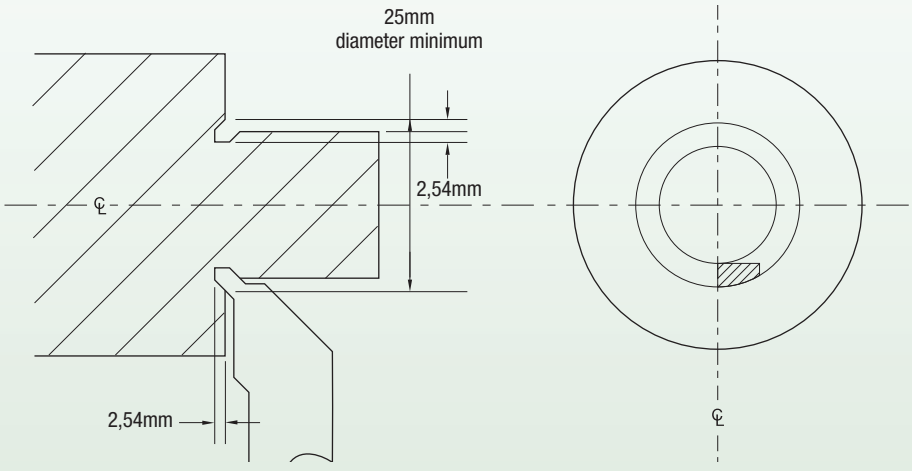
groove cross section	pitch width (P)	groove depth (G)	minimum radius (R2)	radius (R1)	terminal distance	distance between centres of terminal grooves and maximum accumulated tolerance
J	2,34 ±0,03	2,21 ±0,13	0,20	0,32 ±0,06	3,18	(N-1)4,88 ±0,25
L	4,70 ±0,05	5,11 ±0,13	0,38	0,32 ±0,06	9,53	(N-1)4,70 ±0,25

Multiple Tooth Poly-Vee Grooving

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



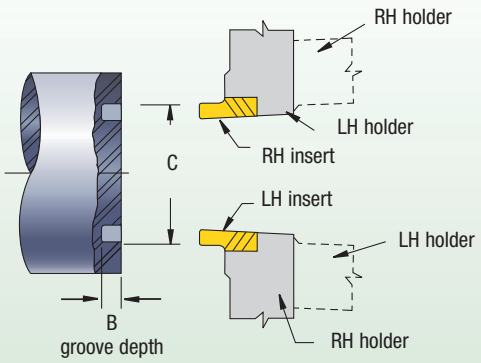
Machining Guidelines for Undercutting Operations Performed with Custom Solution and TopGroove NU Inserts (NU3094, NU3125, and NU3156)



NOTE: Products shown are non-standard items.

Machining Guidelines for Face Grooving Operations • External

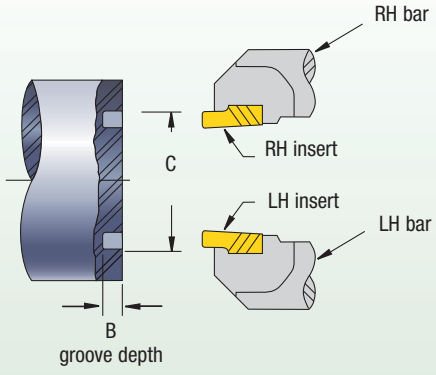
Toolholders



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

Machining Guidelines for Face Grooving Operations • External

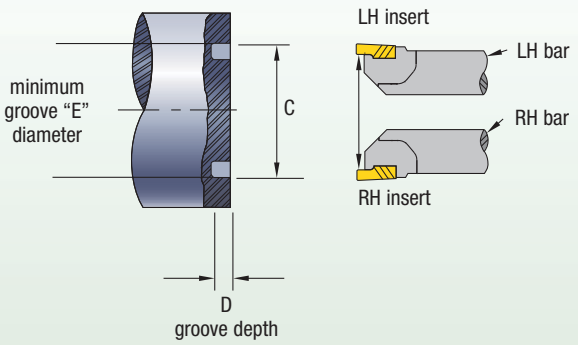
Boring Bars



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

Machining Guidelines for Face Grooving Operations • Internal

Boring Bars



Standard NG/NGD Inserts		
insert family	**maximum groove depth D mm**	**minimum groove diameter E mm**
NFD-3-KI	6,35	63,5 *NOTE: Also check minimum bore diameter of boring bar. See page A41.*

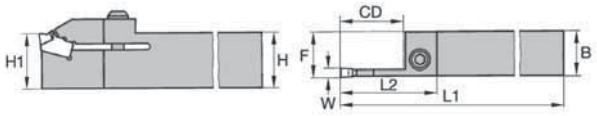
ProGroove™

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.

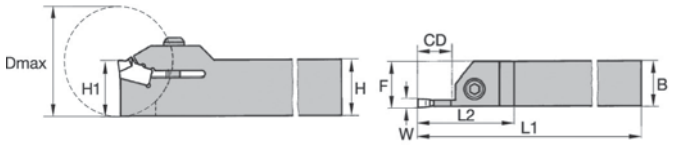
ProGroove



Right Hand Tool

Grooving and Cut-Off

order number	catalogue number	W	CD	H	B	F	L1	L2	H1	cap screw	wrench
	right hand										
2007136	12251782000	2,10	16,0	16	16	16,2	100	27	16	12146012600	12148041100
2022560	12251783000	3,10	20,0	20	20	20,3	125	32	20	12148596200	12148041200
2007142	12251783200	3,10	25,0	25	25	25,3	150	40	25	12148596200	12148041200
2008153	12251783600	3,10	25,0	32	25	25,3	170	40	32	12148596200	12148041200
2022562	12251784000	4,10	25,0	20	20	20,4	125	40	20	12148596200	12148041200
2007148	12251784200	4,10	25,0	25	25	25,4	150	40	25	12148596200	12148041200
2015814	12251784400	4,10	32,0	32	25	25,4	170	53	32	12148596200	12148041200
2022564	12251785200	5,10	32,0	25	25	25,4	150	53	25	12148596200	12148041200
2022566	12251785400	5,10	32,0	32	25	25,4	170	53	32	12148596200	12148041200
2022568	12251786400	6,10	32,0	32	25	25,5	170	53	32	12146012700	12148041300
2022569	12251788400	8,10	40,0	32	25	25,6	170	66	32	12146012700	12148041300
	left hand										
2007139	12251782100	2,10	16,0	16	16	16,2	100	27	16	12146012600	12148041100
2022561	12251783100	3,10	20,0	20	20	20,3	125	32	20	12148596200	12148041200
2007145	12251783300	3,10	25,0	25	25	25,3	150	40	25	12148596200	12148041200
2008150	12251783700	3,10	25,0	32	25	25,3	170	40	32	12148596200	12148041200
2022563	12251784100	4,10	25,0	20	20	20,4	125	40	20	12148596200	12148041200
2007151	12251784300	4,10	25,0	25	25	25,4	150	40	25	12148596200	12148041200
2015816	12251784500	4,10	32,0	32	25	25,4	170	53	32	12148596200	12148041200
2022565	12251785300	5,10	32,0	25	25	25,4	150	53	25	12148596200	12148041200
2022567	12251785500	5,10	32,0	32	25	25,4	170	53	32	12148596200	12148041200
2015839	12251786500	6,10	32,0	32	25	25,5	170	53	32	12146012700	12148041300
2015842	12251788500	8,10	40,0	32	25	25,6	170	66	32	12146012700	12148041300

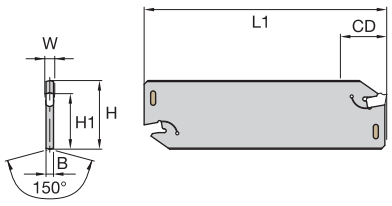


Right Hand Tool

Grooving and Profiling

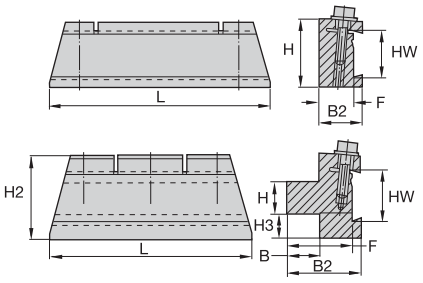
order number	catalogue number	W	CD	D max	H	B	F	L1	L2	H1	cap screw	wrench
	right hand											
2007105	**12251762000**	2,10	10,0	25,4	16	16	16,2	100	26	16	**12146012600**	**12148041100**
2007832	**12251762200**	2,10	10,0	25,4	20	20	20,2	125	26	25	**12146012600**	**12148041100**
2021637	**12251762400**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

NOTE: Select shorter CD dimension for added stability.



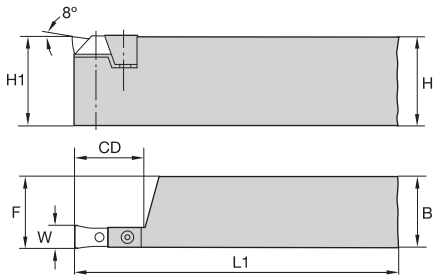
Cut-Off Blades

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



Cut-Off Blade Holders

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



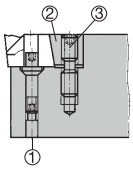
Right Hand Tool

Grooving

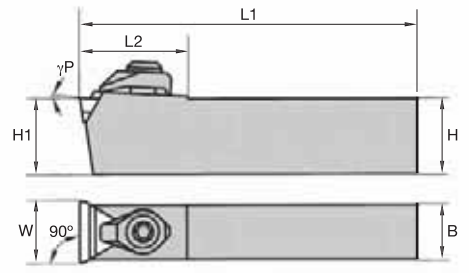
order number	catalogue number	W	CD	H	H1	B	L1	F
	right hand							
2022446	**12250110100**	8	20	32	32	25	170	25,5
2008147	**12250110300**	10	20	32	32	25	170	25,5
2021719	**12250110500**	12	25	40	40	32	200	33,0
2021721	**12250110700**	14	28	40	40	32	200	33,0
2008521	**12250110900**	16	32	40	40	32	200	33,0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

Spare Parts

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



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



Grooving

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

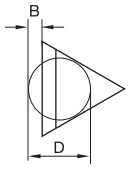
NOTE: KS holders are supplied without chipbreaker. For chipbreaker order numbers, see below.

For Grooving without Chipbreaker

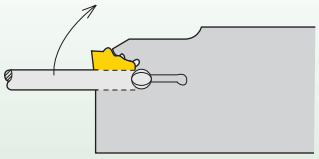
catalogue number	clamp	clamp screw	shim	shim screw	washer	wrench
12191061900	12148589300	12148589800	12148032586	12148021900	–	12148041100
12191062086	12148583800	12148586000	12148031686	12148024100	12148024200	12148041200
12191062586	12148583800	12148586000	12148031686	12148024100	12148024200	12148041200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

For Grooving with Chipbreaker (Order Additional Clamp and Chipbreaker)

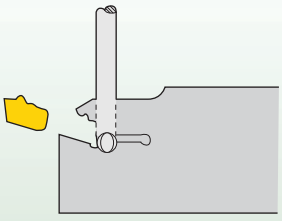
insert	clamp with chipbreaker	D	Chipbreakers B — Edge Width 0,4mm	1,2mm	1,8mm	2,5mm	3,2mm	4,0mm
TP...1103...	12148589200	6,35	12148591011	12148588211	12148588311	12148588411	–	–
TP...1603...	12148589300	9,52	12148591111	12148586611	12148587011	12148587111	12148580011	–
TP...2204...	12148586900	12,70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



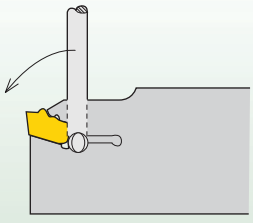
ProGroove System



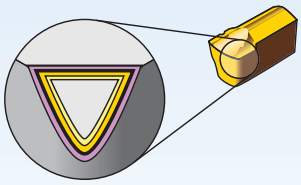
To change the cutting insert, place the wrench into the blade recess.
The blade mouth is opened by turning through 90°.



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



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



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

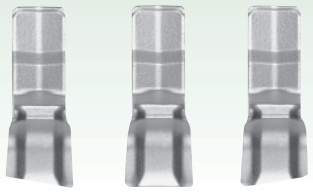
- Reduce cycle times — high speed and feed capability.
- Longer tool life — new multilayer coating provides better wear resistance.

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

Grade

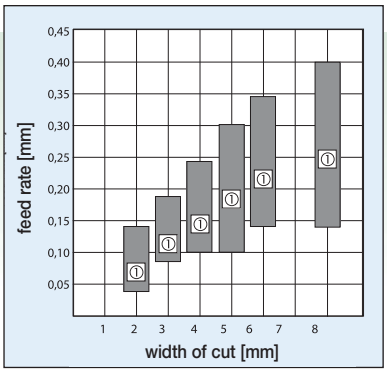
Coating	Grade Description	05	10	15	20	25	30	35	40	45
TN6030 HC-P30	PVD-TiAlN Nano-layer coated carbide. Medium and heavy machining for steels and nodular cast irons. Recommended at medium cutting speeds when good toughness properties are required.	P	P	P	P	P	P	P		
		M	M	M	M	M	M	M		
		K	K	K	K	K	K	K		
TN7525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

ProGroove • U



left hand neutral right hand

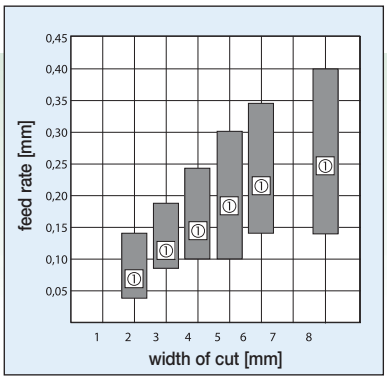
For grooving and parting operations, universal use.
Positive chipbreaker groove for light cutting action.
Right-hand and left-hand styles with 6° front angle.



① Recommended feed

ProGroove • M

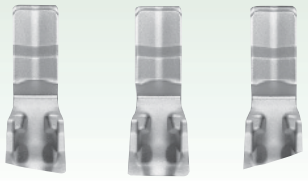
neutral



① Recommended feed

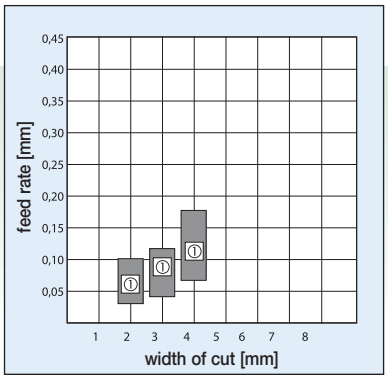
For grooving and parting, also capable of copy and straight turning as well as chamfering. With additional chip forming element for good chip control with varying depths of cut.

ProGroove • S



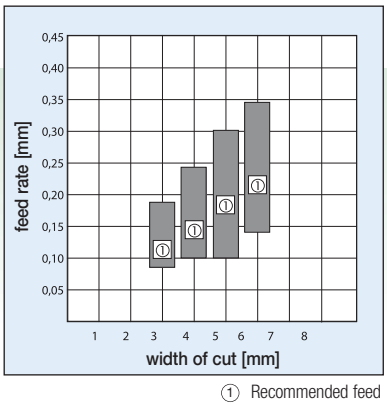
left hand neutral right hand

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



① Recommended feed

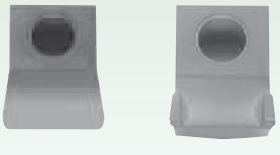
ProGroove • R



① Recommended feed

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

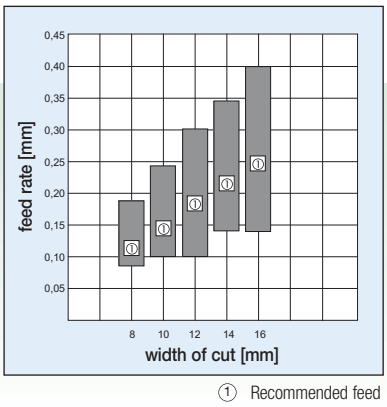
LG System • 0 and 1



0 1

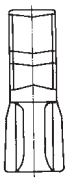
…0
Inserts with wide range of applications in grooving and deep grooving. With additional chip control element for good chip control, even with varying widths of cut.

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



① Recommended feed

ANSI ISO 513	VDI 3323	Cutting Speed • vc m/min																	
Material Group		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
		TN6030			TN7525			TN7535			TN8025			THM			TTM		
P	1	130	**140**	150	200	**215**	230	140	**175**	210	—	—	—	—	—	—	90	**95**	100
	2	120	**160**	200	190	**245**	300	130	**160**	190	—	—	—	—	—	—	90	**105**	140
	3	100	**130**	160	160	**205**	250	110	**140**	170	—	—	—	—	—	—	70	**90**	110
	4	120	**150**	180	180	**230**	280	120	**150**	180	—	—	—	—	—	—	80	**105**	130
	5	100	**130**	160	150	**195**	240	100	**130**	160	—	—	—	—	—	—	70	**90**	110
	6	120	**150**	180	180	**230**	280	120	**150**	180	—	—	—	—	—	—	80	**105**	130
	7	90	**125**	160	140	**190**	240	100	**130**	160	—	—	—	—	—	—	60	**85**	110
	8	80	**110**	140	120	**170**	220	90	**120**	150	—	—	—	—	—	—	50	**75**	100
	9	60	**80**	100	90	**125**	160	60	**90**	120	—	—	—	—	—	—	40	**50**	70
	10	80	**95**	110	130	**150**	170	90	**105**	120	—	—	—	—	—	—	60	**70**	80
	11	50	**65**	80	80	**105**	130	50	**65**	80	—	—	—	—	—	—	40	**50**	60
	12	120	**140**	160	180	**210**	240	120	**155**	190	—	—	—	—	—	—	80	**95**	110
	13.1	80	**105**	130	130	**165**	200	90	**120**	150	—	—	—	—	—	—	60	**75**	90
	13.2	40	**55**	65	65	**85**	100	45	**60**	75							30	**40**	45
		TN6030			TN7525			TN7535			TN8025			THM			TTM		
M	14.1	90	**110**	140	—	—	—	—	—	—	90	**120**	150	—	—	—	60	**75**	90
	14.2	75	**90**	115	—	—	—	—	—	—	75	**100**	120	—	—	—	50	**60**	75
	14.3	55	**70**	90	—	—	—	—	—	—	55	**75**	95	—	—	—	40	**50**	55
	14.4	45	**60**	70	—	—	—	—	—	—	45	**60**	75	—	—	—	30	**40**	45
		TN6030			TN7525			TN7535			TN8025			THM			TTM		
K	15	70	**90**	100	140	**170**	200	—	—	—	—	—	—	70	**90**	100	—	—	—
	16	50	**65**	80	100	**130**	160	—	—	—	—	—	—	50	**65**	80	—	—	—
	17	60	**70**	80	120	**150**	180	—	—	—	—	—	—	60	**70**	80	—	—	—
	18	40	**55**	70	90	**120**	150	—	—	—	—	—	—	40	**55**	70	—	—	—
	19	80	**95**	110	150	**180**	210	—	—	—	—	—	—	80	**95**	110	—	—	—
	20	60	**75**	90	110	**140**	170							60	**75**	90			
		TN6030			TN7525			TN7535			TN8025			THM			TTM		
N	21	—	—	—	—	—	—	—	—	—	—	—	—	600	**750**	900	—	—	—
	22	—	—	—	—	—	—	—	—	—	—	—	—	500	**650**	800	—	—	—
	23	—	—	—	—	—	—	—	—	—	—	—	—	600	**750**	900	—	—	—
	24	—	—	—	—	—	—	—	—	—	—	—	—	500	**650**	800	—	—	—
	25	—	—	—	—	—	—	—	—	—	—	—	—	230	**300**	370	—	—	—
	26	—	—	—	—	—	—	—	—	—	—	—	—	150	**200**	250	—	—	—
	27	—	—	—	—	—	—	—	—	—	—	—	—	150	**200**	250	—	—	—
	28	—	—	—	—	—	—	—	—	—	—	—	—	110	**140**	170	—	—	—
	29	—	—	—	—	—	—	—	—	—	—	—	—	60	**80**	100	—	—	—
	30													80	**100**	120			
		TN6030			TN7525			TN7535			TN8025			THM			TTM		
S	31	—	—	—	—	—	—	—	—	—	—	—	—	26	**37**	45	—	—	—
	32	—	—	—	—	—	—	—	—	—	—	—	—	21	**30**	36	—	—	—
	33	—	—	—	—	—	—	—	—	—	—	—	—	17	**24**	28	—	—	—
	34	—	—	—	—	—	—	—	—	—	—	—	—	11	**15**	18	—	—	—
	35	—	—	—	—	—	—	—	—	—	—	—	—	11	**16**	18	—	—	—
	36	—	—	—	—	—	—	—	—	—	—	—	—	42	**60**	72	—	—	—
	37	—	—	—	—	—	—	—	—	—	—	—	—	21	**30**	36	—	—	—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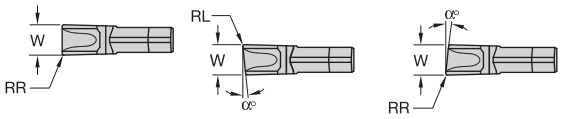


● first choice
○ alternate choice

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

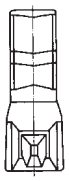
■ PGU

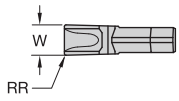
catalogue number	W	RR	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
A20PROGROOVEUN	2,10	0,20	–	N - Neutral	●	●	●	●	●	
A30PROGROOVEUN	3,10	0,30	–	N - Neutral	●	●	●	●	●	
123567340	4,10	0,30	–	N - Neutral	●	●	●		●	
123567350	5,10	0,30	–	N - Neutral	●	●	●	●	●	
123567360	6,10	0,40	–	N - Neutral	●	●	●	●	●	
123567380	8,15	0,60	–	N - Neutral	●	●	●	●	●	

catalogue number	W	RR	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567231	3,10	0,25	6	L - Left	●	●	●			
A40PROGROOVEUR	4,10	0,25	6	L - Left	●	●	●			

catalogue number	W	RL	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
A30PROGROOVEUR	3,10	0,25	6	R - Right	●	●	●			
123567240	4,10	0,25	6	R - Right	●	●	●			

NOTE: W tolerance on all = ±0,05mm.

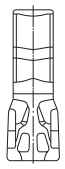

M

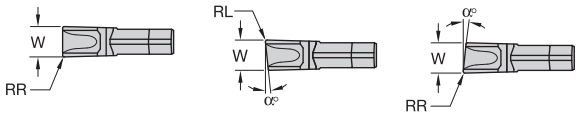


■ PGM

catalogue number	W	RR	α°	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567420	2,10	0,20	–	●	●	●			
A30PROGROOVEMN	3,10	0,30	–	●	●	●			
A40PROGROOVEMN	4,10	0,30	–	●	●	●			
123567450	5,10	0,30	–	●	●	●			
123567460	6,10	0,40	–	●	●	●			
123567480	8,15	0,60	–	●	●	●			

NOTE: W tolerance on all = ±0,05mm.





● first choice
○ alternate choice

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

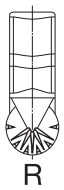
PGS

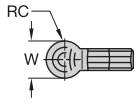
catalogue number	W	RR	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567702	2,25	0,20	—	N - Neutral			●	●		
123567703	3,25	0,20	—	N - Neutral			●	●		
123567704	4,25	0,20	—	N - Neutral			●	●		

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

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

NOTE: W tolerance on all = ±0,05mm.

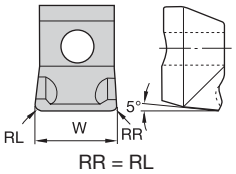




PGR

catalogue number	W	RC	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567803	3,00	1,50		●				
A40PROGROOVERN20	4,00	2,00		●				
123567805	5,00	2,50		●				
A60PROGROOVERN30	6,00	3,00		●				

NOTE: W tolerance on all = ±0,07mm.



RR = RL

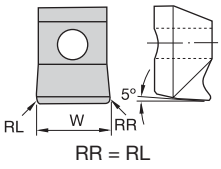
● first choice
○ alternate choice

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

■ LGN0

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

NOTE: W tolerance on all = ±0,05mm.



RR = RL

■ LGN1

catalogue number	W	RR						
A81LTGROOVEN1	8,15	0,80					●	
123568101	10,15	0,80					●	
123568121	12,20	0,80					●	
A141LTGROOVEN1	14,20	0,80					●	
123568161	16,20	0,80					●	

NOTE: W tolerance on all = ±0,05mm.

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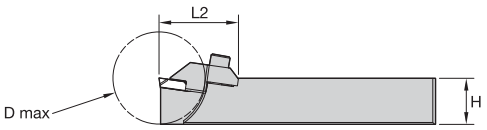
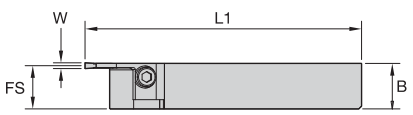
- Toolholder shank sizes 10–31,75mm.
- Cut-off up 76mm bar capacity.

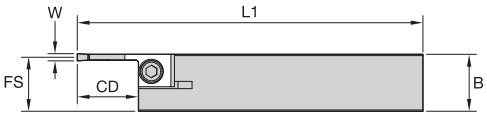
Benefits

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





Left Hand Tool

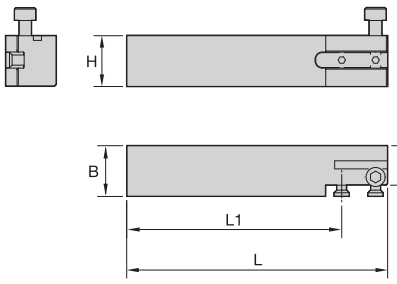


Left Hand Tool

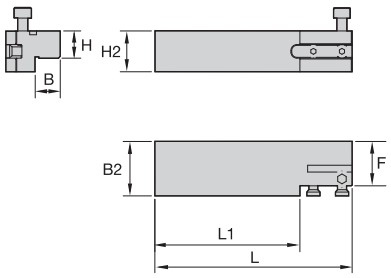
Right Hand Tool

Square Shank

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



Left Hand Tool

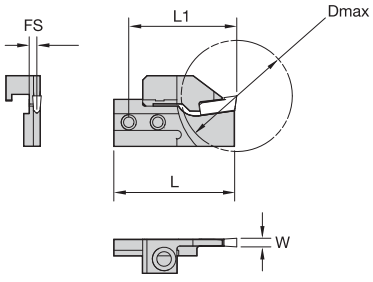


Left Hand Tool

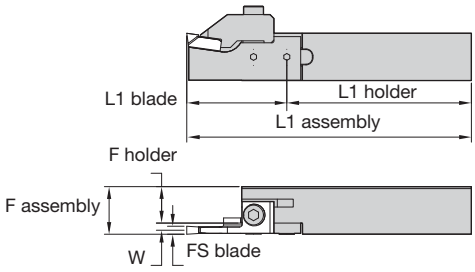
Right Hand Tool

12mm and 20mm Shank Toolholders

order number	catalogue number	H	B	B2	L	L1	H2	F	support blade screw	clamp screw
	right hand									
3538772	**206518**	12,00	11,53	24,99	102,77	84,68	19,05	20,55	**606247**	**MS1495**
3614344	**206522**	20,00	20,00	—	102,77	84,68	—	15,55	**606247**	**MS1495**
	left hand									
3538773	**206519**	12,00	11,53	24,99	102,77	84,68	19,05	20,55	**606247**	**MS1495**
3538774	**206523**	20,00	20,00	—	102,77	84,68	—	15,55	**606247**	**MS1495**



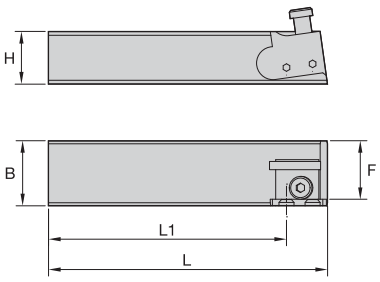
Right Hand Tool



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

12mm and 20mm Shank Blades

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

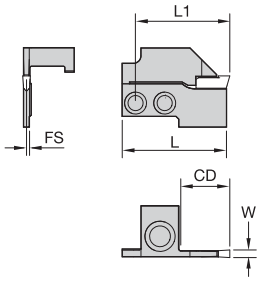


Left Hand Tool

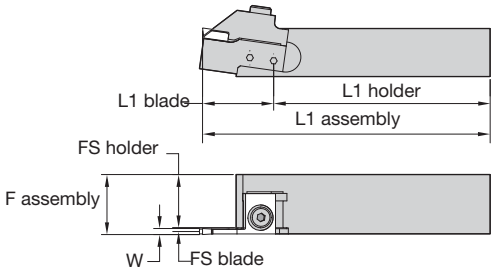

Right Hand Tool

25mm and 32mm Shank Toolholders

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



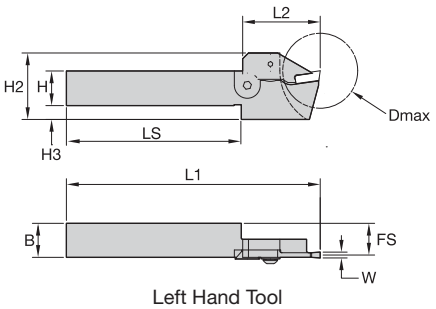
Left Hand Tool



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

25mm and 32mm Shank Blades

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



Left Hand Tool

Sub-Spindle

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

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- Positive mechanical clamping.
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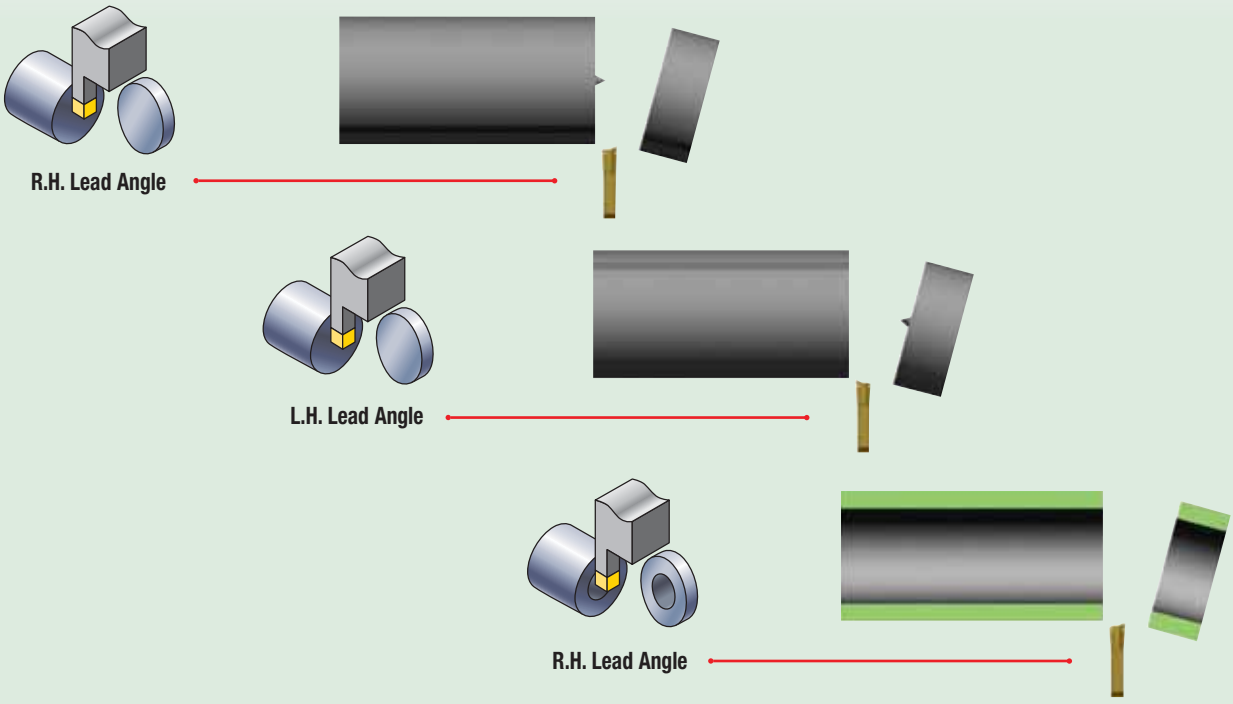
WIDIA™

1 Choose the application to be performed:

Choose lead angle of insert for application.



2 Identify the material to be machined:

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

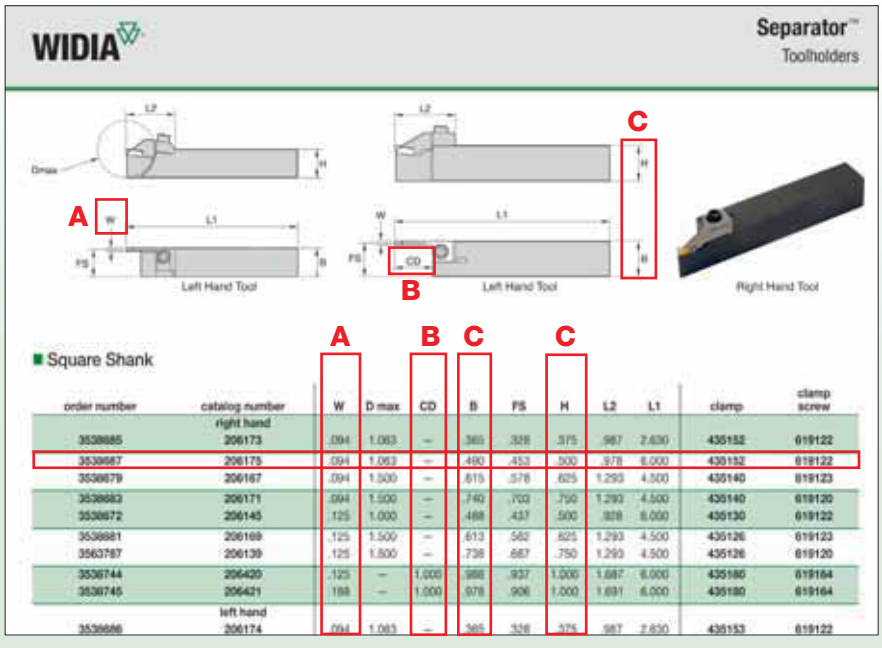
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

3 Select your toolholder based on the application:

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

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

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



order number	catalog number	W	D max	CD	B	FS	H	L2	L1	clamp	clamp screw
	right hand										
3538685	206173	.094	1.063	–	.360	.328	.375	.987	2.630	435152	619122
3539687	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
3536744	206420	.125	–	1.000	.988	.937	1.000	1.687	6.000	435180	619164
3536745	206421	.188	–	1.000	.978	.906	1.000	1.691	6.000	435180	619164
	left hand										
3539686	206174	.094	1.063	–	.360	.328	.375	.987	2.630	435153	619122

4 Select chipbreaker style for the application:

See the application guide on page A95 for a complete list of insert styles.

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

5 Select grade:

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

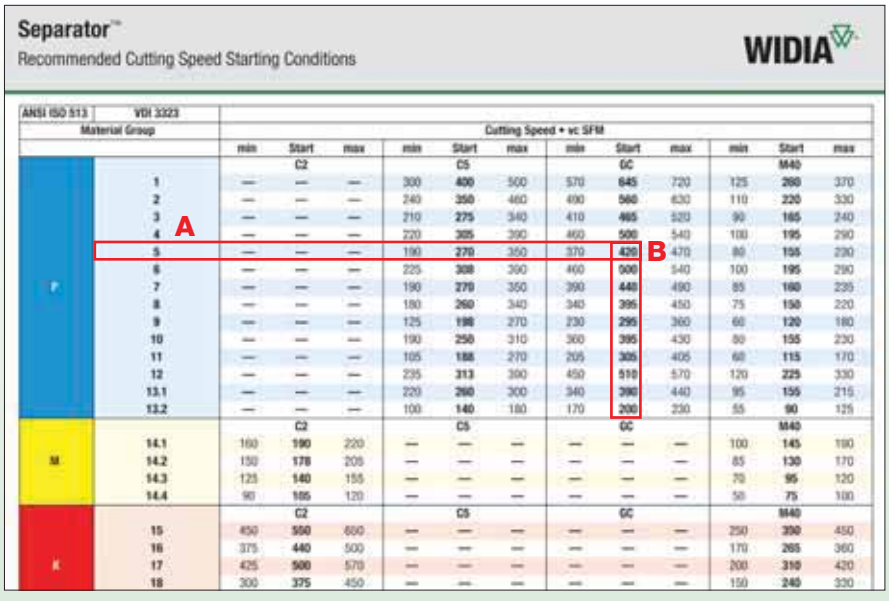
See page A94 for Grades and Grade Descriptions.

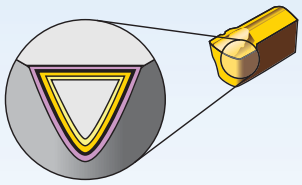
6 Determine cutting data:

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

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

See page A96–A97 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.									

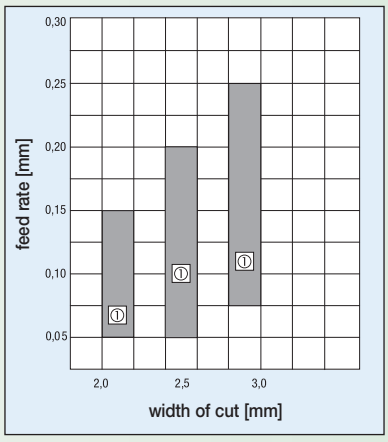
Separator • X² and X²-Ultra

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.



① Recommended feed

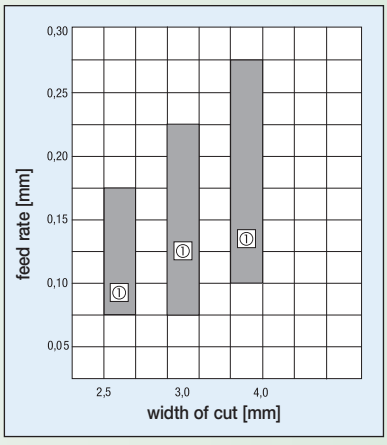
Separator • S² and S²-Ultra

S²

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

S²-Ultra

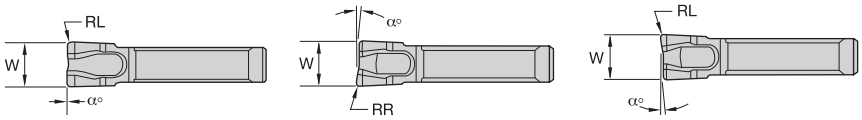
The S²-Ultra is an enhanced version of the S² and is ideal for 300 series stainless steel, nickel-based alloys, tool steel, INCONEL, and titanium at moderate to high speeds and feeds.



① Recommended feed

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

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



● first choice
○ alternate choice

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

X²

catalogue number	W	RR	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507363	2,50	0,13	–	N - Neutral					●		●	●
507372	3,00	0,15	–	N - Neutral					●		●	●

catalogue number	W	RR	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507365	2,50	0,13	5	L - Left					●		●	●
507374	3,00	0,15	5	L - Left					●		●	●

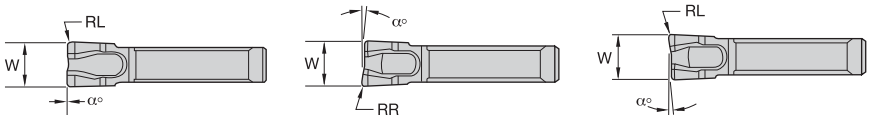
catalogue number	W	RL	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507364	2,50	0,13	5	R - Right					●		●	●
507373	3,00	0,15	5	R - Right					●		●	●

X² Ultra

catalogue number	W	RR	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507366	2,50	0,15	–	N - Neutral						●		
507369	3,00	0,15	–	N - Neutral						●		

catalogue number	W	RR	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507368	2,50	0,13	5	L - Left						●		
507371	3,00	0,15	5	L - Left						●		

catalogue number	W	RL	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507383	2,00	–	5	R - Right						●		
507367	2,50	0,13	5	R - Right						●		
507370	3,00	0,15	5	R - Right						●		



● first choice
○ alternate choice

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

S²

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

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

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

S² Ultra

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

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

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

Definitions and Guidelines

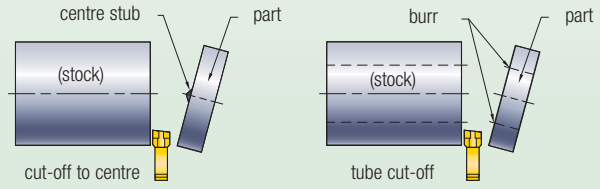
1. Width of cut (W) = width of the insert.

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

Reduce burr of cut-off faces:

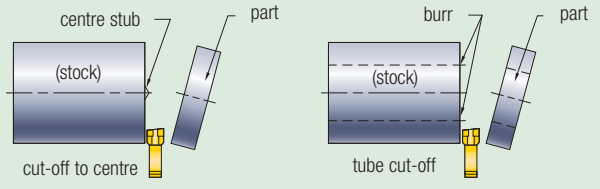
- Use lead angle-type inserts (Figures 1 and 2). Lead angle on a cut-off insert reduces the burr that remains on the part but decreases tool life and increases tool side deflection and possibly cycle time.

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



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

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

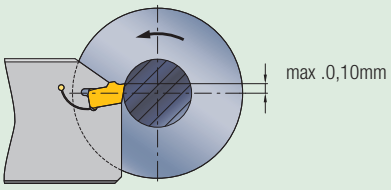


Right-hand lead insert leaves centre stub or burr on stock and produces clean part surface.

- Check total height and maintain on centre with part diameter.

- The cutting edge height should be within 0,1mm to the centre; recommended cutting position is 0,05mm above centre.

Figure 3
Above centre



- If 0° lead angle is mandatory, use the narrowest possible cut-off insert and blade. This will minimise the centre stub or cut-off burr length. Decrease the feed rate to maximum 0,05mm or less at the point where diameter equals insert width.

- On tubing-type parts that require a chamfer on the 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.

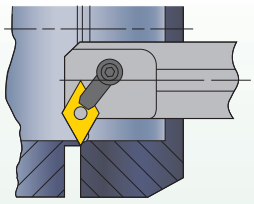


Figure 4
Internal chamfer line up

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.

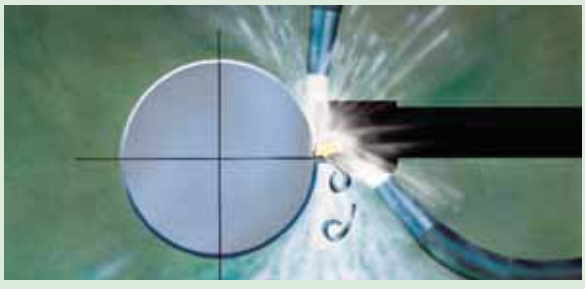


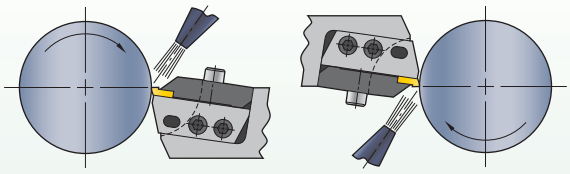
Figure 5
Preferred method for applying coolant

- 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

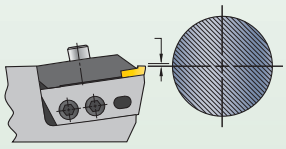
Improve flatness of cut-off surfaces:

- 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 S^2 or X^2.
- Use strongest toolholder system possible.
- Use 0° lead angle inserts when possible. If lead angle inserts are needed, reduce the feed rate.
- Check for minimum overhang of holder and blade.
- Set up for minimum workpiece overhang (distance out of chuck).
- Reduce feed rate.
- Maintain sharp edge and corners on cut-off insert.
- Increase speed (RPM).
- Use ample amounts of well-directed coolant (see Figure A).
- Maintain proper tool centre height 0–0,0001mm above centre (see Figure B).

Improve surface finish:

- For low to moderate speed (sfpm), use Separator F2.
- For moderate to high speed (sfpm), use Separator S^2 or X^2.
- Avoid overly aggressive chip control.
- Increase speed.
- Reduce lead angle and feed rate.
- Determine if corner radius is too large or small.
- Use a coated grade.
- Use coolant (see Figure A).

Figure B



Minimise edge chipping:

- Check to see if tool is significantly above or below centre.
- Reduce feed prior to part drop off.
- Use Separator S^2 or X^2.
- Choose the proper speed associated with the insert grade used.
- Call Technical Support to see if a larger hone size is needed.
- Eliminate chatter.
- Avoid chip re-cutting.
- Check for these part and machine problems:
  - Slide is loose.
  - Slide travel is irregular.
  - Bar/tube 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:

- Minimise tool blade and holder overhang.
- Minimise 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 centre.
- Avoid machine dwell.
- Use S^2 or X^2 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 centre to 0,05mm above centreline of workpiece.
- To reduce nib on part, use a high lead angle-type insert. Lead angle on a cut-off insert reduces the nib, which remains on the workpiece. CAUTION: the higher the lead, the more tool-side deflection.
- Use the narrowest possible cut-off insert to minimise the cut-off burr length.
- Reduce feed rate at the end of a cut.
- On most tubing-type parts, a 4° or 5° lead angle will be sufficient.
- Add support to a long slender-type part.
- Maintain proper sub-spindle alignment.
- If nib or burr persists, call Technical Support about reducing hone size.
- Use small- or no-corner radius.

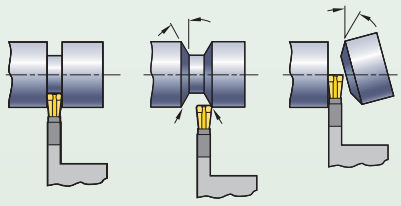
Eliminate built-up edge:

- Select proper grade for insert.
- Increase speed (RPM).
- Increase the feed rate.
- Use ample amounts of well-directed coolant (see Figure A on page A101).

Chamfer and cut-off operations:

- Use Separator S^2 or X^2.
- Groove or breakdown workpiece surface being machined.
- Machine the chamfer.
- For jobs requiring a chamfer on both ends of the part, begin by plunging to a depth just beyond the depth of the chamfers. Then, return to the part 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

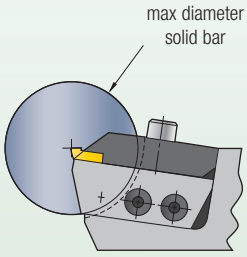


Figure 1
Standard bar capacity shown

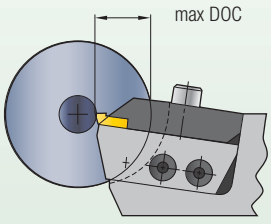


Figure 2
Larger bar diameter shown

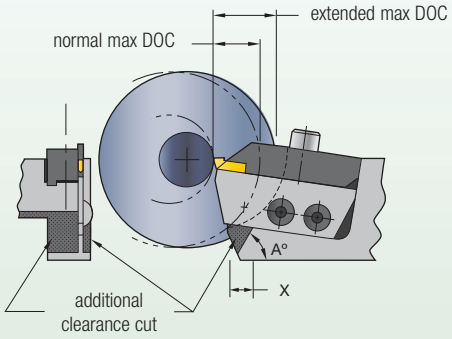


Figure 3
Modified toolholder with larger bar diameter shown

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

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

Ranger™

Adjustable Face Grooving System.

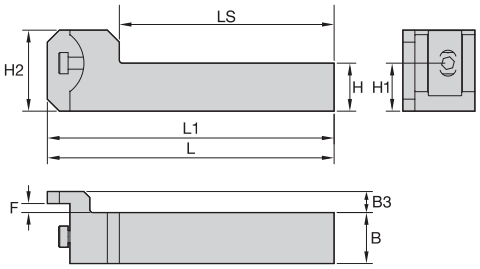
Features

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

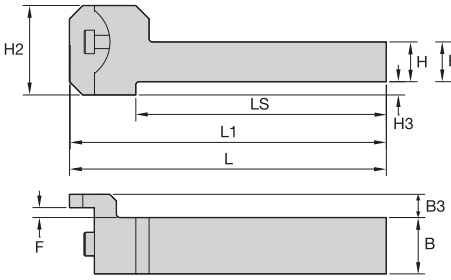
Ranger

Benefits

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



Right Hand Tool



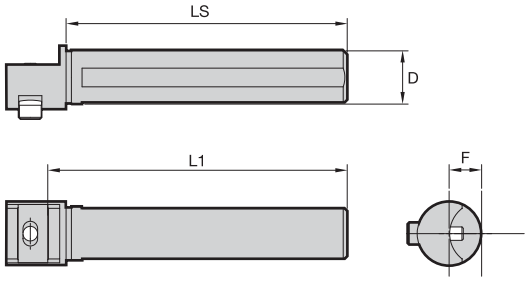
Right Hand Tool


Left Hand Assembly

Square Shank

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

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

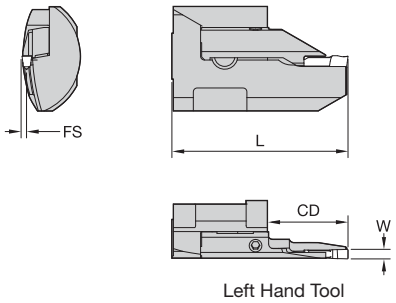



Left Hand Assembly

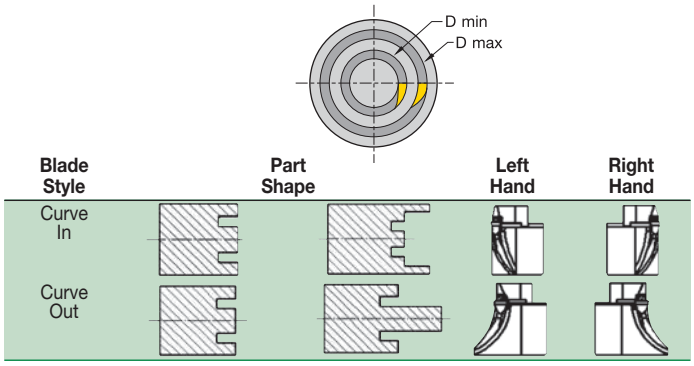
Round Shank

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

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



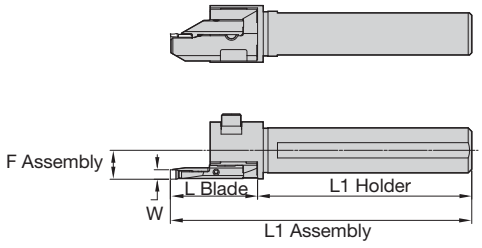
Left Hand Tool



Curve In

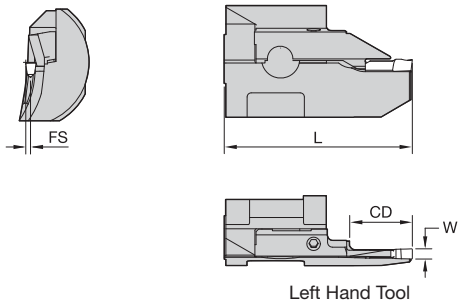
order number	catalogue number	W	CD	D min	D max	FS	L	hand	clamp	clamp screw
3539561	**338223**	3,18	19	57	400	-1,80	58	L - Left	**440203**	**606219**
3539562	**338224**	4,76	25	57	400	-2,39	58	L - Left	**440204**	**606219**
3539570	**338232**	6,35	25	57	400	-3,18	58	L - Left	**4402122**	**606219**
3539559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

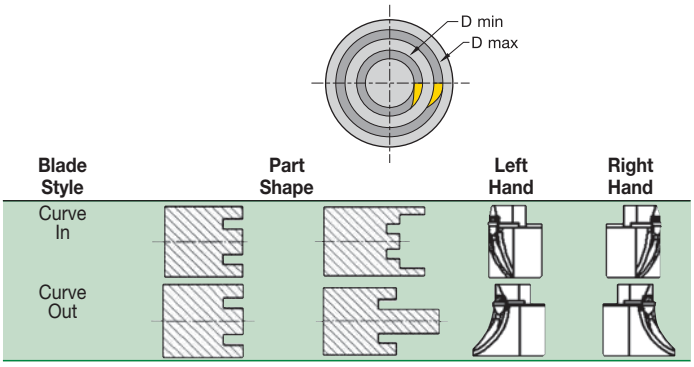
NOTE: RH cartridge goes with LH toolholder.
LH cartridge goes with RH toolholder.



For Round Shank

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

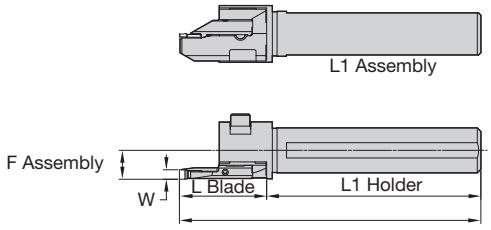




Curve Out

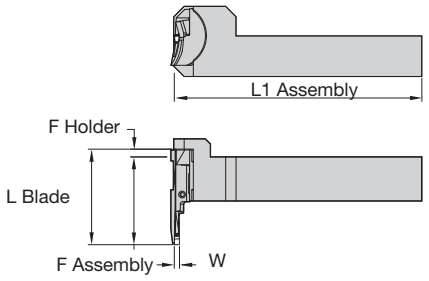
order number	catalogue number	W	CD	D min	D max	FS	L	hand	clamp	clamp screw
3539563	**338225**	3,18	19	57	400	-1,47	58	L - Left	**440205**	**606219**
3539564	**338226**	4,76	25	57	400	-2,39	58	L - Left	**440206**	**606219**
3539565	**338227**	6,35	25	57	400	-3,18	58	L - Left	**440207**	**606219**
3539566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

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



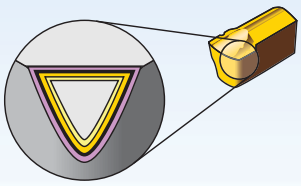
For Round Shank

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



For Square Shank

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



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

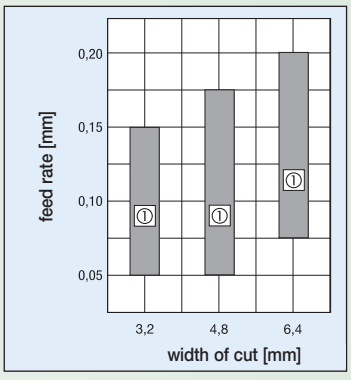
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

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.	M, K, N, S								
GC	HC-P15	Coated carbide. CVD — TiC-TiCN-TiN. Tri-phase coating on a hard, low binder content, fine-grained grade. High-speed, general-purpose grade for all kinds of steel. Gold in colour.	P								
M40	HC-P35	A premium, single-phase PVD TiN coating over a tough, specially formulated substrate that performs well under extremely low to moderate speed conditions found on screw machines. Ideal for carbon steels, alloy steels, most stainless steels, and many high-temperature alloys.	P, M, K, N, S								
M43	HC-P30	PVD-TiAlN multi-layer coating over a tough, shock-resistant, fine-grained carbide substrate with increased oxidation resistance. Recommended on low to medium cutting speeds when good toughness properties are required.	P, M, K, S								

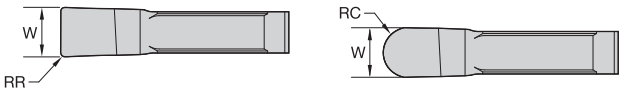
Ranger • Face Grooving

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



① Recommended feed

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



● first choice
○ alternate choice

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

Face Grooving

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

NOTE: Inserts 506101 and 506104 are to be used for anti-clockwise 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.

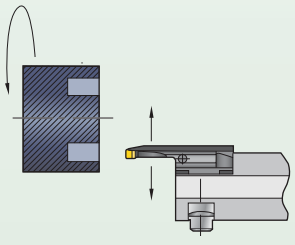
Face Grooving Ranges per Setting

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

NOTE: This chart is a general guide for face groove entry at outside diameters both smaller and larger than each given O.D. setting on the tool. Example: If the tool is adjusted for 101,6mm O.D., plunge cuts from 88,9mm O.D. to 114,3mm O.D. can be made without changing the 101,6mm O.D. setting.

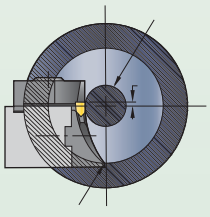
Widening a Face Groove

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 centre or the O.D. of the workpiece.



WMT™ Face Grooving Clearances

The cutting edge of the WMT face grooving system is +0,762mm above centre to improve cutting clearances. This tool should not be repositioned on centre. When facing toward centre, this system does not have sufficient clearance to cut at <21,59mm diameters.



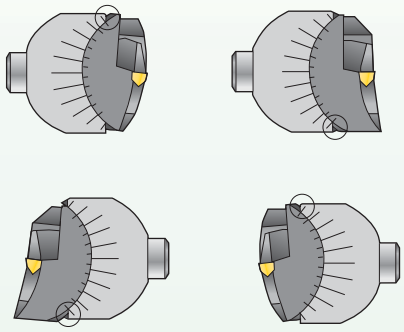
Adjusting Information for Ranger Tooling

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

- Appropriate diameter range setting can be accomplished as follows:

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

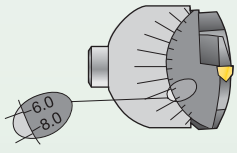
2.25 Diameter Settings



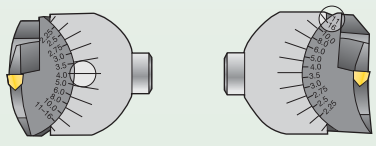
style 1 style 2

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

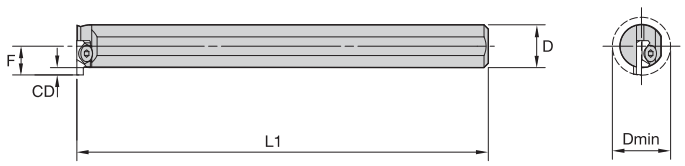
NOTE: It is important that these instructions are followed. Failure to do so may result in damage to the tool and the workpiece.

S-LOC™

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

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

S-LOC

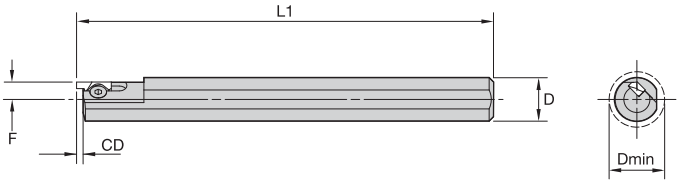


Right Hand Assembly

I.D. Grooving

order number	catalogue number	CD	L1	D	F	D min	clamp screw
3538783	**218134**	2,40	152,50	12,00	7,92	14,20	**606193**
3538784	**218142**	2,40	150,00	16,00	7,92	14,20	**606193**
3538785	**218143**	2,40	200,00	20,00	13,00	24,00	**606193**

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

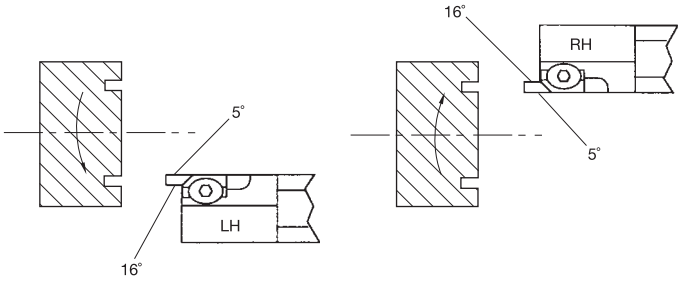


Left Hand Tool

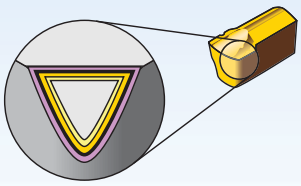
Face Grooving

order number	catalogue number	CD	L1	D	F	D min	clamp screw
	right hand						
3538779	**218125**	2,39	152,41	15,88	6,35	16,26	**606190**
	left hand						
3538780	**218126**	2,39	152,41	15,88	6,35	16,26	**606190**

NOTE: 12mm and larger outside diameter.



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



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

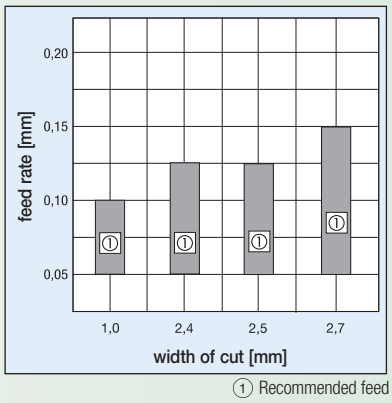
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

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 colour.									
M40	HC-P35	A premium, single-phase PVD TiN coating over a tough, specially formulated substrate that performs well under extremely low to moderate speed conditions found on screw machines. Ideal for carbon steels, alloy steels, most stainless steels, and many high-temperature alloys.									

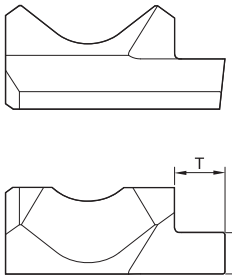
S-LOC

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

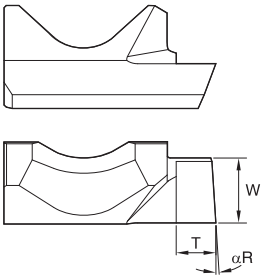


① Recommended feed

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



Left Hand Insert



Boring Insert

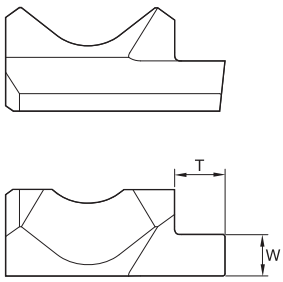
● first choice
○ alternate choice

P	●
M	●
K	○
N	●
S	○
H	

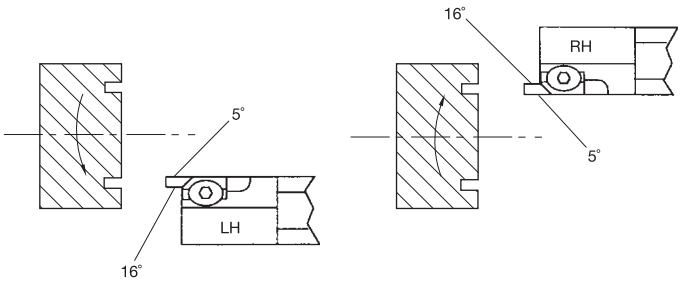
I.D. Grooving

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

NOTE: Insert 510102 is used for boring.



Left Hand Insert



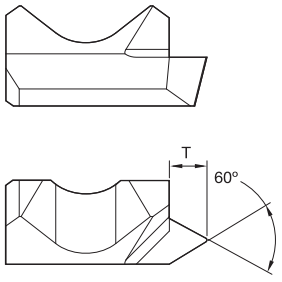
- Side clearance angles as noted.
- Use left-hand tooling for anti-clockwise rotation only.
- Use right-hand tooling for clockwise rotation only.

● first choice
○ alternate choice

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

Face Grooving

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



Left Hand Insert

Threading

catalogue number	T	C2	C5	GC	M40
right hand					
510106	2,38	●			●
left hand					
510103	2,38	●	●	●	●

NOTE: Minimum 10 threads per inch.

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.

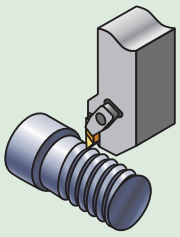
Eliminate the need for shims with the rigid TopClamp™ design.

Laydown Threading

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

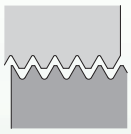
- Extensive selection of metric (ISO) and common European thread forms.
- Inserts available in PVD-coated carbide grades for high-performance applications.
- Low-profile design enables unrestricted chip flow.
- Three cutting edges per insert for superior, consistent results.

TopThread External Threading



Square Shank Toolholder Sizes:
- 10–32mm

Fine Pitch

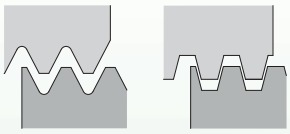


Cresting (Full Profile):
UN maximum TPI of 32
ISO minimum pitch of 1,5mm

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

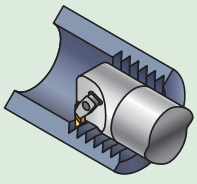
Coarse Pitch/Heavy Duty



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

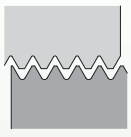
Partial Profile — Flat Top and Chip Control (NT-C and NT-CK):
UN minimum TPI of 4.5
ISO maximum pitch of 5,5mm

TopThread Internal Threading



Boring Bar Diameters:
- Metric — 10–50mm
- Minimum bore — 11,5mm
- Steel

Fine Pitch

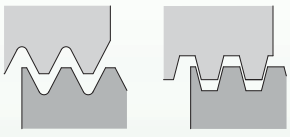


Cresting (Full Profile):
UN maximum TPI of 16
ISO minimum pitch of 1,5mm

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

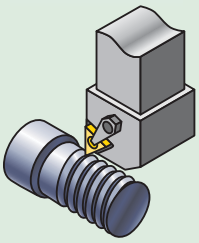
Coarse Pitch/Heavy Duty



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

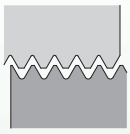
Partial Profile — Flat Top and Chip Control (NT-C and NT-CK):
UN minimum TPI of 4.5
ISO maximum pitch of 5,5mm

Laydown External Threading



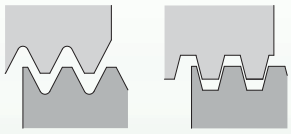
Square Shank Toolholder Sizes:
- 8–40mm available

Fine Pitch



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

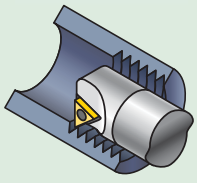
Coarse Pitch/Heavy Duty



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

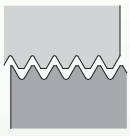
Partial Profile:
UN minimum TPI of 5
ISO maximum pitch of 5mm

Laydown Internal Threading



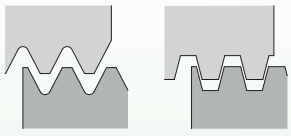
Boring Bar Diameters:
- 12–50mm
- Minimum bore — 13mm
- Steel and carbide

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

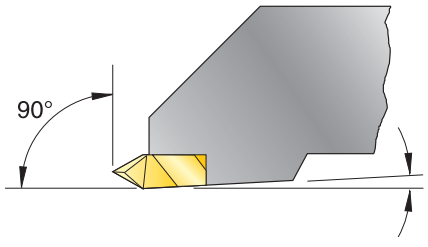
TopThread Insert Technology

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.

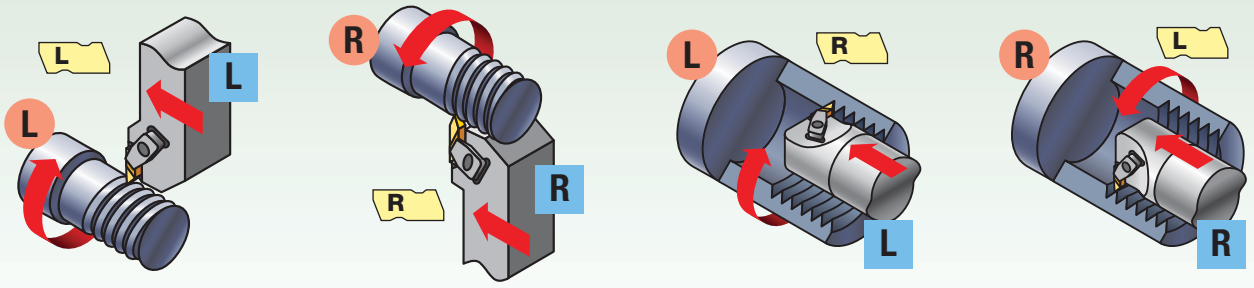
- Rigid design for increased insert stability during high feed rate applications.
- Good quality threads, minimised insert breakage, and improved tool life and surface finishes.
- Locking forces in three directions for superior resistance to thrust and tangential force.
- Unique 3° insert relief angle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

Step 1 • Select Threading Method and Hand of Tooling

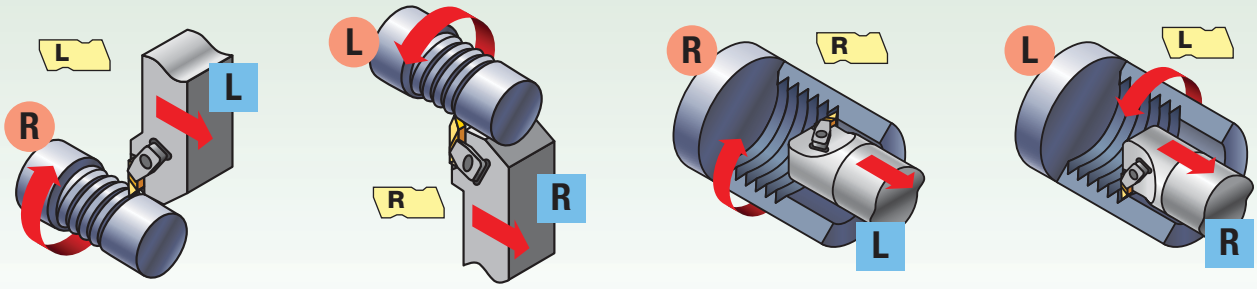
Required Information:

- 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 Catalogue Page

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

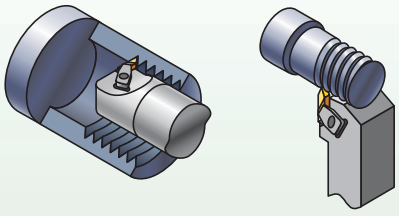
Required Information:

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

catalogue 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:



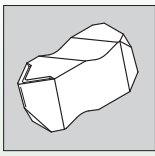
NOTE: Optimise your threading operation by using the proper infeed angle and the recommended infeed values.

See the Technical section on pages A192–A196 of this catalogue.

For internal threading, minimum bore varies depending on thread type. See page A196 for details.

Step 3 • Choose Insert for Application

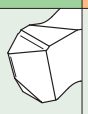
- See threading insert overview on page A126.
- Select cresting inserts for fully controlled thread form including diameter control. Cresting inserts eliminate the need for deburring.
- Non-cresting partial profile inserts can cut a variety of thread pitches. Chip control is only available with partial profile inserts.
- Note insert size for toolholder selection.



insert size	catalogue 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

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** 50–230	**TN6010** 50–185	**TN6010** 70–210	—	**TN6010** 20–120
first choice	**TN6025** 40–200	**TN6025** 40–135	**TN6025** 60–145	**TN6025** 50–360	**TN6025** 10–100

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

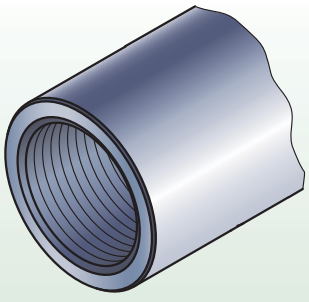
Positive: NTP, NTK, NJP, NJK

TopThread Threading Example:

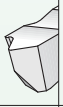
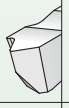
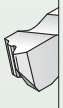
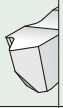
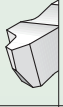
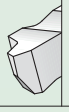
application: 8 TPI Acme internal right-hand thread
material: alloy steel
workpiece diameter: 114,3mm
good cutting conditions
feed towards the chuck

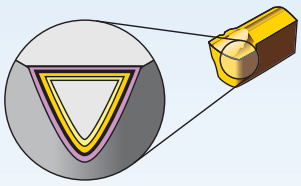
Recommendation:

insert: NA3L8
grade: TN6010
insert size: 3
boring bar: A40TNNTOR3
gage insert: N.3L
speed: 150 m/min
infeed passes*: 12 passes



** Infeed recommendations provided in technical data section on pages A188–A191.*

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 60º thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches.	**A139–A140**
NT-CK 			Partial Profile 60º — coarse pitch	—	—	N	Coarse pitch 60º thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches.	**A141**
	NTF 	NTK 	Partial Profile 60º — fine pitch	—	—	N	Fine pitch 60º 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.	**A141-A142**
	NTU 		Partial Profile 60º — four-edged insert	—	—	N	Four-edged insert for 60˚ partial profile threading. Requires NSU-style toolholder for size 4U insert.	**A142**
	NTC 		American UN	ANSI B1.1:74	2A/2B	Y	Widely used inch-based 60º V-form for all industries.	**A143**
		NJP 	UNJ	SAEA588791	3A/3B	N	Controlled root radius on external threads for military and aerospace industries.	**A144**
		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.	**A144**
	NDC-V 		NPT	ANSI/ACME B1.201: 1983	Standard NPT	Y	National Pipe Thread standard forms for pipe fittings.	**A145**
	NDC-V-M 		NPT — multi-tooth	ANSI/ACME B1.201: 1983	Standard NPT	Y	High-productivity multi-tooth threading inserts for NPT threads.	**A145**
	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.	**A146**
	NDC-RD 		API Round	API STD. 5B:1979	Standard API RD	Y	60º V-form with large radius for casing, tubing, and line pipe in the oil and gas industry, including 8 and 10 round forms.	**A146**
	NA 		Acme	ANSI B1.5:1988	3G	N	29º truncated thread form for motion applications in a wide variety of industries.	**A147**
	NAS 		Stub Acme	ANSI B1.8:1988	2G	N	Shallow-depth 29º truncated thread form for motion applications in a wide variety of industries.	**A148**
	NTB-B 		American Buttress — 45º 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 45º clearance flank is the leading edge.	**A148**



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

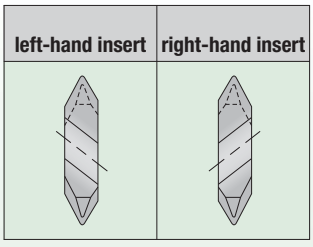
- Reduce cycle times — high speed and feed capability.
- Longer tool life — new multi-layer coating provides better wear resistance.

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

Grade

Coating		Grade Description	05	10	15	20	25	30	35	40	45
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			
						M	M	M			
						K	K	K			
						N	N	N			
						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.

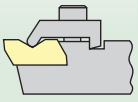


TopThread Holder Identification System

N	S	R		2525	M	4	Q
Insert Holding Method	Insert Mounting Location	Hand of Tool	Drop Head	Shank Size	Tool Length	Insert Size	Qualified Holder

N — Insert Holding Method

N — TopThread*

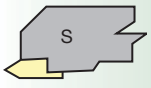


*Proprietary standard only.

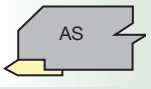
S — Insert Mounting Location

End mount

Side mount, offset

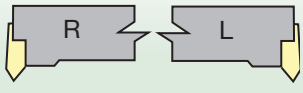


Side mount, no offset

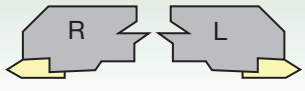


R — Hand of Tool

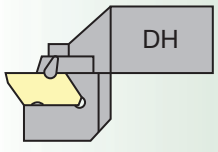
End mount



Side mount



Drop Head



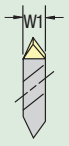
2525 — Shank Size

Shank height and width in mm and holder.

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	3,81
3	4,95
4	6,98
5	9,65
6	9,73
8	11,13

Q — Qualified Holder

Q – qualified holder

WIN WITH WIDIA™

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

WIDIA

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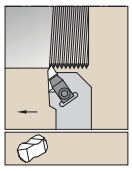
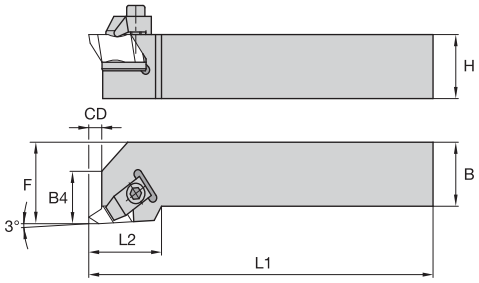


See page A126 for inserts.

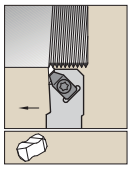


Right Hand Tool

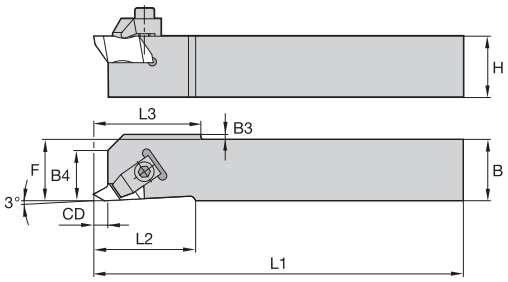
NS

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

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



See page A126 for inserts.

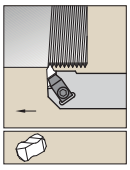


Right Hand Tool

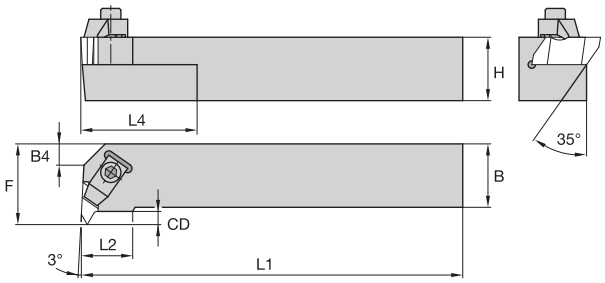
NAS

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

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



See page A126 for inserts.

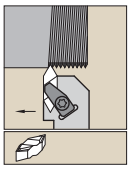


Right Hand Tool

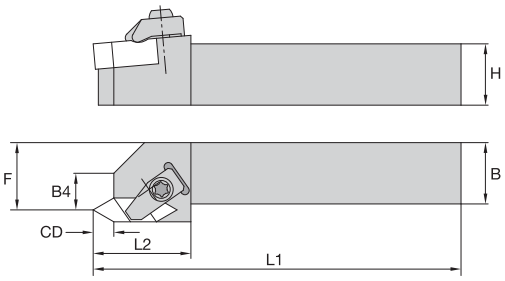
NE

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

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



See page A126 for inserts.



Right Hand Tool

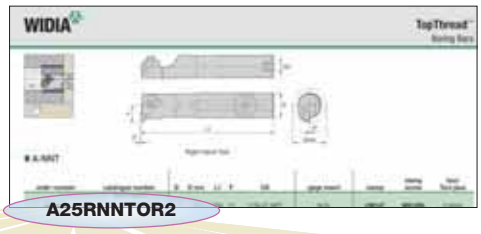
NSU

order number	catalogue number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus
	right hand											
3851386	**NSUR2020K4Q**	20	20	23	125	32	13	6,1	NTU4R	**CM72LP**	**MS2111**	25 IP
3851387	**NSUR2525M4Q**	25	25	28	150	32	13	6,1	NTU4R	**CM72LP**	**MS2111**	25 IP
	left hand											
3851384	**NSUL2020K4Q**	20	20	23	125	32	13	6,1	NTU4L	**CM73LP**	**MS2111**	25 IP
3851385	**NSUL2525M4Q**	25	25	28	150	32	13	6,1	NTU4L	**CM73LP**	**MS2111**	25 IP

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

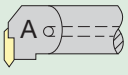
Turning

TopThread
Boring Bar Identification System

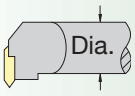


A	25	R	N	N	T	O	R	2
Bar Type	Bar Diameter	Bar Length	Insert Holding Method	Insert Shape	Insert Location	Rake Angle 0 = 0°	Hand of Tool	Insert Size

A — Steel with coolant

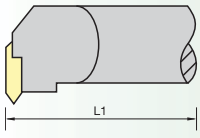


25 — Bar diameter in millimetres

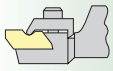


R — Bars

K = 125,0mm
M = 150,0mm
Q = 180,0mm
R = 200,0mm
S = 250,0mm
T = 300,0mm
U = 350,0mm



N — N* — TopThread



N — Insert Shape

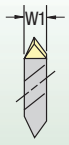
T — End mount

O — Rake Angle 0 = 0°

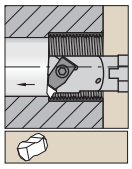
R — Right hand

Left hand

2 — Insert Size

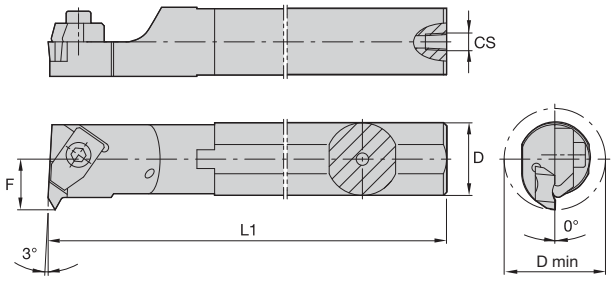


insert size	W1
1	3,54
2	3,81
3	5,35
4	6,40
5	9,65
6	9,73
8	11,13



Steel shank with through coolant.

See page A126 for inserts.

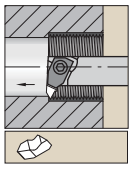


Right Hand Tool

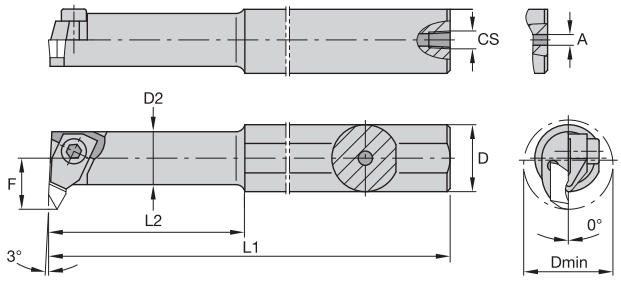
A-NNT

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

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



Necked steel shank
with through coolant.
See page A126 for inserts.



Right Hand Tool

A-NNT-1

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

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

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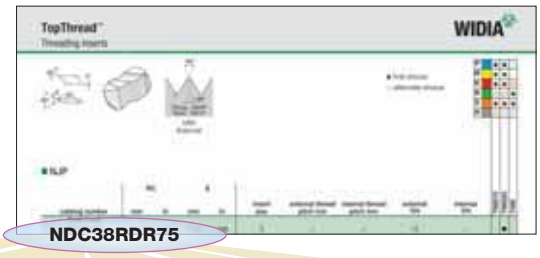
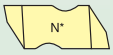
TopThread Insert Identification System



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.

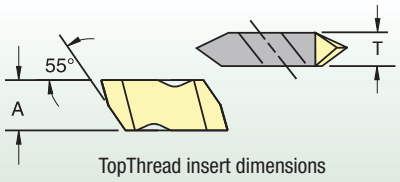
D — Insert Style

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

C — Additional Information

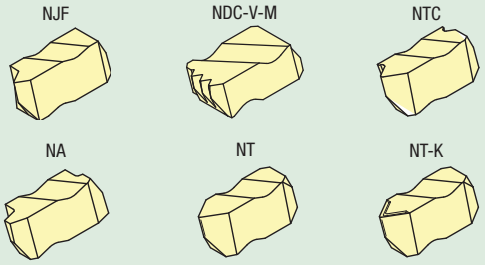
- B — Buttress
- F — Fine pitch
- S — Stub Acme
- C — Cresting
- P — Positive rake
- K — Fine pitch, positive

3 — Insert Size



TopThread insert dimensions

insert size	A mm	T mm
1	2,54	2,54
2	5,56	3,81
3	8,74	4,95
4	11,51	6,48
5	17,48	9,65
6	11,51	9,73
8	7,93	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 0,025 increments (NJ, NJF, NJP, NJK)
or
M indicates metric ISO thread

R — Hand of Insert

R — Right hand

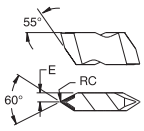
L — Left hand

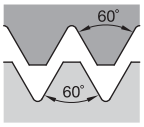
75 — Definition of Insert

- 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





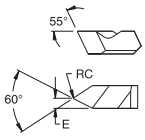
Partial Profile 60°

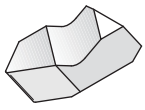
● first choice
○ alternate choice

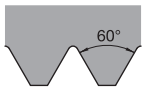
		TN6010	TN6025	THM
P		●	●	
M		●	●	
K		●	●	○
N		○	○	●
S		●	●	●
H		○		

NT-K

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



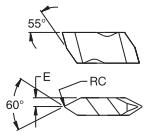


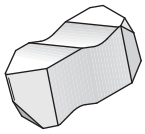


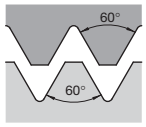
Partial Profile 60°
Internal

NT-1L

catalogue number	RC	E	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI			
left hand										
NT1L	0,08	1,09	1	–	1,00-2,00	–	12-24	●	●	







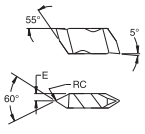
Partial Profile 60°

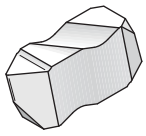
● first choice
○ alternate choice

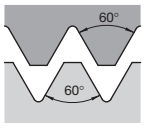
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

NT

catalogue number	RC	E	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand										
NT2R	0,10	1,90	2	0,70-3,00	1,25-3,50	8-36	7-20	●	●	
NT3R	0,17	2,49	3	1,25-4,00	2,00-5,00	6-20	5-12	●	●	
NT4R	0,17	3,25	4	1,25-6,25	2,00-6,25	4-20	4-12	●	●	
left hand										
NT2L	0,10	1,90	2	0,70-3,00	1,25-3,50	8-36	7-20	●	●	
NT3L	0,17	2,49	3	1,25-4,00	2,00-5,00	6-20	5-12	●	●	
NT4L	0,17	3,25	4	1,25-6,25	2,00-6,25	4-20	4-12		●	



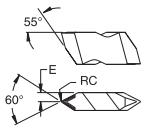


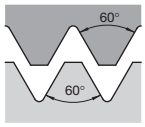


Partial Profile 60°

NTP

catalogue number	RC	E	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI			
right hand										
NTP2R	0,10	1,91	2	0,70-3,00	1,25-3,50	8-36	7-20	●	●	
NTP3R	0,17	2,49	3	1,25-4,00	2,00-5,00	6-20	5-12	●	●	
NTP4R	0,17	3,25	4	1,25-6,25	2,00-6,25	4-20	4-12		●	
left hand										
NTP2L	0,10	1,91	2	0,70-3,00	1,25-3,50	8-36	7-20	●	●	
NTP3L	0,17	2,49	3	1,25-4,00	2,00-5,00	6-20	5-12	●	●	





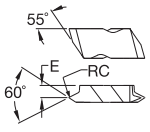
Partial Profile 60°

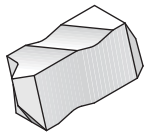
● first choice
○ alternate choice

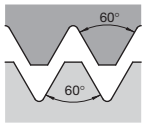
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

NT-CK

catalogue number	RC	E	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand **NT3RCK**	0,34	2,46	3	2,50-4,00	4,00	6-11	6	●	●	



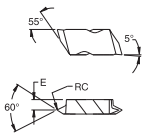


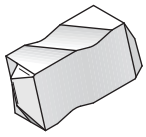


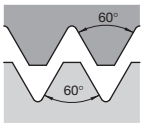
Partial Profile 60°

NTF

catalogue number	RC	E	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI			
right hand **NTF2R**	0,08	2,79	2	0,60-1,75	1,00-2,00	14-44	12-24	●	●	
NTF3R left hand	0,08	3,58	3	0,60-2,50	1,00-2,50	10-44	9-24	●	●	
NTF3L	0,08	3,58	3	0,60-2,50	1,00-2,50	10-44	9-24	●	●	







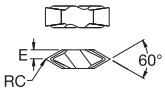
Partial Profile 60°

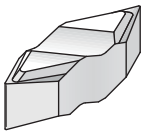
● first choice
○ alternate choice

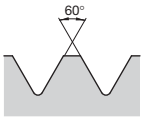
		TN6010	TN6025	THM
P		●	●	
M		●	●	
K		●	●	○
N		○	○	●
S		●	●	●
H		○		

NTK

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



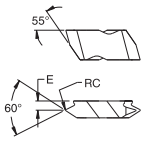


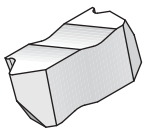


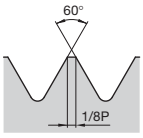
Partial Profile 60°
External

NTU

catalogue number	RC	E	insert size	thread pitch mm	internal thread pitch mm	external TPI	internal TPI			
right hand **NTU4R**	0,11	3,18	4U	1,25-6,25	–	4-20	–		●	
left hand **NTU4L**	0,11	3,18	4U	1,25-6,25	–	4-20	–		●	







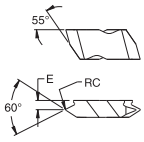
American UN-External

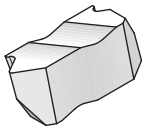
● first choice
○ alternate choice

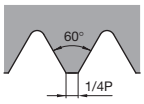
P		●	●	
M		●	●	
K		●	●	○
N		○	○	●
S		●	●	●
H		○		

NTC-E

catalogue number	RC	E	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
right hand										
NTC3R16E	0,19	3,76	3	–	–	16	–	●	●	
NTC3R14E	0,22	3,76	3	–	–	14	–	●		
NTC3R12E	0,25	3,76	3	–	–	12	–	●	●	



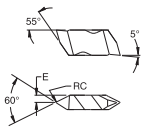


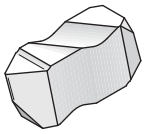


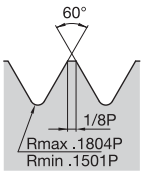
American UN-Internal

NTC-I

catalogue number	RC	E	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI			
left hand										
NTC3L12I	0,10	3,76	3	–	–	–	12		●	







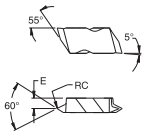
UNJ External

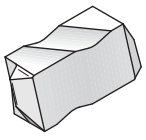
● first choice
○ alternate choice

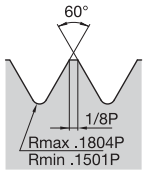
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

NJP

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



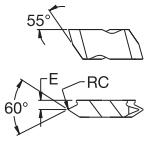


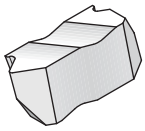


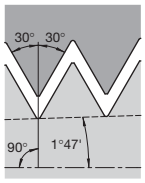
UNJ External

NJK

catalogue number	RC	E	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI			
right hand										
NJK3008R20	0,20	3,58	3	–	–	20	–	●		







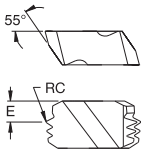
NPT

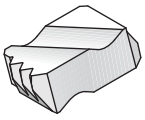
● first choice
○ alternate choice

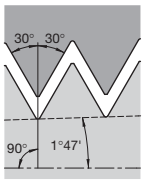
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

NDC-V

catalogue number	RC	E	insert size	TPI	TPF	TN6010	TN6025	THM
right hand **NDC3115VR75**	0,10	3,66	3	11.5	.750	●		



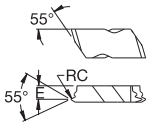


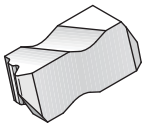


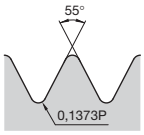
NPT

NDC-V-M

catalogue number	RC	E	insert size	TPI	TPF			
right hand **NDC8115VR75M**	0,10	2,59	8	11.5	.750	●		
NDC88VR75M	0,13	2,41	8	8	.750	●		







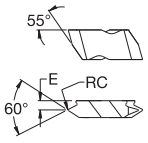
Whitworth BSW,
BSP-External

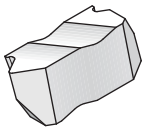
● first choice
○ alternate choice

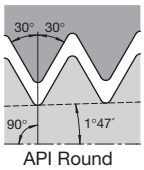
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

NWC-E

catalogue number	RC	E	insert size	TPI	TPF	TN6010	TN6025	THM
right hand								
NWC3R14E	0,24	3,43	3	14	–		●	
NWC3R11E	0,30	3,43	3	11	–		●	



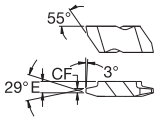


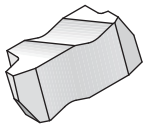


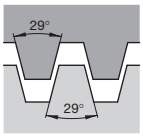
API Round

NDC-RD

catalogue number	RC	E	insert size	TPI	TPF			
right hand								
NDC38RDR75	0,43	3,18	3	8	.750		●	
left hand								
NDC310RDL75	0,36	3,18	3	10	.750		●	
NDC38RDL75	0,43	3,18	3	8	.750		●	







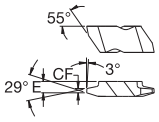
ACME

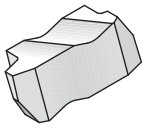
● first choice
○ alternate choice

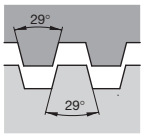
		TN6010	TN6025	THM
P		●	●	
M		●	●	
K		●	●	○
N		○	○	●
S		●	●	●
H		○		

■ NA

catalogue number	RC	CF	E	insert size	TPI	TPF	TN6010	TN6025	THM
right hand									
NA3R8	–	1,04	3,79	3	8	–		●	
NA3R6	–	1,44	3,79	3	6	–		●	
NA3R4	–	2,22	3,38	3	4	–		●	
NA4R4	–	2,22	5,13	4	4	–		●	
NA6R3	–	3,01	7,19	6	3	–		●	
NA6R2	–	4,58	7,19	6	2	–		●	
left hand									
NA3L8	–	1,04	3,79	3	8	–		●	
NA3L6	–	1,44	3,79	3	6	–		●	
NA3L4	–	2,22	3,38	3	4	–		●	
NA4L4	–	2,22	5,13	4	4	–		●	
NA6L3	–	3,01	7,19	6	3	–		●	
NA6L2	–	4,58	7,19	6	2	–		●	







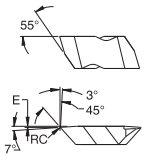
Stub ACME

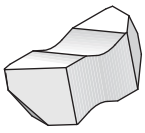
● first choice
○ alternate choice

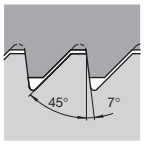
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

NAS

catalogue number	RC	CF	E	insert size	TPI	TPF	TN6010	TN6025	THM
right hand									
NAS3R8	–	1,21	3,79	3	8	–		●	
left hand									
NAS3L12	–	0,83	3,79	3	12	–		●	
NAS3L8	–	1,21	3,79	3	8	–		●	
NAS3L6	–	1,66	3,79	3	6	–		●	







American
Buttress-Pull

NTB-B

catalogue number	RC	E	insert size	TPI	TPF	TN6010	TN6025	THM
left hand								
NTB3LB	0,17	0,31	3	8-16	–		●	

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

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.

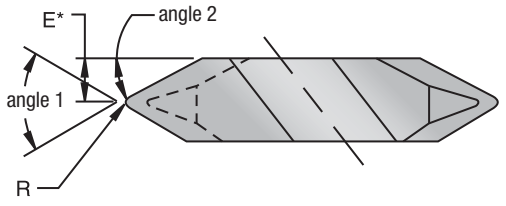
The large variety of TopThread blank sizes allows maximum flexibility in threading endform design, especially for extra wide or oil field applications.

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:

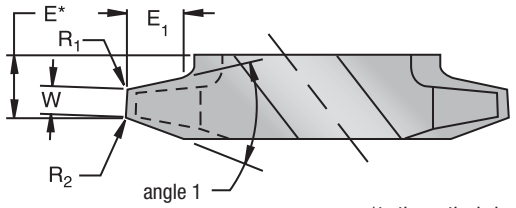
- Quotes are handled quickly and efficiently using state-of-the-art CAD design software and electronic database software.
- Our Carbide Custom Solutions Design Team is your link to one of the industry's largest electronic databases. They can solve your most challenging design problems.
- Where necessary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

style C2 RH shown



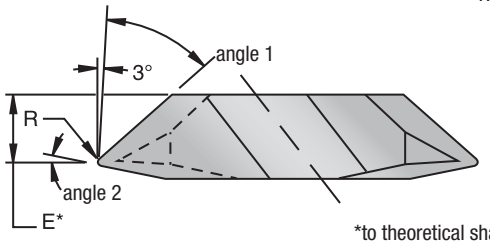
*to theoretical sharp point

style C3 RH shown



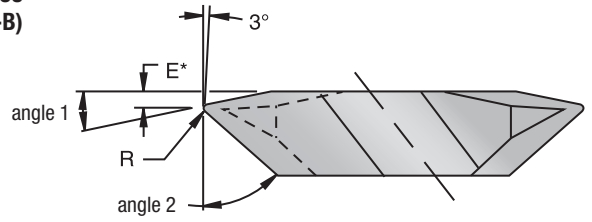
*to theoretical sharp point

style C4 (NTB-A) RH shown



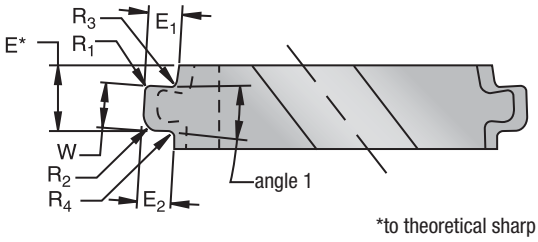
*to theoretical sharp point

style C5 (NTB-B) RH shown



*to theoretical sharp point

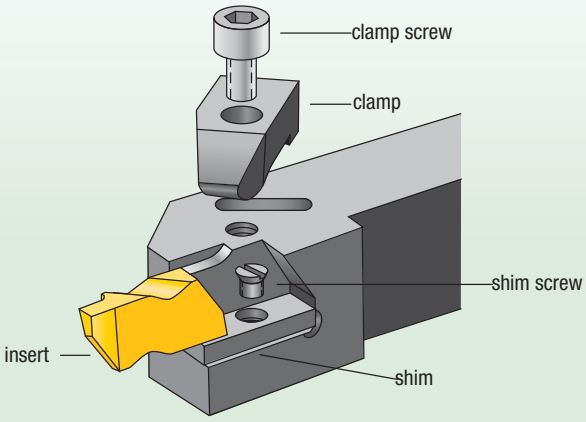
style C6 RH shown



*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 maximises 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, minimised 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

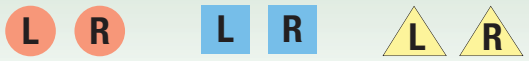
With the WIDIA™ Laydown Threading System, you experience reliable countersunk screw locking for unhindered chip flow and precise insert positioning accuracy.

- 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.
- Maximised tool life and low-profile design for unhindered chip flow and superior performance.

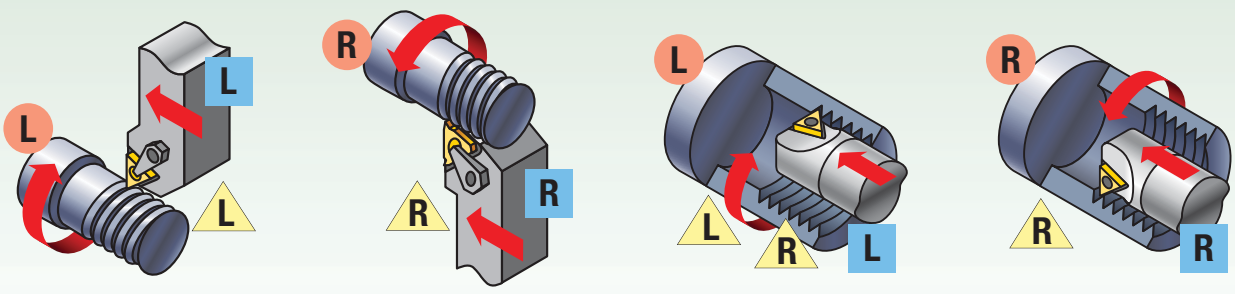
Step 1 • Select Threading Method and Hand of Tooling

Required Information:

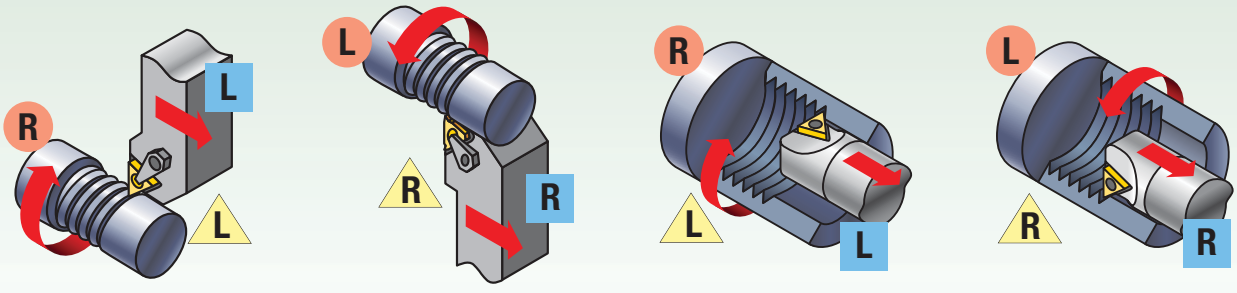
- External/internal operation.
- Spindle rotation/hand of thread.
- Feed direction.



Feed direction toward the chuck • standard helix



Feed direction away from the chuck • reverse helix

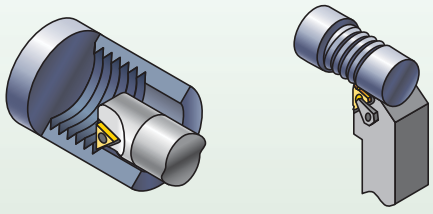


Step 2 • Select Holder from Catalogue Page

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:



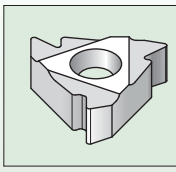
The insert size must match the gage insert size of your toolholder selection:

catalogue number	gage insert	minimum bore diameter	shim
S0812LSER2	2IRA60	16,5mm	—
S2020LSER3	3IR...	36,8mm	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 optimised 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 A156.



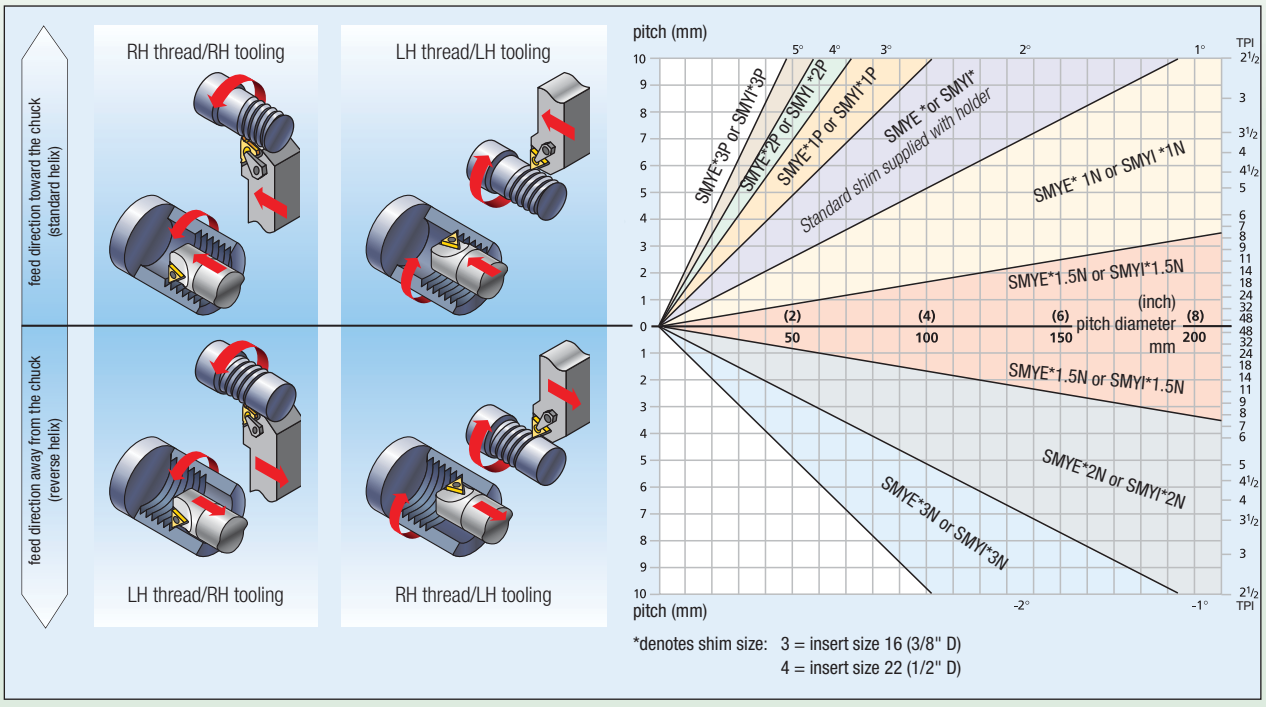
insert size	catalogue number	TN6025
11	2IRA60	●
16	3IRAG60	●

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



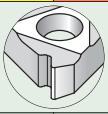
*denotes shim size: 3 = insert size 16 (3/8" D)
4 = insert size 22 (1/2" D)

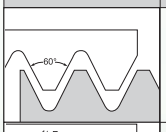
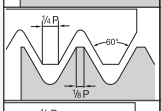
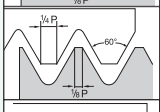
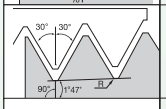
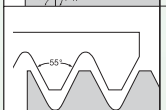
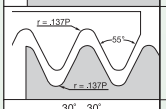
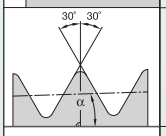
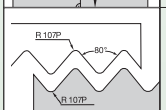
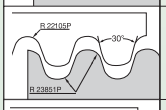
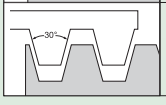
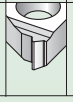
If recommended shim is different from shim supplied with toolholder, order shim separately.

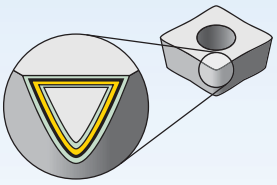
NOTE: Optimise your threading operation by using the proper infeed angle and the recommended infeed values. See the Technical Section on pages A188–A191. Also see detailed shim selection information on page A200.

Step 5 • Select Grade and Speed

Recommendations for Grade and Speed Selection — m/min

workpiece material	steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys
insert style	 precision ground				
first choice	**TN6025** 40–200	**TN6025** 40–135	**TN6025** 60–145	**TN6025** 50–360	**TN6025** 10–100

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.	**A163–A165**
	ISO		Metric ISO	ISO R262, DIN 13	6g/6H	Y	Widely used metric 60° V-form for all industries.	**A167**
	UN		American UN	ANSI B1.1:74	2A/2B	Y	Widely used inch-based 60° V-form for all industries.	**A168–A169**
	NPT		NPT	ANSI/ASME B1.20.1S1983	Standard NPT	N	National Pipe Thread standard 60° thread form for pipe fittings.	**A170**
	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.	**A171**
	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.	**A172–A173**
	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.	**A173–A174**
	PG		PG	DIN 404B0		Y	80° steel conduit thread.	**A174–A175**
	RD		Round	DIN 405	7e/7H	Y	Round thread form for tube fittings in the chemical and food industries.	**A175–A176**
	TR		Trapez	DIN 103	7e/7H	N	30° truncated metric thread form for motion applications.	**A176–A177**



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

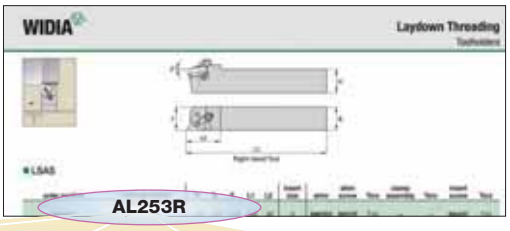
Grade	Coating	Grade Description	05	10	15	20	25	30	35	40	45
TN6025	HC-P25	PVD-TiAlN Nano-multilayer coated carbide. General-purpose machining for steels, stainless steels, cast irons, non-ferrous materials, and difficult-to-machine materials. Recommended at low to medium cutting speeds when higher toughness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

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 optimised 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



A	L	25	3	R
Toolholder Construction	Toolholder Style	Shank Size	Insert Size	Hand of Tool

A —
With shim

N —
Without shim

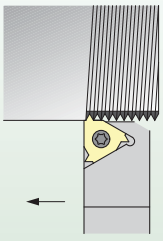
Toolholders

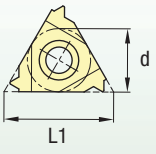
- First two numbers are shank height in mm.

RH —
Thread symbol R

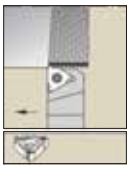
LH —
Thread symbol L

L —
External thread

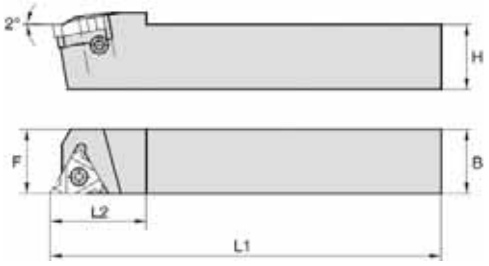




symbol	d	L1
2	6,35	11
3	9,52	16
4	12,7	22
5	15,88	27



See page A156 for inserts.



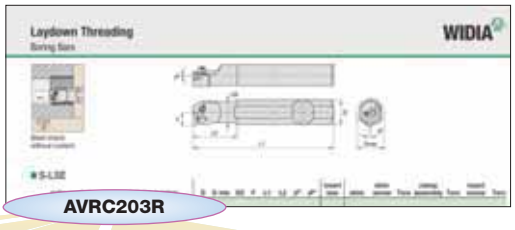
Right Hand Tool

N/A

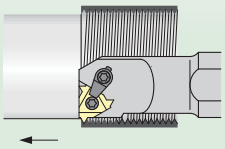
order number	catalogue number	H	B	F	L1	L2	insert size	shim	shim screw	Torx	insert screw	Torx
	right hand											
2022340	NL82R	8	8	11	136	18	–	–	–	–	SSN2T	T8
2009587	AL163R	16	16	16	100	25	–	SMYE3	SSY3T	T10	SSA3T	T10
2009591	AL203R	20	20	20	128	30	–	SMYE3	SSY3T	T10	SSA3T	T10
2009594	AL253R	25	25	25	153	30	–	SMYE3	SSY3T	T10	SSA3T	T10
2009600	AL323R	32	32	32	173	30	–	SMYE3	SSY3T	T10	SSA3T	T10
2009597	AL254R	25	25	25	155	36	–	SMYE4	SSY4T	T20	SSA4T	T20
2009603	AL324R	32	32	32	175	36	–	SMYE4	SSY4T	T20	SSA4T	T20
2016118	AL404R	40	40	40	205	36	–	SMYE4	SSY4T	T20	SSA4T	T20
2022589	AL325R	32	32	32	176	40	–	SMYE5	SSY5T	T25	SSA5T	T25
2016122	AL405R	40	40	40	206	40	–	SMYE5	SSY5T	T25	SSA5T	T25
	left hand											
2071294	AL163L	16	16	16	100	25	3	SMYI3	SSY3T	T10	SSA3T	T10
2071295	AL203L	20	20	20	125	30	3	SMYI3	SSY3T	T10	SSA3T	T10
2065128	AL253L	25	25	25	150	30	3	SMYI3	SSY3T	T10	SSA3T	T10
2114772	AL254L	25	25	25	150	36	4	SMYI4	SSY4T	T20	SSA4T	T20

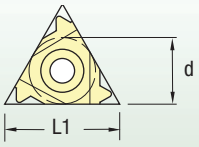
Turning

Laydown Threading
Boring Bar Identification System



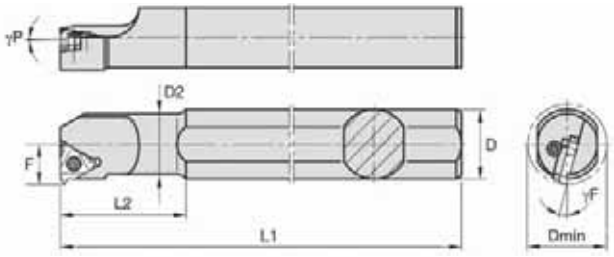
A	VR	C	20	3	R
Shim Requirement	Tool Type	Coolant Capability	Shank Head Diameter	Insert Size	Hand of Tool
A — Shim required N — No shim required O — Miniature holder	VR — Internal round shank	C — With coolant	10, 12, 13, 16, 20, 25, 32, 40 ,50 6.2 (Mini adjust) 8.0 (Mini adjust)		RH — Thread symbol R LH — Thread symbol L





symbol	d	L1
2	6,35	11
3	9,52	16
4	12,7	22
5	15,88	27

Steel shank without through coolant.
See page A156 for inserts.

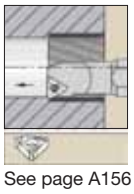


Right Hand Tool

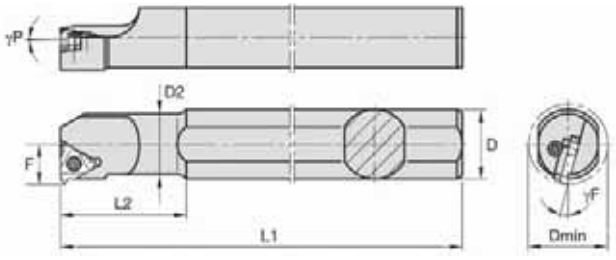
N/A-VR

order number	catalogue number	D	D min	D2	F	L1	L2	γF°	γP°	insert size	shim	shim screw	Torx	insert screw	Torx
	right hand														
2025828	NVR102R	20	13	10	7,3	180	25	-15.0	-1.5	–	–	–	–	SSN2T	T8
2022342	NVR132R	20	16	13	8,9	180	32	-15.0	-1.5	–	–	–	–	SSN2T	T8
2012307	NVR163R	20	20	16	11,5	180	40	-15.0	-1.5	–	SMYI3	SSY3T	T10	SSA3T	T10
2009609	AVR203R	20	24	20	13,4	180	50	-15.0	-1.5	–	SMYI3	SSY3T	T10	SSA3T	T10
2022343	NVR204R	20	27	20	15,6	180	50	-15.0	-1.5	–	SMYI4	SSY4T	T20	SSA4T	T20
2009628	AVR25D3R	25	29	25	16,1	200	45	-15.0	-1.5	–	SMYI3	SSY3T	T10	SSA3T	T10
2009631	AVR25D4R	25	32	25	17,2	200	45	-15.0	-1.5	–	SMYI4	SSY4T	T20	SSA4T	T20
2009612	AVR253R	32	29	25	16,3	250	60	-15.0	-1.5	–	SMYI3	SSY3T	T10	SSA3T	T10
2009625	AVR254R	32	32	25	17,4	250	60	-15.0	-1.5	–	SMYI4	SSY4T	T20	SSA4T	T20
2009640	AVR32D3R	32	36	32	19,6	250	60	-15.0	-1.5	–	SMYI3	SSY3T	T10	SSA3T	T10
2009634	AVR324R	32	39	32	21,5	250	60	-15.0	-1.5	–	SMYI4	SSY4T	T20	SSA4T	T20
2009637	AVR325R	32	40	32	22,4	250	60	-15.0	-1.5	–	SMYI5	SSY5T	T25	SSA5T	T25
2009643	AVR403R	40	44	40	23,8	300	60	-15.0	-1.5	–	SMYI3	SSY3T	T10	SSA3T	T10
2009646	AVR405R	40	48	40	26,4	300	60	-15.0	-1.5	–	SMYI5	SSY5T	T25	SSA5T	T25
2009649	AVR505R	50	58	50	31,4	350	75	-15.0	-1.5	–	SMYI5	SSY5T	T25	SSA5T	T25
	left hand														
2071317	NVR163L	20	20	16	11,5	180	40	-15.0	-1.5	3	SMYE3	SSY3T	–	SSA3T	T10
2071318	AVR203L	20	24	20	13,4	180	40	-15.0	-1.5	3	SMYE3	SSY3T	T10	SSA3T	T10
2065134	AVR25D3L	25	29	25	16,1	200	45	-15.0	-1.5	3	SMYE3	SSY3T	T10	SSA3T	T10
2114832	AVR253L	32	29	25	16,3	250	60	-15.0	-1.5	3	SMYE3	SSY3T	T10	SSA3T	T10
2065135	AVR25D4L	25	32	25	17,2	200	45	-15.0	-1.5	4	SMYE4	SSY4T	T20	SSA4T	T20

NOTE: Items listed without a shim are designed for a 1,5° inclination angle.



See page A156 for inserts.



Right Hand Tool

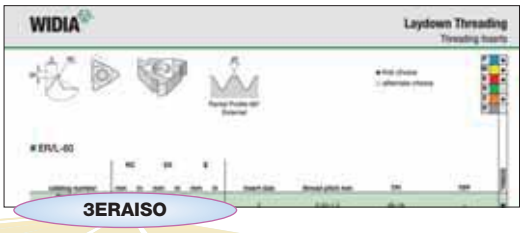
OVR

order number	catalogue number	D	D min	D2	F	L1	L2	γF°	γP°	insert size	screw	Torx driver	Torx
	right hand												
2012325	OVR122R	12	13	10	7	100	25	-15.0	-0.5	–	12147789100	12148001100	T8
2022345	OVR152R	15	16	13	9	100	32	-15.0	-0.5	–	12147789100	12148001100	T8

NOTE: WIDIA™ miniature holders are for use on automatic machines as used in the optical and precision mechanics industries. The shank dimensions correspond to conventional hardmetal or HSS tools. Holders with round or square shanks are available. An internal RH tool can also be used for external LH threads in the same way an internal LH tool can be used for external RH threads. Please use correct inserts. The inclination angle on this tool is 0.5°. Tools are always clamped with the shank parallel to the part.

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

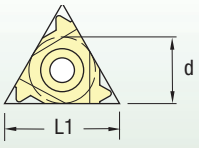
L — Left-hand thread

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	6,35	11
3	9,52	16
4	12,7	22
5	15,88	27

Partial profile inserts

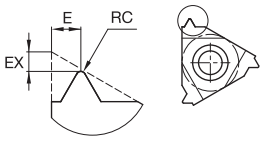
symbol	mm
A	0,5–1,5
AG	0,5–3,0
G	1,7–3,0
N	3,5–5,0
Q	5,5–6,0

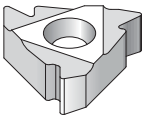
Full profile inserts

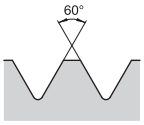
symbol	mm
Actual TP	0,5–0,4

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







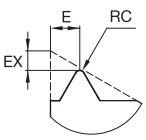
Partial Profile 60° External

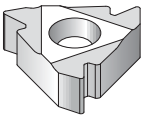
● first choice
○ alternate choice

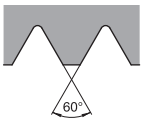
P		●
M		●
K		●
N		○
S		●
H		

ER/L-60

catalogue number	RC	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand								
2ERA60	0,05	0,9	0,8	2	0,50-1,5	48-16	–	●
3ERAG60	0,08	1,2	1,7	3	0,50-3,0	48-8	–	●
3ERA60	0,05	0,8	0,9	3	0,50-1,5	48-16	–	●
3ERG60	0,28	1,2	1,7	3	1,75-3,0	14-8	–	●
4ERN60	0,53	1,7	2,5	4	3,5-5,0	7-5	–	●
5ERQ60	0,64	2,1	3,1	5	5,5-6,0	4.5-4	–	●
left hand								
3ELAG60	0,08	1,2	1,7	3	0,50-3,0	48-8	–	●
3ELA60	0,05	0,8	0,9	3	0,50-1,5	48-16	–	●
3ELG60	0,28	1,2	1,7	3	1,75-3,0	14-8	–	●
4ELN60	0,53	1,7	2,5	4	3,5-5,0	7-5	–	●







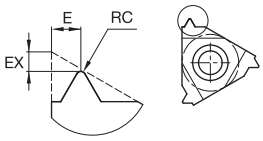
Partial Profile 60°
Internal

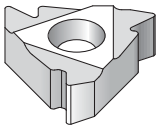
● first choice
○ alternate choice

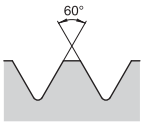
P	●
M	●
K	●
N	○
S	●
H	

IR/L-60

catalogue number	RC	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand								
2IRA60	0,05	0,8	0,9	2	0,50-1,5	48-16	–	●
3IRAG60	0,05	1,2	1,7	3	0,50-3,0	48-8	–	●
3IRA60	0,05	0,8	0,9	3	0,50-1,5	48-16	–	●
3IRG60	0,15	1,2	1,7	3	1,75-3,0	14-8	–	●
4IRN60	0,31	1,7	2,5	4	3,5-5,0	7-5	–	●
5IRQ60	0,30	1,8	2,7	5	5,5-6,0	4.5-4	–	●
left hand								
2ILA60	0,05	0,8	0,9	2	0,50-1,5	48-16	–	●
3ILAG60	0,05	1,2	1,7	3	0,50-3,0	48-8	–	●
3ILA60	0,05	0,8	0,9	3	0,50-1,5	48-16	–	●
3ILG60	0,15	1,2	1,7	3	1,75-3,0	14-8	–	●
4ILN60	0,31	1,7	2,5	4	3,5-5,0	7-5	–	●







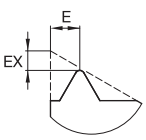
Partial Profile 60°
External

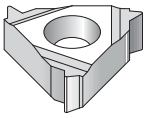
● first choice
○ alternate choice

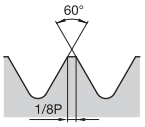
P		●	●
M		●	●
K		●	●
N		○	○
S		●	●
H			

ER/L-60

catalogue number	RC	EX	E	insert size	thread pitch mm	TPI	TPF	PN120	TTS
right hand									
44315900	0,05	0,8	0,9	3	0,50 - 1,5	48 - 8	–	●	●
44315901	0,28	1,2	1,7	3	1,75 - 3,0	14 - 8	–	●	●







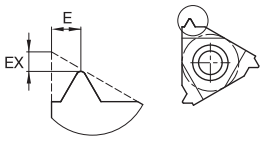
ISO Metric-External
Full Profile

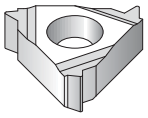
● first choice
○ alternate choice

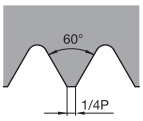
P	●
M	●
K	●
N	○
S	●
H	

■ ER/L-ISO

catalogue number	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand							
2ER175ISO	1,1	0,8	2	1,75	–	–	●
2ER15ISO	1,0	0,8	2	1,5	–	–	●
3ER30ISO	1,2	1,6	3	3,0	–	–	●
3ER25ISO	1,1	1,5	3	2,5	–	–	●
3ER20ISO	1,0	1,3	3	2,0	–	–	●
3ER175ISO	0,9	1,2	3	1,75	–	–	●
3ER15ISO	0,8	1,0	3	1,5	–	–	●
3ER125ISO	0,8	0,9	3	1,25	–	–	●
3ER10ISO	0,7	0,7	3	1,0	–	–	●
3ER08ISO	0,6	0,6	3	0,80	–	–	●
3ER075ISO	0,6	0,6	3	0,75	–	–	●
3ER07ISO	0,6	0,6	3	0,70	–	–	●
3ER05ISO	0,6	0,4	3	0,50	–	–	●
3ER035ISO	0,4	0,8	3	0,35	–	–	●
4ER50ISO	1,7	2,5	4	5,0	–	–	●
4ER35ISO	1,6	2,3	4	4,5	–	–	●
4ER45ISO	1,7	2,4	4	4,5	–	–	●
4ER40ISO	1,6	2,3	4	4,0	–	–	●
5ER60ISO	2,9	2,0	5	6,0	–	–	●
5ER55ISO	2,7	1,9	5	5,5	–	–	●
left hand							
3EL30ISO	1,2	1,6	3	3,0	–	–	●
3EL25ISO	1,1	1,5	3	2,5	–	–	●
3EL20ISO	1,3	1,0	3	2,0	–	–	●
3EL175ISO	0,9	1,2	3	1,75	–	–	●
3EL15ISO	0,8	1,0	3	1,5	–	–	●
3EL125ISO	0,8	0,9	3	1,25	–	–	●
3EL10ISO	0,7	0,7	3	1,0	–	–	●
3EL075ISO	0,6	0,6	3	0,75	–	–	●
3EL05ISO	0,6	0,4	3	0,50	–	–	●
4EL40ISO	1,6	2,3	4	4,0	–	–	●
4EL35ISO	1,6	2,3	4	3,5	–	–	●







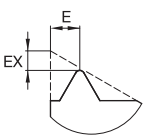
ISO
Metric-Internal

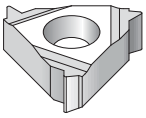
● first choice
○ alternate choice

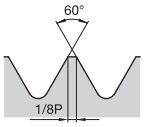
P	●
M	●
K	●
N	○
S	●
H	

IR/L-ISO

catalogue number	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand							
2IR20ISO	0,9	1,1	2	2,0	–	–	●
2IR175ISO	0,9	1,1	2	1,75	–	–	●
2IR15ISO	0,8	1,0	2	1,5	–	–	●
2IR125ISO	0,6	0,7	2	1,25	–	–	●
2IR10ISO	0,6	0,7	2	1,0	–	–	●
2IR08ISO	0,6	0,6	2	0,80	–	–	●
2IR075ISO	0,6	0,3	2	0,75	–	–	●
2IR05ISO	0,6	0,6	2	0,50	–	–	●
3IR30ISO	1,1	1,5	3	3,0	–	–	●
3IR25ISO	1,1	1,5	3	2,5	–	–	●
3IR20ISO	1,0	1,3	3	2,0	–	–	●
3IR175ISO	0,9	1,2	3	1,75	–	–	●
3IR15ISO	0,8	1,0	3	1,5	–	–	●
3IR125ISO	0,8	0,9	3	1,25	–	–	●
3IR10ISO	0,6	0,7	3	1,0	–	–	●
3IR08ISO	0,6	0,6	3	0,80	–	–	●
3IR075ISO	0,6	0,6	3	0,75	–	–	●
3IR05ISO	0,6	0,6	3	0,50	–	–	●
4IR50ISO	1,6	2,3	4	5,0	–	–	●
4IR45ISO	1,6	2,4	4	4,5	–	–	●
4IR40ISO	1,6	2,3	4	4,0	–	–	●
4IR35ISO	1,6	2,3	4	3,5	–	–	●
5IR60ISO	1,8	2,5	5	6,0	–	–	●
left hand							
2IL20ISO	0,9	1,1	2	2,0	–	–	●
2IL15ISO	0,8	1,0	2	1,5	–	–	●
2IL125ISO	0,8	0,9	2	1,25	–	–	●
2IL10ISO	0,6	0,7	2	1,0	–	–	●
2IL075ISO	0,6	0,6	2	0,75	–	–	●
2IL05ISO	0,6	0,4	2	0,50	–	–	●
3IL30ISO	1,1	1,5	3	3,0	–	–	●
3IL25ISO	1,1	1,5	3	2,5	–	–	●
3IL20ISO	1,0	1,3	3	2,0	–	–	●
3IL15ISO	0,8	1,0	3	1,5	–	–	●
3IL10ISO	0,6	0,7	3	1,0	–	–	●
3IL075ISO	0,6	0,6	3	0,75	–	–	●
3IL05ISO	0,6	0,4	3	0,50	–	–	●
4IL50ISO	1,6	2,3	4	5,0	–	–	●
4IL40ISO	1,6	2,3	4	4,0	–	–	●
4IL35ISO	1,6	2,3	4	3,5	–	–	●
5IL60ISO	1,8	2,5	5	6,0	–	–	●
5IL55ISO	1,6	2,3	5	5,5	–	–	●







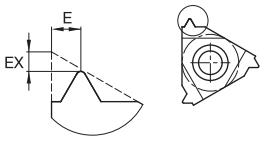
American
UN-External

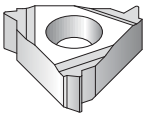
● first choice
○ alternate choice

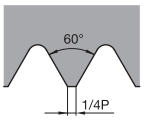
P		●
M		●
K		●
N		○
S		●
H		

■ ER/L-UN

catalogue number	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand							
3ER48UN	0,6	0,6	3	–	48	–	●
3ER40UN	0,6	0,6	3	–	40	–	●
3ER36UN	0,6	0,6	3	–	36	–	●
3ER32UN	0,6	0,6	3	–	32	–	●
3ER28UN	0,6	0,7	3	–	28	–	●
3ER27UN	0,8	0,7	3	–	27	–	●
3ER24UN	0,7	0,8	3	–	24	–	●
3ER20UN	0,8	0,9	3	–	20	–	●
3ER18UN	0,8	1,0	3	–	18	–	●
3ER16UN	0,9	1,1	3	–	16	–	●
3ER14UN	1,0	1,2	3	–	14	–	●
3ER13UN	1,3	1,0	3	–	13	–	●
3ER12UN	1,1	1,4	3	–	12	–	●
3ER11UN	1,1	1,5	3	–	11	–	●
3ER10UN	1,1	1,5	3	–	10	–	●
3ER8UN	1,2	1,6	3	–	8	–	●
left hand							
3EL16UN	0,9	1,1	3	–	16	–	●
3EL12UN	1,1	1,4	3	–	12	–	●
3EL10UN	1,1	1,5	3	–	10	–	●
3EL8UN	1,2	1,6	3	–	8	–	●







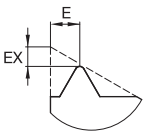
American
UN-Internal

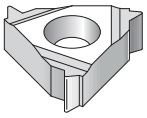
● first choice
○ alternate choice

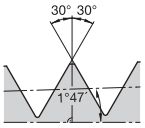
P		●
M		●
K		●
N		○
S		●
H		

■ IR/L-UN

catalogue number	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand							
2IR32UN	0,6	0,6	2	–	32	–	●
2IR27UN	0,8	0,7	2	–	28	–	●
2IR28UN	0,6	0,7	2	–	28	–	●
2IR24UN	0,7	0,8	2	–	24	–	●
2IR20UN	0,8	0,9	2	–	20	–	●
2IR18UN	0,8	1,0	2	–	18	–	●
2IR16UN	0,9	1,1	2	–	16	–	●
3IR36UN	0,6	0,6	3	–	36	–	●
3IR32UN	0,6	0,6	3	–	32	–	●
3IR28UN	0,6	0,7	3	–	28	–	●
3IR24UN	0,7	0,8	3	–	24	–	●
3IR20UN	0,8	0,9	3	–	20	–	●
3IR18UN	0,8	1,0	3	–	18	–	●
3IR16UN	0,9	1,1	3	–	16	–	●
3IR14UN	0,9	1,2	3	–	14	–	●
3IR12UN	1,1	1,4	3	–	12	–	●
3IR11UN	1,1	1,5	3	–	11	–	●
3IR10UN	1,1	1,5	3	–	10	–	●
3IR8UN	1,1	1,5	3	–	8	–	●
left hand							
2IL32UN	0,6	0,6	2	–	32	–	●
3IL12UN	1,1	1,4	3	–	12	–	●
3IL8UN	1,1	1,5	3	–	8	–	●







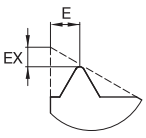
NPT-External

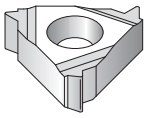
● first choice
○ alternate choice

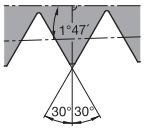
P	●
M	●
K	●
N	○
S	●
H	

ER/L-NPT

catalogue number	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand							
3ER27NPT	0,7	0,8	3	–	27	.75	●
3ER18NPT	0,8	1,0	3	–	18	.75	●
3ER14NPT	0,9	1,2	3	–	14	.75	●
3ER115NPT	1,1	1,5	3	–	11.5	.75	●
3ER8NPT	1,3	1,8	3	–	8	.75	●
left hand							
3EL27NPT	0,7	0,8	3	–	27	.75	●
3EL18NPT	0,8	1,0	3	–	18	.75	●
3EL115NPT	1,1	1,5	3	–	11.5	.75	●
3EL8NPT	1,3	1,8	3	–	8	.75	●



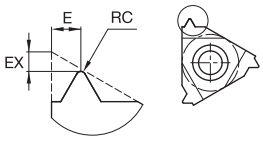


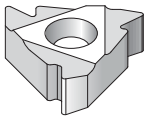


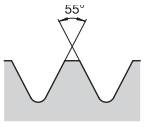
NPT-Internal

IR/L-NPT

catalogue number	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand							
3IR27NPT	0,7	0,8	3	–	27	.75	●
3IR18NPT	0,8	1,0	3	–	18	.75	●
3IR14NPT	0,9	1,2	3	–	14	.75	●
3IR115NPT	1,1	1,5	3	–	11.5	.75	●
3IR8NPT	1,3	1,8	3	–	8	.75	●
left hand							
3IL14NPT	0,9	1,2	3	–	14	.75	●







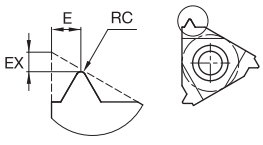
Partial Profile 55°
External

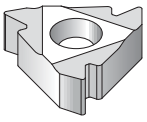
● first choice
○ alternate choice

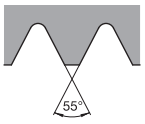
P		●
M		●
K		●
N		○
S		●
H		

ER/L-55

catalogue number	RC	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand								
3ERAG55	0,08	1,2	1,7	3	0,50-3,0	48-8	–	●
3ERA55	0,05	0,8	0,9	3	0,50-1,5	48-16	–	●
3ERG55	0,20	1,2	1,7	3	1,75-3,0	14-8	–	●
4ERN55	0,43	1,7	2,5	4	3,5-5,0	7-5	–	●
left hand								
3ELG55	0,20	1,2	1,7	3	1,75-3,0	14-8	–	●



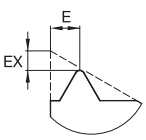


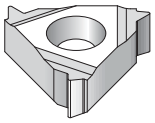


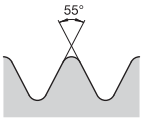
Partial Profile 55°
Internal

IR/L-55

catalogue number	RC	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand								
2IRA55	0,05	0,8	0,9	2	0,50-1,5	48-16	–	●
3IRAG55	0,07	1,2	1,7	3	0,50-3,0	48-8	–	●
3IRA55	0,05	0,8	0,9	3	0,50-1,5	48-16	–	●
3IRG55	0,21	1,2	1,7	3	1,75-3,0	14-8	–	●
4IRN55	0,43	1,7	2,5	4	3,5-5,0	7-5	–	●
left hand								
3ILAG55	0,07	1,2	1,7	3	0,50-3,0	48-8	–	●
3ILA55	0,05	0,8	0,9	3	0,50-1,5	48-16	–	●
3ILG55	0,21	1,2	1,7	3	1,75-3,0	14-8	–	●







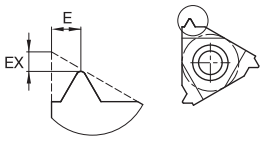
Whitworth BSW,
BSF, BSP-External

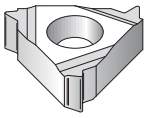
● first choice
○ alternate choice

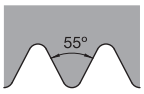
P		●
M		●
K		●
N		○
S		●
H		

■ ER/L-W

catalogue number	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand							
3ER36W	0,6	0,6	3	–	36	–	●
3ER32W	0,6	0,6	3	–	32	–	●
3ER28W	0,6	0,7	3	–	28	–	●
3ER26W	0,8	0,7	3	–	26	–	●
3ER24W	0,7	0,8	3	–	24	–	●
3ER20W	0,8	0,9	3	–	20	–	●
3ER19W	0,8	1,0	3	–	19	–	●
3ER18W	0,8	1,0	3	–	18	–	●
3ER16W	0,9	1,1	3	–	16	–	●
3ER14W	1,0	1,2	3	–	14	–	●
3ER12W	1,1	1,4	3	–	12	–	●
3ER11W	1,1	1,5	3	–	11	–	●
3ER10W	1,1	1,5	3	–	10	–	●
3ER9W	1,2	1,7	3	–	9	–	●
3ER8W	1,2	1,5	3	–	8	–	●
4ER7W	1,6	2,3	4	–	7	–	●
4ER6W	1,6	2,3	4	–	6	–	●
left hand							
3EL11W	1,1	1,5	3	–	11	–	●
3EL8W	1,2	1,5	3	–	8	–	●







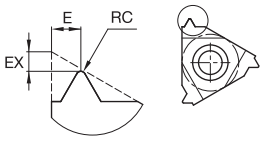
Whitworth BSW,
BSF, BSP-Internal

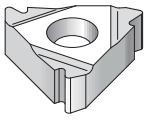
● first choice
○ alternate choice

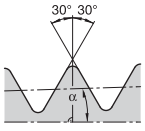
P		●
M		●
K		●
N		○
S		●
H		

IR/L-W

catalogue number	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand							
2IR19W	0,8	1,0	2	–	19	–	●
2IR18W	1,0	0,8	2	–	18	–	●
2IR16W	1,1	0,9	2	–	16	–	●
2IR14W	0,9	1,1	2	–	14	–	●
3IR19W	0,8	0,9	3	–	19	–	●
3IR18W	0,8	1,0	3	–	18	–	●
3IR16W	0,9	1,1	3	–	16	–	●
3IR14W	1,0	1,2	3	–	14	–	●
3IR12W	1,1	1,4	3	–	12	–	●
3IR11W	1,1	1,5	3	–	11	–	●
3IR8W	1,2	1,5	3	–	8	–	●
4IR7W	1,6	2,3	4	–	7	–	●
4IR6W	1,6	2,3	4	–	6	–	●
left hand							
2IL19W	0,8	1,0	2	–	19	–	●
2IL14W	0,9	1,1	2	–	14	–	●
3IL14W	1,0	1,2	3	–	14	–	●
3IL11W	1,1	1,5	3	–	11	–	●



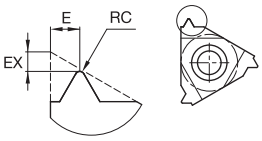


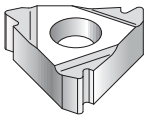


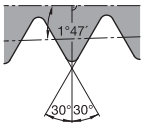
API Round-External
d=1/2 arctan
(tpf/12)

ER/L-APIRD

catalogue number	RC	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
3ER10APIRD	0,34	1,2	1,4	3	–	10	.75	●
3ER8APIRD	0,40	1,3	1,5	3	–	8	.75	●







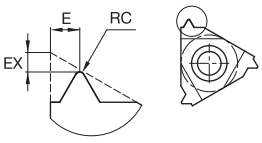
API Round-Internal

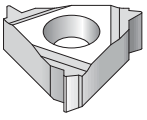
● first choice
○ alternate choice

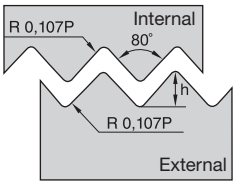
P	●	
M	●	
K	●	
N	○	
S	●	
H		

■ IR/L-APIRD

catalogue number	RC	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand								
3IR10APIRD	0,34	1,2	1,4	3	–	10	.75	●
3IR8APIRD	0,40	1,3	1,5	3	–	8	.75	●



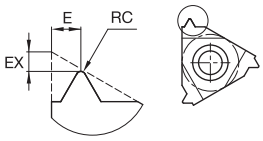


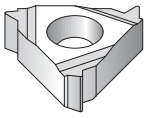


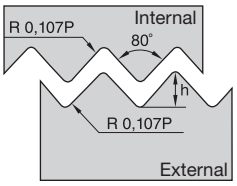
Defined by: DIN 40430

■ ER/L-PG

catalogue number	RC	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand								
3ER20PG	0,07	0,9	0,8	3	–	20	–	●
3ER18PG	0,09	1,0	0,8	3	–	18	–	●
3ER16PG	0,11	1,1	0,9	3	–	16	–	●







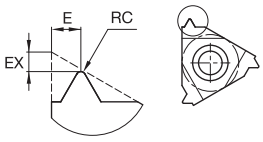
Defined by: DIN 40430

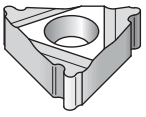
● first choice
○ alternate choice

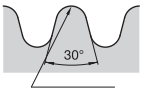
P	●	
M	●	
K	●	
N	○	
S	●	
H		

IR/L-PG

catalogue number	RC	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand								
2IR18PG	0,09	1,0	0,8	2	–	18	–	●
3IR18PG	0,09	0,1	0,8	3	–	18	–	●
3IR16PG	0,11	1,1	0,8	3	–	16	–	●



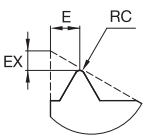


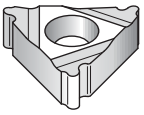


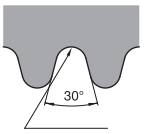
Round External
R = 0,2385P

ER/L-RD

catalogue number	RC	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand								
3ER10RD	0,61	1,1	1,2	3	–	10	–	●
3ER8RD	0,76	1,4	1,3	3	–	8	–	●
4ER6RD	1,01	1,5	1,7	4	–	6	–	●
4ER4RD	1,52	2,3	2,2	4	–	4	–	●
left hand								
3EL8RD	0,76	1,4	1,3	3	–	8	–	●







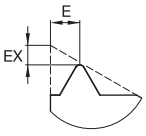
Round-Internal
R = 0,221P

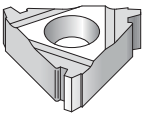
● first choice
○ alternate choice

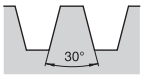
P		●
M		●
K		●
N		○
S		●
H		

IR/L-RD

catalogue number	RC	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand								
3IR10RD	0,70	1,1	1,2	3	–	10	–	●
3IR8RD	0,70	1,4	1,4	3	–	8	–	●
3IR6RD	0,94	1,5	1,4	3	–	6	–	●
4IR6RD	0,93	1,5	1,7	4	–	6	–	●
4IR4RD	1,40	2,3	2,2	4	–	4	–	●
left hand								
3IL8RD	0,06	1,4	1,4	3	–	8	–	●



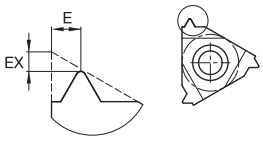


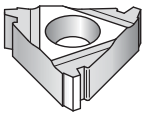


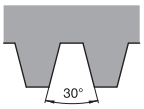
Trapez-External

ER/L-TR

catalogue number	EX	E	insert size	thread pitch mm	TPI	TPF	
right hand							
3ER3TR	1,3	1,5	3	3,0	–	–	●
3ER2TR	1,1	1,3	3	2,0	–	–	●
3ER15TR	1,0	1,1	3	1,5	–	–	●
4ER5TR	2,1	2,5	4	5,0	–	–	●
4ER4TR	1,7	1,9	4	4,0	–	–	●
5ER6TR	2,3	2,7	5	6,0	–	–	●
left hand							
3EL3TR	1,3	1,5	3	3,0	–	–	●
3EL2TR	1,1	1,3	3	2,0	–	–	●
4EL4TR	1,7	1,9	4	4,0	–	–	●
5EL6TR	2,3	2,7	5	6,0	–	–	●







Trapez-Internal

● first choice
○ alternate choice

P		●
M		●
K		●
N		○
S		●
H		

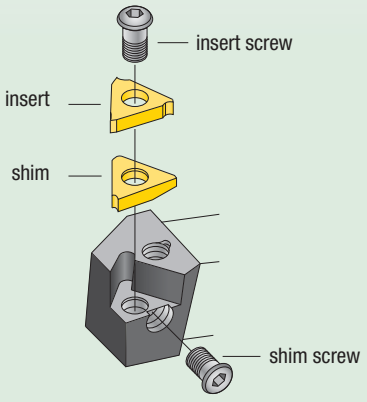
IR/L-TR

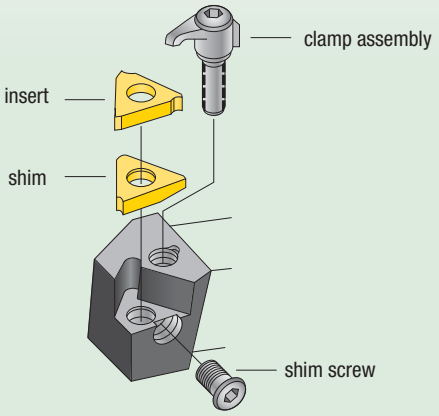
catalogue number	EX	E	insert size	thread pitch mm	TPI	TPF	TN6025
right hand							
3IR3TR	1,3	1,5	3	3,0	–	–	●
3IR15TR	1,0	1,1	3	1,5	–	–	●
4IR5TR	2,1	2,5	4	5,0	–	–	●
4IR4TR	1,7	1,9	4	4,0	–	–	●
5IR6TR	2,3	2,7	5	6,0	–	–	●
left hand							
3IL3TR	1,3	1,5	3	3,0	–	–	●
4IL5TR	2,1	2,5	4	5,0	–	–	●

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 A200.





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 — 16mm		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					
16mm	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
22mm	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

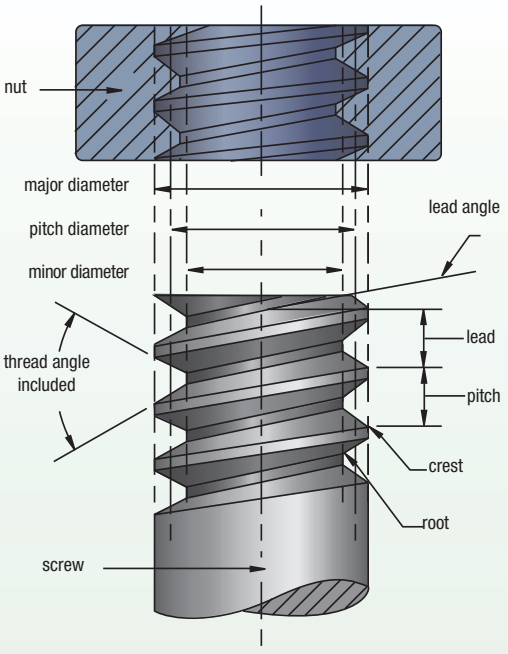
Slanted Shim Kit

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	16mm	ABY3	SM-YE3-2P, 1P, 1N, 2N, 3N SM-YI3-2P, 1P, 1N, 2N, 3N
4x	22mm	ABY4	SM-YE4-2P, 1P, 1N, 2N, 3N SM-YI4-2P, 1P, 1N, 2N, 3N

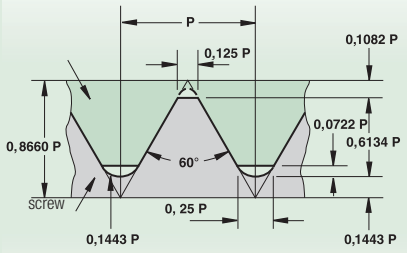
Screw Thread Definitions

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.



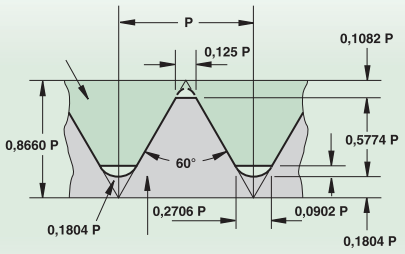
NOTE: Threads per inch (TPI) not shown:
The number of threads per inch measured axially.
The terms pitch and TPI are often used interchangeably. TPI=1/pitch

ISO M (Metric) and UN (Unified National)



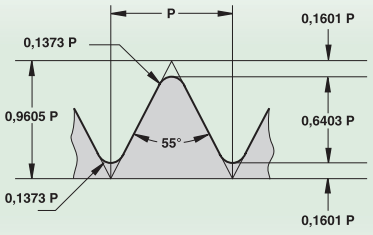
Use: All branches of mechanical industry.

UNJ (controlled root radius)



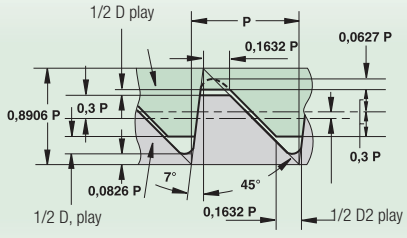
Use: Aircraft and space industry.

Whitworth (BSW)



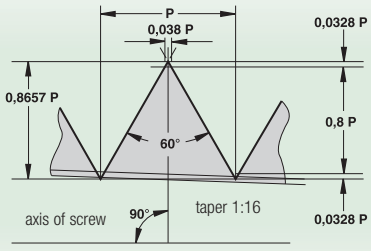
Use: Fittings and pipe couplings for gas, water, and sewer lines (replaced by ISO).

American Buttress



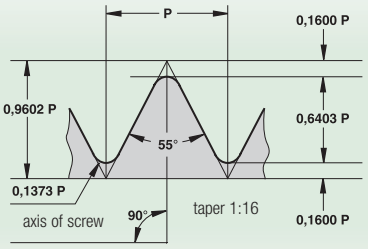
Use: Fittings and pipe couplings.

NPT (American National Pipe Thread)



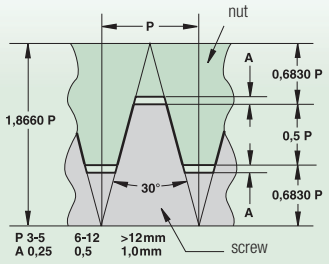
Use: Fittings and pipe couplings.

BSPT (British Standard Pipe Thread)



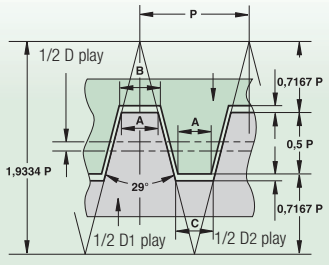
Use: Pipe thread for steam, gas, and water lines.

TR DIN 103



Use: Mechanical industry for motion transmission screws.

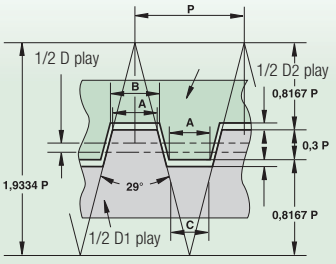
Acme



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.

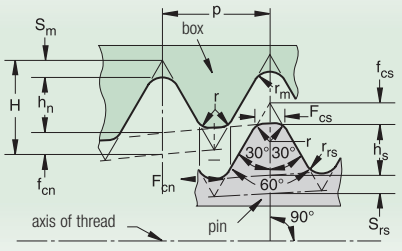
Acme, truncated (Stub)



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

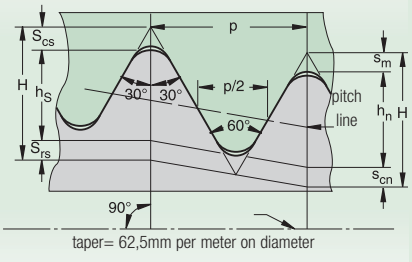
Use: Where normal Acme is too deep.

API Rotary Shoulder Connection



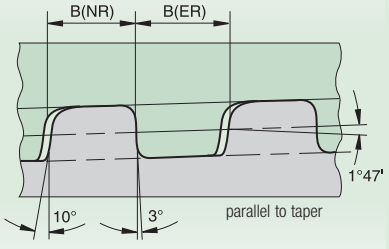
NOTE: Taper shown exaggerated.

API Casing and Tubing Round Thread Form



NOTE: Taper shown exaggerated.

API Buttress

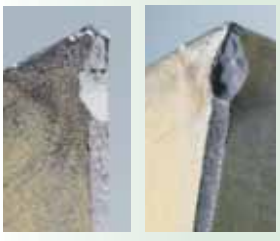


Suggested Grades and Speeds for Threading Various Workpiece Materials

workpiece group	workpiece material	recommendations surface speed – m/min		
		uncoated	PVD coated	
		THM	TN6010	TN6025
free-machining carbon steel	10L18, 10L45, 1213, 12L13, 12L14, 1140, 1141, 11L44, 1151, 10L50	—	91–198	45–198
plain carbon steel	10063, 1008, 1010, 1015, 1018, 1020, 1025, 1026, 1108, 1117	—	76–198	45–175
alloy steels/tool steels 150–325 HB (≤35 HRC)	1042, 1045, 1070, 1080, 1085, 1090, 1095, 1541, 1561, 1572, 5140, 8620, W1, O1, S1, P20, H13, D2, A6, H13, L6	—	76–198	38–167
alloy steels/tool steels 330–450 HB 36–47 HRC		—	61–160	—
martensitic/ferritic stainless/precipitation hardening	416, 420F, 440F, 405, 409, 429, 430, 434, 436, 442, PH	—	45–160	30–122
austenitic stainless steel	201, 202, 301, 302, 303, 304, 304, 305, 321, 347, 348, 310, 314, 316, 316L, 330	61–106	61–198	46–137
grey cast iron 135–270 HB	class 20, 30, 35, 45	61–91	61–237	46–122
grey cast iron 275–450 HB	class 50, 55, 60	45–76	45–175	15–76
alloy/ductile iron	A536, J434C, 60-40-18, 80-55-06, 100-70-03	45–76	45–198	30–160
free-machining aluminium alloys	2024-T4, 2014-T6, 6061-T6 2011-T3, 3003-H18, A2, Alcan, Alcoa 510, Duralumin	122–244	122–365	—
high-silicon aluminium alloys	A380, A390, A380-1, A390-1, A380-2	—	—	—
copper/zinc/brass		76–183	76–304	46–236
non-metallics	Graphite, Nylon, Plastics, Rubbers, Phenolics, Carbon	122–457	122–396	46–305
high-temperature alloys 125–269 HB (≤27 HRC)	Nickel 200, Monel, R405, Monel K500, INCONEL 600, INCONEL 625/901x750/718, Waspaloy, Hastelloy C	24–37	24–122	13–76
high-temperature alloys 260–450 HB (26–47 HRC)	Rene 95, Waspaloy A286, Incoloy 800, Haynes 188, Stellite F, Haynes 25	24–30	30–76	6–61
titanium alloys	Ti-6Al-4V, TI-5Al-2.5Sn	34–55	34–99	—

NOTE: When workpiece hardness levels are at the top of a range, starting m/min 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

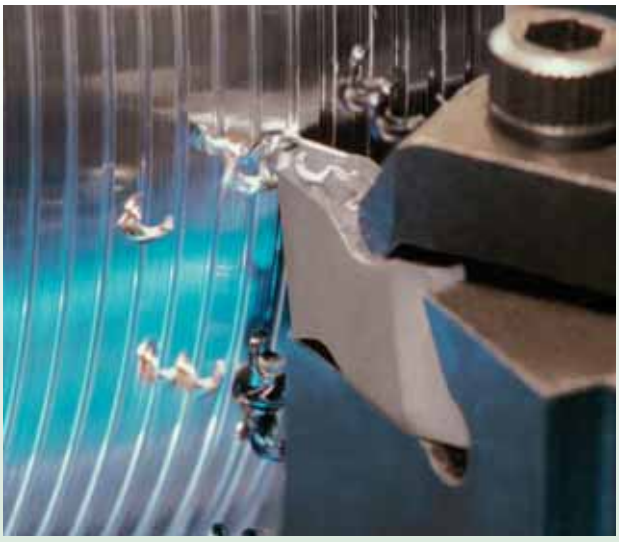
problem	cause	possible solution
thread with torn finish 	• Burrs. • Torn finish. • Steps.	• Use positive rake or full profile insert. • Increase coolant concentration. • Alter infeed. • Increases m/min. • Check machine “Z” travel axis. • Check insert form. • Check for correct shim in LT system.
chatter 	• Poor rigidity. • Incorrect speed. • Insert movement. • Improper infeed. • Off centreline. • Wrong edge prep.	• Minimise tool overhang. • Check for workpiece deflection. • Adjust m/min. • Check insert and clamp. • Use modified feed angle. • Verify that tool cutting position is at workpiece centreline. • Adjust hone level by ordering special insert.
built-up edge 	• Speed too low. • Insufficient coolant. • Chip load. • Wrong edge prep.	• Increase m/min. • 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 m/min. • 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 m/min if chipping on trailing edge. • Decrease m/min if chipping on leading edge. • Minimise 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 centreline.	• Use a more wear-resistant grade (e.g., TN6025). • Increase coolant flow. • Check the centreline height of the tool. (The smaller the diameter, the more critical the need for centreline accuracy.)

problem	possible solution																
	increase m/min	reduce m/min	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 centre height	begin cutting threads 12mm 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 0,127mm depth of cut and produce an acceptable finish. For some materials, a 0,025mm to 0,076mm (spring) pass may be used to improve surface finish, however, chip breaking action may be compromised.

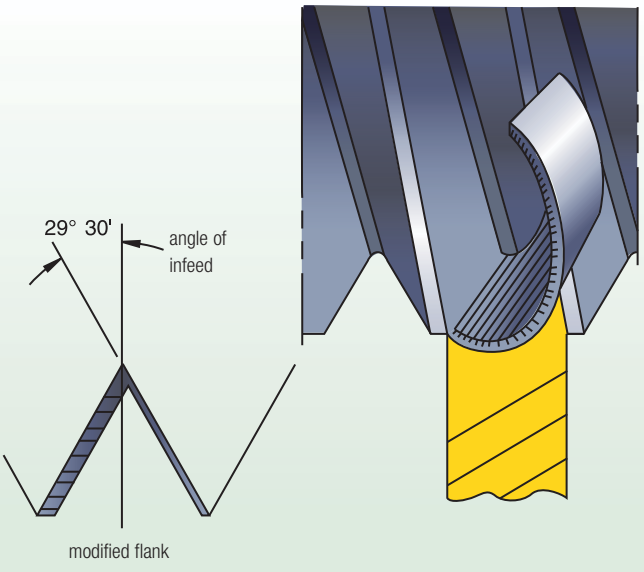


Machine Programming

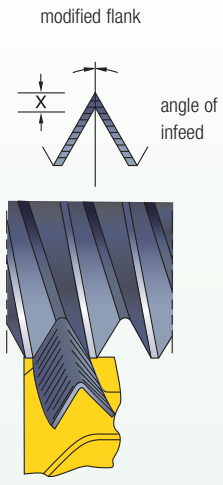
Modern CNC controls allow the programmer to easily adjust infeed angle, the number of passes, and depth of cut for each pass. The chip control threading insert performs best at an infeed angle of 29° 30', although 15° to 30° is acceptable. Also, it is important to maintain a minimum of 0,127mm depth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



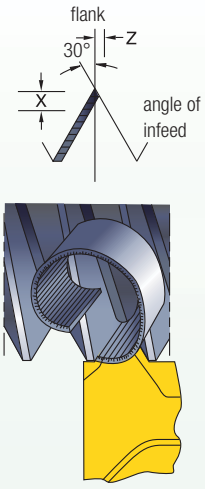
Radial



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.

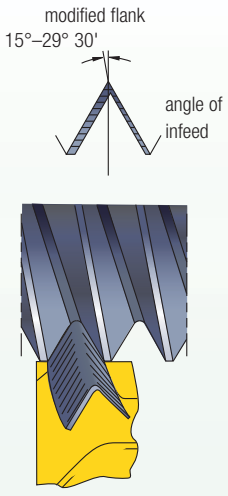
Flank



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, aluminium, and stainless steels.

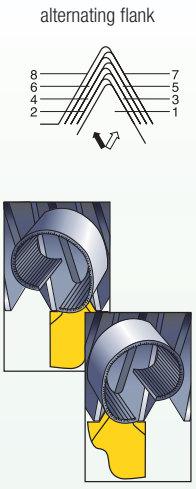
Modified flank



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 equalised and chip flow is much less of a problem.

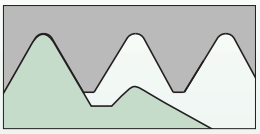
Alternating flank



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.

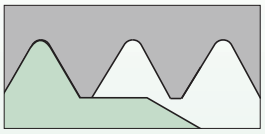
Disadvantage —
- Difficult to cut on conventional machinery.

Partial Profile



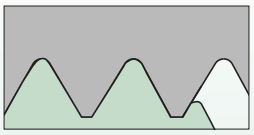
Tooth profile with universal profile shape:
- 55° or 60° without cutting edges for the tooth tapers.
- Reduced inventory.
- For various pitches in a limited range.
- Preferably one time production.
- Outside/core diameters must be accurately pre-turned.

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 0,1–0,15mm.

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

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

m/min = metres 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 (mm/min) of the tool allowed by the machine.

Check your maximum speed with the following formula:

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

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 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 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 2mm.
25% of 2mm = approximately 0,50mm
(This is the infeed/doc for the first pass.)

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

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

0,500mm x √ 4 = 1,001mm
1,001mm - 0,867mm = 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 stabilised cutting edges produce more favourable 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 0,05mm. The allowance at the diameter should not exceed 0,2mm.

Metric ISO, External Thread Cutting

pitch (mm)	6,0	5,5	5,0	4,5	4,0	3,5	3,0	2,5	2,0	1,8	1,5	1,3	1,0	0,8	0,5
total depth	3,84	3,53	3,20	2,87	2,54	2,24	1,93	1,60	1,24	1,12	0,94	0,81	0,66	0,48	0,36
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	X/Z	X/Z
1	0,46	0,43	0,41	0,38	0,08	0,33	0,28	0,28	0,23	0,20	0,20	0,20	0,20	0,15	0,13
2	0,43	0,41	0,38	0,33	0,33	0,30	0,25	0,23	0,23	0,20	0,20	0,18	0,15	0,15	0,10
3	0,36	0,33	0,33	0,28	0,25	0,25	0,20	0,20	0,18	0,18	0,18	0,15	0,13	0,10	0,08
4	0,30	0,28	0,28	0,23	0,23	0,20	0,18	0,18	0,15	0,15	0,15	0,10	0,10	0,08	0,05
5	0,28	0,25	0,25	0,23	0,20	0,20	0,18	0,15	0,15	0,13	0,13	0,10	0,08		
6	0,25	0,23	0,23	0,20	0,18	0,18	0,15	0,15	0,13	0,10	0,08	0,08			
7	0,23	0,20	0,23	0,20	0,18	0,15	0,15	0,13	0,10	0,08					
8	0,23	0,20	0,20	0,18	0,15	0,15	0,13	0,10	0,08	0,08					
9	0,23	0,18	0,18	0,18	0,15	0,15	0,13	0,10							
10	0,20	0,18	0,18	0,15	0,13	0,13	0,10	0,08							
11	0,18	0,18	0,15	0,15	0,13	0,10	0,10								
12	0,15	0,15	0,15	0,13	0,10	0,08	0,08								
13	0,15	0,15	0,13	0,13	0,10										
14	0,15	0,13	0,10	0,10	0,08										
15	0,13	0,13													
16	0,10	0,10													

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	0,271	0,406	0,541	0,677	0,812	0,947	1,083	1,353	1,624	1,894	2,165	2,436	2,706
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	0,108/-	0,162/-	0,182/-	0,196/-	0,235/-	0,212/-	0,243/-	0,243/-	0,263/-	0,277/-	0,261/-	0,269/-	0,277/-
2	0,067/0,039	0,102/0,058	0,120/0,069	0,137/0,079	0,165/0,095	0,166/0,096	0,190/0,110	0,213/0,123	0,243/0,140	0,272/0,157	0,288/0,166	0,313/0,180	0,336/0,194
3	0,052/0,030	0,077/0,045	0,092/0,053	0,105/0,061	0,126/0,073	0,128/0,074	0,146/0,084	0,163/0,094	0,187/0,108	0,209/0,120	0,221/0,127	0,240/0,138	0,258/0,149
4	0,044/0,025	0,065/0,038	0,078/0,045	0,089/0,051	0,107/0,062	0,108/0,062	0,123/0,071	0,138/0,079	0,157/0,091	0,176/0,102	0,186/0,107	0,202/0,117	0,218/0,126
5			0,069/0,040	0,078/0,045	0,94/0,054	0,095/0,055	0,108/0,063	0,121/0,070	0,139/0,080	0,155/0,089	0,164/0,095	0,178/0,103	0,192/0,111
6				0,072/0,041	0,085/0,049	0,086/0,050	0,098/0,057	0,110/0,063	0,125/0,072	0,140/0,081	0,148/0,086	0,161/0,093	0,173/0,100
7						0,079/0,046	0,090/0,052	0,101/0,058	0,115/0,067	0,129/0,074	0,136/0,079	0,148/0,086	0,159/0,092
8						0,073/0,042	0,084/0,048	0,094/0,054	0,107/0,062	0,120/0,069	0,127/0,073	0,138/0,080	0,148/0,086
9								0,088/0,051	0,101/0,058	0,113/0,065	0,119/0,069	0,129/0,075	0,139/0,080
10								0,082/0,048	0,095/0,055	0,106/0,061	0,113/0,065	0,122/0,071	0,132/0,076
11									0,092/0,052	0,101/0,058	0,107/0,062	0,116/0,067	0,125/0,072
12										0,097/0,056	0,102/0,059	0,111/0,064	0,120/0,069
13											0,098/0,057	0,107/0,062	0,115/0,066
14											0,095/0,055	0,103/0,059	0,111/0,064
15												0,099/0,057	0,107/0,062
16													0,103/0,060

UN Thread, External Thread Cutting

TPI	24	20	18	16	14	12	11	10	9	8	7	6	5
depth	0,649	0,779	0,866	0,974	1,113	1,299	1,416	1,558	1,731	1,948	2,226	2,597	3,116
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	0,206/-	0,210/-	0,233/-	0,226/-	0,196/-	0,229/-	0,220/-	0,214/-	0,210/-	0,211/-	0,213/-	0,218/-	0,229/-
2	0,148/0,086	0,163/0,094	0,181/0,104	0,188/0,109	0,189/0,110	0,222/0,128	0,228/0,132	0,240/0,139	0,256/0,148	0,276/0,160	0,304/0,176	0,343/0,198	0,399/0,230
3	0,114/0,066	0,125/0,072	0,139/0,080	0,145/0,083	0,146/0,084	0,170/0,098	0,176/0,102	0,184/0,106	0,196/0,113	0,212/0,122	0,234/0,135	0,263/0,152	0,306/0,177
4	0,096/0,055	0,105/0,061	0,117/0,068	0,122/0,070	0,123/0,071	0,143/0,083	0,148/0,086	0,155/0,090	0,165/0,095	0,179/0,103	0,197/0,114	0,222/0,128	0,258/0,149
5	0,085/0,049	0,093/0,054	0,103/0,059	0,107/0,062	0,108/0,062	0,126/0,073	0,131/0,075	0,137/0,079	0,146/0,084	0,158/0,091	0,173/0,100	0,195/0,113	0,227/0,131
6		0,084/0,048	0,093/0,054	0,097/0,056	0,098/0,056	0,114/0,066	0,118/0,068	0,124/0,072	0,132/0,076	0,142/0,082	0,157/0,091	0,177/0,102	0,205/0,119
7				0,089/0,052	0,090/0,052	0,105/0,061	0,109/0,063	0,114/0,066	0,121/0,070	0,131/0,076	0,144/0,083	0,163/0,094	0,189/0,109
8					0,084/0,048	0,098/0,056	0,101/0,058	0,106/0,061	0,113/0,065	0,122/0,070	0,134/0,078	0,151/0,087	0,176/0,101
9					0,079/0,045	0,092/0,053	0,095/0,055	0,100/0,057	0,106/0,061	0,114/0,066	0,126/0,073	0,142/0,082	0,165/0,095
10							0,090/0,052	0,094/0,054	0,100/0,058	0,108/0,063	0,119/0,069	0,134/0,078	0,156/0,090
11								0,090/0,052	0,095/0,055	0,103/0,059	0,113/0,065	0,128/0,074	0,149/0,086
12									0,091/0,053	0,098/0,057	0,108/0,063	0,122/0,071	0,142/0,082
13										0,094/0,054	0,104/0,060	0,117/0,068	0,136/0,079
14											0,100/0,058	0,113/0,065	0,131/0,076
15												0,109/0,063	0,126/0,073
16													0,122/0,071

UN Thread, Internal Thread Cutting

TPI	24	20	18	16	14	12	11	10	9	8	7	6	5
depth	0,573	0,687	0,764	0,860	0,982	1,146	1,250	1,375	1,528	1,719	1,964	2,291	2,750
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	0,193/-	0,200/-	0,222/-	0,219/-	0,220/-	0,228/-	0,250/-	0,247/-	0,246/-	0,252/-	0,262/-	0,278/-	0,302/-
2	0,127/0,073	0,239/0,081	0,155/0,089	0,161/0,093	0,173/0,100	0,190/0,110	0,207/0,120	0,216/0,125	0,229/0,132	0,247/0,142	0,271/0,156	0,304/0,176	0,353/0,204
3	0,098/0,056	0,107/0,062	0,119/0,069	0,124/0,072	0,132/0,076	0,146/0,084	0,159/0,092	0,166/0,096	0,176/0,101	0,189/0,109	0,208/0,120	0,234/0,135	0,271/0,156
4	0,082/0,048	0,090/0,052	0,100/0,058	0,104/0,060	0,112/0,064	0,123/0,071	0,134/0,077	0,140/0,081	0,148/0,086	0,160/0,092	0,175/0,101	0,197/0,114	0,228/0,132
5	0,073/0,042	0,072/0,041	0,088/0,051	0,092/0,053	0,098/0,057	0,108/0,062	0,118/0,068	0,123/0,071	0,130/0,075	0,141/0,081	0,154/0,089	0,173/0,100	0,201/0,116
6			0,080/0,046	0,083/0,048	0,089/0,051	0,098/0,056	0,107/0,062	0,111/0,064	0,118/0,068	0,127/0,073	0,140/0,081	0,157/0,091	0,182/0,105
7				0,077/0,044	0,082/0,047	0,090/0,052	0,098/0,057	0,102/0,059	0,108/0,063	0,117/0,067	0,128/0,074	0,144/0,083	0,167/0,097
8					0,076/0,044	0,084/0,048	0,091/0,053	0,095/0,055	0,101/0,058	0,109/0,063	0,119/0,069	0,134/0,078	0,156/0,090
9						0,079/0,045	0,086/0,050	0,090/0,052	0,095/0,055	0,102/0,059	0,112/0,065	0,126/0,073	0,146/0,084
10								0,085/0,049	0,090/0,052	0,097/0,056	0,106/0,061	0,119/0,069	0,138/0,080
11									0,085/0,049	0,092/0,053	0,101/0,058	0,113/0,065	0,131/0,076
12										0,088/0,051	0,096/0,056	0,108/0,063	0,126/0,073
13											0,092/0,053	0,104/0,060	0,121/0,070
14												0,100/0,058	0,116/0,067
15													0,112/0,065

NPT Thread, External, and Internal Machining

pitch, Gg/Z	27,0	18,0	14,0	11,5	8,0
depth	0,0750	1,129	1,451	1,767	2,540
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	0,19/—	0,22/—	0,240/—	0,24/—	0,255/—
2	0,15/0,087	0,181/0,104	0,200/0,115	0,208/0,120	0,250/0,144
3	0,13/0,075	0,152/0,088	0,170/0,098	0,182/0,105	0,245/0,141
4	0,11/0,063	0,141/0,081	0,150/0,086	0,168/0,097	0,230/0,133
5	0,09/0,052	0,131/0,075	0,140/0,081	0,155/0,089	0,210/0,121
6	0,08/0,046	0,121/0,070	0,130/0,075	0,145/0,084	0,195/0,112
7		0,101/0,058	0,120/0,069	0,138/0,079	0,180/0,104
8		0,082/0,047	0,110/0,063	0,124/0,072	,175/0,101
9			0,100/0,058	0,117/0,067	0,170/0,098
10			0.091/0,052	0,105/0,060	0,155/0,089
11				0,095/0,055	0,140/0,080
12				0,090/0,052	0,125/0,072
13					0,110/0,063
14					0,100/0,058

BSPT Thread, External, and Internal Machining

pitch, Gg/Z	28	19	14	11
depth	0,581	0,856	1,162	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	0,179/—	0,223/—	0,222/—	0,214/—
2	0,134/0,070	0,181/0,094	0,213/0,111	0,242/0/0,126
3	0,103/0,054	0,139/0,072	0,163/0,085	0,186/0,097
4	0,087/0,045	0,1171/0,061	0,138/0,072	0,157/0,082
5	0,078/0,040	0,103/0,054	0,121/0,063	0,138/0,072
6		0,093/0,049	0,110/0,057	0,125/0,065
7			0,101/0,052	0,115/0,060
8			0,094/0,049	0,107/0,056
9				0,100/0,052
10				0,095/0,049

Trapezoid Thread to DIN 103, External, and Internal Machining

pitch	27,0	18,0	14,0	11,5	8,0
depth	0,0750	1,129	1,451	1,767	2,540
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	0,240/—	0,250/—	0,260/—	0,265/—	0,285/—
2	0,190/0,051	0,230/0,062	,245/0,066	0,270/0,072	0,295/0,079
3	0,137/0,037	0,175/0,047	0,220/0,059	0,250/0,067	0,275/0,074
4	0,124/0,033	0,149/0,040	0,200/0,054	0,230/0,062	0,255/0,068
5	0,110/0,029	0,126/0,034	0,175/0,047	0,210/0,056	0,235/0,063
6	0,099/0,027	0,114/0,031	0,160/0,043	0,190/0,051	0,215/0,058
7		0,106/0,028	0,145/0,039	0,175/0,047	0,200/0,054
8		0,100/0,028	0,103/0,035	0,160/0,043	0,185/0,050
9			0,115/0,031	0,145/0,039	0,170/0,046
10			0,100/0,027	0,130/0,035	0,155/0,042
11				0,120/0,032	0,140/0,038
12				0,105/0,028	0,125/0,033
13					0,115/0,031
14					0,100/0,027

Round Thread to DIN 405, External, and Internal Machining

pitch, Gg/Z	10	8	6
depth	1,31	1,63	2,17
number of passes	8	10	12
	values for flank infeed (X/Z)		
order of passes	X/Z	X/Z	X/Z
1	0,210/—	0,220/—	0,206/—
2	0,205/0,055	0,210/0,058	0,250/0,067
3	0,195/0,052	0,200/0,055	0,024/0,064
4	0,180/0,048	0,190/0,051	0,230/0,062
5	0,160/0,042	0,175/0,047	0,215/0,059
6	0,140/0m037	0,160/0,043	0,195/0,54
7	0,115/0,031	0,145/0,039	0,180/0,048
8	0,090/0,024	0,1360/0,035	0,160/0,043
9		0,110/0,029	0,140/0,038
10		0,140/0,038	0,120/0,032
11			0,100/0,027
12			0,080/0,024

Whitworth, External, and Internal Thread Cutting

pitch, TPI	28	20	19	16	14	12	11	10	9	8	7	6	5
depth	0,581	0,813	0,813	0,856	1,017	1,355	1,479	1,626	1,807	2,033	2,324	2,711	3,251
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	0,179/—	0,211/—	0,223/—	0,196/—	0,223/—	0,226/—	0,246/—	0,236/—	0,230/—	0,255/—	0,195/—	0,197/—	0,204/—
2	0,134/0,070	0,172/0,089	0,181/0,094	0,186/0,097	0,213/0,111	0,234/0,122	0,255/0133	0,266/0,139	0,282/0,147	0,304/0,158	0,322/0,167	0,361/0,189	0,421/0,219
3	0,104/0,054	0,132/0,069	0,139/0,072	0,142/0,074	0,163/0,085	0,180/0,093	0,197/0,102	0,206/0,106	0,216/0,113	0,233/0,121	0,247/0,128	0,278/0,145	0,323/0,168
4	0,087/0,045	0,111/0,058	0,117/0,061	0,120/0,063	0,138/0,072	0,15/0,079	0,165/0,086	0,172/0,090	0,182/0,095	0,197/0,102	0,208/0,108	0,234/0,122	0,272/0,0,142
5	0,077/0,040	0,098/0,051	0,103/0,054	0,160/0,055	0,121/0,063	0,133/0,069	0,1450,076	0,152/0,079	0,161/0,084	0,173/0,090	0,183/0,095	0,207/0,108	0,240/0,125
6		0,098/0,051	0,093/0,049	0,096/0,050	0,110/0,057	0,121/0,063	0,131/0,068	0,137/0,071	0,145/0,076	0,157/0,082	0,166/0,086	0,187/0,097	0,217/0,113
7				0,088/0,046	0,101/0,052	0,111/0,058	0,121/0,063	0,126/0,066	0,134/0,070	0,144/0,075	0,152/0,079	0,172/0,089	0,200/0,104
8				0,082/0,043	0,093/0,049	0,103/0,054	0,113/0,059	0,117/0,061	0,124/0,0065	0,134/0,070	0,142/0,074	0,160/0,083	0,186/0,097
9						0,97/0,050	0,106/0,055	0,110/0,057	0,117/0,061	0,126/0,066	0,133/0,069	,150/0,078	0,174/0,091
10								0,104/0,054	0,111/0,058	0,119/0,062	0,126/0,066	0,135/0,074	0,165/0,086
11									0,105/0,055	0,113/0,059	0,120/0,062	,135/0,070	0,157/0,082
12										0,108/0,056	0,114/0,060	0,129/0,067	0,150/0,078
13											0,110/0,057	,124/0,064	0,144/0,075
14											0,106/0,055	0,119/0,062	0,138/0,072
15												0,115/0,060	0,133/0,069
16													0,129/0,067

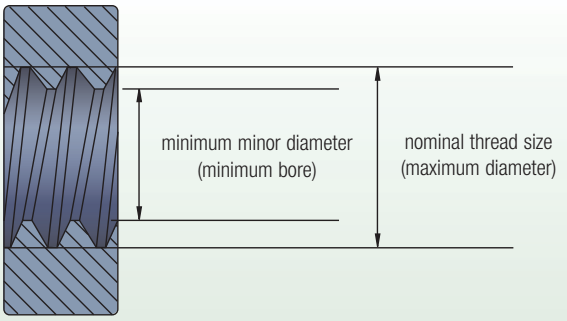
Multi-Tooth Threads, Internal

	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 (mm)	0,609	0,838	0,838	11,684	11,684	1,778	0,939	0,939	12,446	12,446	18,796	15,748	17,526	17,526	2,540
pass 1,0mm	0,330	0,381	0,508	0,508	0,711	0,558	0,431	0,558	0,558	0,762	0,584	0,736	0,584	0,812	0,889
2	0,279	0,254	0,330	0,381	0,457	0,482	0,304	0,381	0,406	0,482	0,508	0,482	0,508	0,558	0,635
3	—	0,203	—	0,279	—	0,431	0,203	—	0,279	—	0,431	0,355	0,355	0,381	0,558
4	—	—	—	—	—	0,304	—	—	—	—	0,355	—	0,304	—	0,457

Recommendations for Steel Workpieces (<300 BHN)

			total depth — on radius		
catalogue number	insert size	TPI profile	1st pass	2nd pass	3rd pass
NTC-8R/L8EM	8	8 UN	1,21	16,25	2,00
NTC-8R/L8IM	8	8 UN	1,19	15,36	1,88
NTC-8R/L10EM	8	10 UN	0,92	1,27	1,60
NTC-8R/L10IM	8	10 UN	0,90	12,06	1,52
NTC-8R/L12EM	8	12 UN	0,76	10,41	1,32
NTC-8R/L12IM	8	12 UN	0,76	0,93	1,20
NTC-8R/L14EM	8	14 UN	0,68	0,95	1,12
NTC-8R/L14IM	8	14 UN	0,60	0,78	1,04
NTC-8R/L16EM	8	16 UN	0,58	0,81	0,96
NTC-8R/L16IM	8	16 UN	0,50	0,68	0,93
NTC-8R/L18EM	8	18 UN	0,48	0,66	0,86
NTC-8R/L18IM	8	18 UN	0,48	0,60	0,83
NDC-68RDR/L-75M	8	8 round	1,47	1,65	1,85
NDC-61RDR/L-75M	8	10 round	1,11	1,29	1,45
NDC-88RDRD/L-75M	8	8 round	1,29	1,75	1,85
NDC-88VR/L-75M	8	8 NPT	1,01	1,72	2,45
NDC-8115VR/L-75M	8	11.5 NPT	0,96	1,37	1,70
NDN-814VR/L-75M	8	14 NPT	0,96	1,22	1,36

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.



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

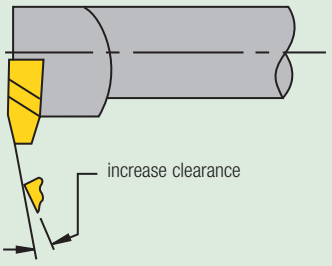
*Thread pitch of 1,5mm and less can be cut provided core thread diameter is 35mm or larger.
**NT-4-insert only.

Acme Threading Limits

internal threading limitations
NA and NAS-2, -3, -4, and -6 Acme threading inserts

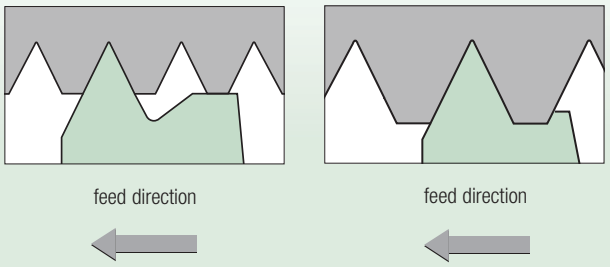
TPI	nominal thread size	minimum thread diameter	
		NT-1	NT-2
2**	5	4.500	114.3
2-1/2**	4-1/2	4.100	104.1
3**	4	3.665	93.1
4	3-1/2	3.250	82.6
5	3	2.800	71.1
6	2-1/2	2.333	59.3
8	2-1/4	2.125	54.0
10	2	1.900	48.3
12	1-3/4	1.667	42.4
14	1-5/8	1.554	39.5
16*	1-1/2	1.438	36.5

*Sixteen threads per inch and finer can be cut provided minor diameter is 36,5 mm 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



NTC crest turning insert for (P ≤ 2mm) and finer.

NTC crest turning insert for (P ≥ 3mm) and coarser.

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.

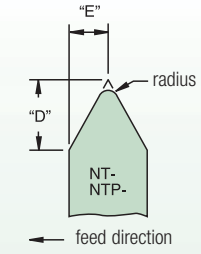
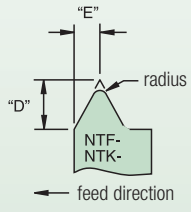
60° V-Thread Crest Turning Application Data

insert catalogue 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 catalogue

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 (mm)	E (mm)	recommended TPI		recommended TP	
				external	internal	external	internal
	NT-1	1,91	1,12	—	24–12	—	1,00–2,00
	NT-2	2,87	1,91	36–8	20–7	0,70–3,00	1,25–3,50
	NT-2-K	2,87	1,91	36–8	20–7	0,70–3,00	1,25–3,50
	NTF-2	1,57	1,02	44–14	24–12	0,60–1,75	1,00–2,00
	NTK-2	1,57	1,02	44–14	24–12	0,60–1,75	1,00–2,00
	NTP-2	2,87	1,91	36–8	20–7	0,70–3,00	1,25–3,50
	NT-3	3,76	2,46	20–6	12–5	1,25–4,00	2,00–5,00
	NT-3-K	3,76	2,46	20–6	12–5	1,25–4,00	2,00–5,00
	NT-3-C	3,76	2,46	11–6	6 (only)	2,50–4,00	4,00 (only)
	NT-3-CK	3,76	2,46	11–6	6 (only)	2,50–4,00	4,00 (only)
	NTF-3	2,11	1,37	44–10	24–9	0,60–2,50	1,00–2,50
	NTK-3	2,11	1,37	44–10	24–9	0,60–2,50	1,00–2,50
	NTP-3	3,76	2,46	20–6	12–5	1,25–4,00	2,00–5,00
	NT-4	4,98	3,23	20–4	12–4	1,25–6,25	2,00–6,25
	NT-4-K	4,98	3,23	20–4	12–4	1,25–6,25	2,00–6,25
	NTP-4	4,98	3,23	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.*

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

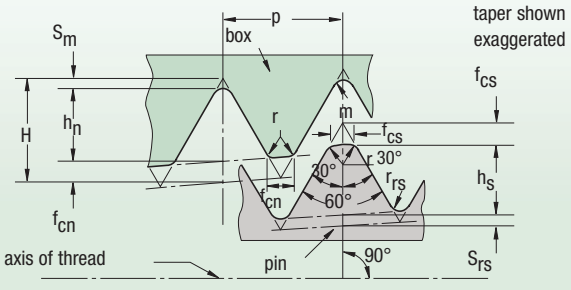
*Minimum box size that can be threaded with a standard TopThread insert due to minimum bore equipment.

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.

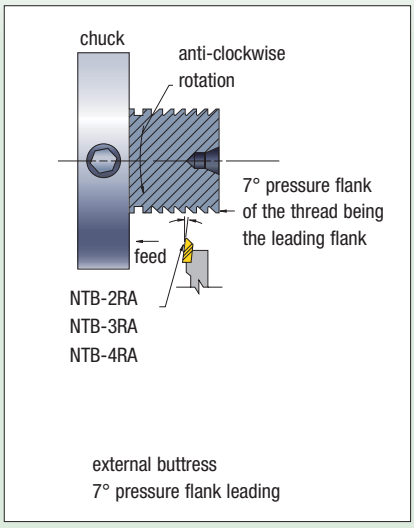
V-.040 and V-.050 Product Thread Form

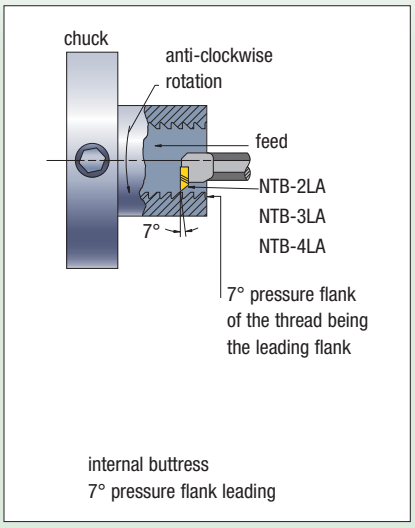


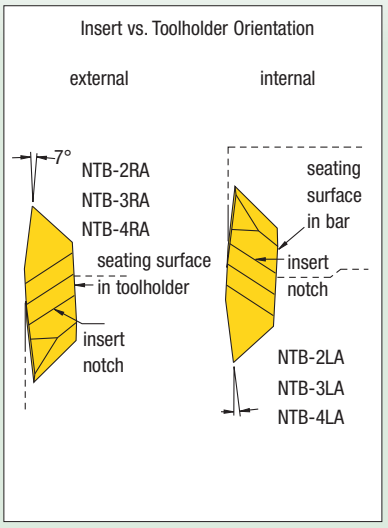
Casing and Tubing Round Thread (Height Dimensions)

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

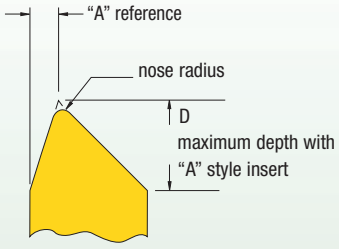
American Buttress (7° Pressure Flank Leading) NTB-A Inserts • Push Type







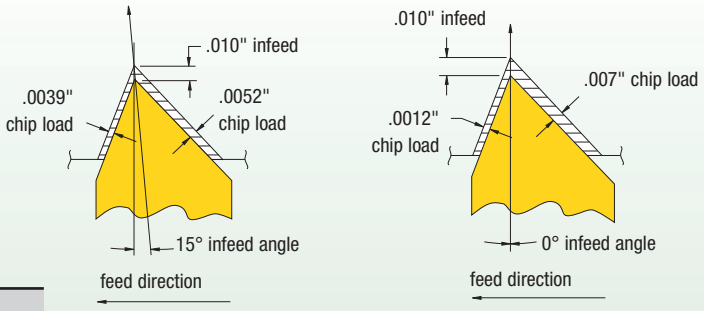
Reference Dimensions



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

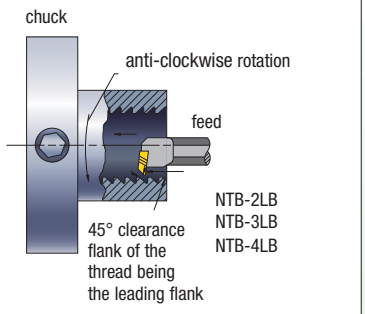
*NTB-4A insert only.
**Can cut 16 or 20 threads per inch provided minor diameter is 1.375" or larger.

Threads per Inch vs. Maximum Root Radius Chart (Inch)

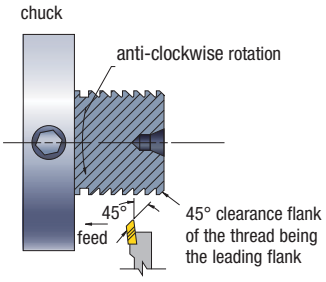
TPI	20	16	12	10	8	6	5	4	3	2-1/2	2	1-1/2	1-1/4	1
maximum root radius	0036	.0045	.0059	.0071	.0089	.0119	.0143	.0179	.0238	.0286	.0375	.0476	.0572	.0714

NOTE: Special Buttress forms are available upon request.

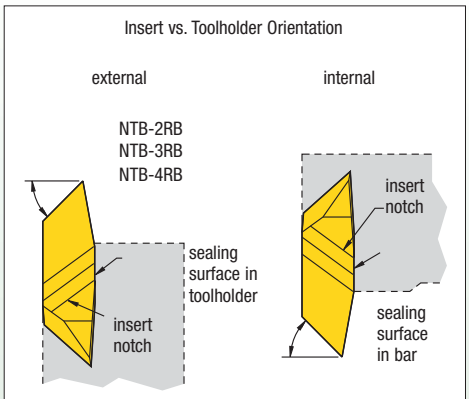
American Buttress (45° Clearance Flank Leading): NTB-B Inserts • PULL-type



Internal Buttress
45° clearance flank leading

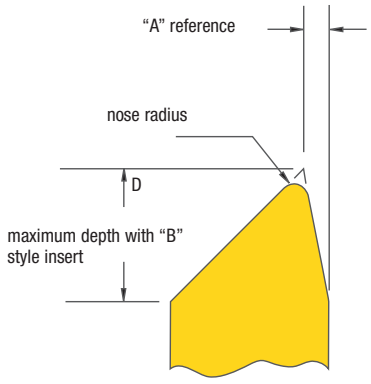


External Buttress
45° clearance flank leading

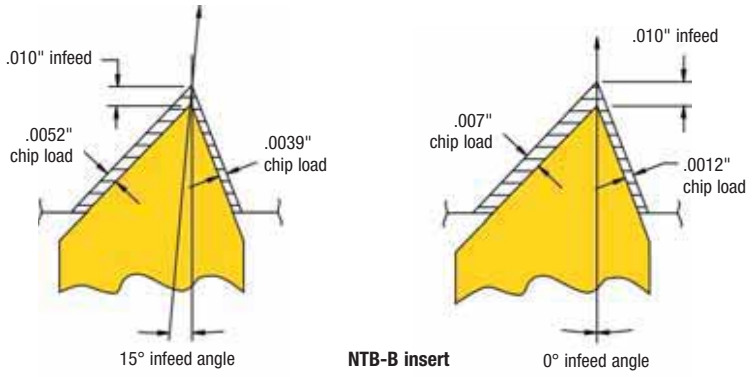


45° clearance flank leading

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

WIDIA™

A197

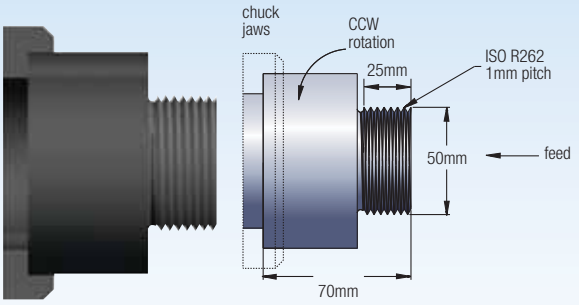
Required Information

From Part Drawing:

material: 316SS, 200 HB
thread form: ISO R262 1mm pitch
operation: external threading
pitch diameter: 50mm x 25mm deep

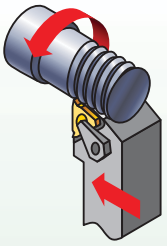
From Machine Set-Up Data:

tooling: 20mm x 20mm
spindle rotation: anti-clockwise
feed: toward chuck



Steps for a Successful Threading Operation

Step 1 • Determine Threading Method



Need to Know:

- Operation (external).
- Spindle rotation (CCW).
  Anti-clockwise rotation.
- Feed direction (toward chuck).
- Right-hand toolholder.
- Right-hand insert (ER).
- Standard helix method.

Step 2 • Select Insert

Need to Know:

- Thread form (ISO R262 1mm pitch).
- Hand of insert (right hand — ER).

Choose the High-Performance Solution

catalogue number	insert size	TN6025
3ER10ISO	3	●

High-Performance Selection

NOTE: Use insert with largest insert size available.

insert: 3ER10ISO
grade: TN6025
speed: 150 m/min

Step 3 • Select the Grade and Speed

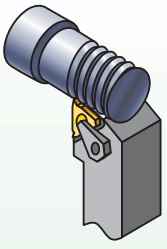
Need to Know:

- Workpiece material (316SS-200HB).
- Operation (external).

Options: Grade and Speed Selection Guidelines

threading operation	stainless steel
external	general purpose and high performance
	KC6025
	50–360 m/min

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 (16).

Options:

catalogue number	insert size	shim
ALA203R	3	SM-YE3

First choice: LSASR2020K16 holder

Step 5 • Select Shim

Need to Know:

- Thread form — TPI or pitch (1mm pitch).
- Pitch diameter (50mm).
- Helix method (standard).
  See Laydown (LT) shim selection chart.

Select SM-YE3

NOTE: For this application, the standard shim supplied should be replaced with the recommended shim, SM-YE3.

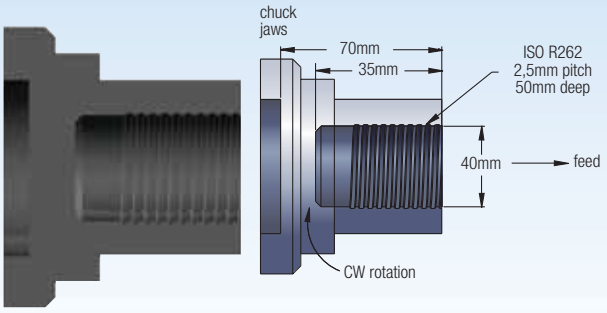
Required Information

From Part Drawing:

material: 4140 steel
thread form: ISO R262 2,5mm pitch
operation: internal threading
pitch diameter: 40mm x 35mm deep

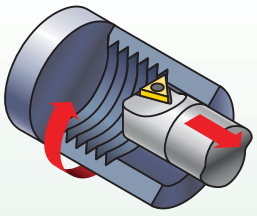
From Machine Set-Up Data:

tooling: 20mm 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 (ISO Metric Class 6G/6H).
- Hand of insert (left hand — NL).

Choose the High-Performance Solution

catalogue number	insert size	TN6025
3IL25ISO	3	●

High-Performance Selection

NOTE: Use insert with largest possible insert size to go into the bore.

insert: 3IL25ISO
grade: TN6025
speed: 130 m/min

Step 3 • Select the Grade and Speed

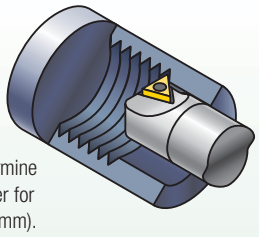
Need to Know:

- Workpiece material (4010 steel).
- Operation (internal).

Options: Grade and Speed Selection Guidelines

threading operation	steel	
	general purpose	style
internal	TN6025	ISO Metric
	40–200 m/min	

Step 4 • Select Toolholder



Need to Know:

- External or internal operation (internal).
- Pitch diameter to determine minimum bore diameter for internal operations (40mm).
- Type of tooling — toolholder, boring bar (boring bar).
- Hand of tool (left hand).
- Insert size (16).

Options:

catalogue number	insert size	minimum bore diameter	shim
A2020LSEL16	3	24	SM-YI3

First choice: S1212-LSEL3 bar

Step 5 • Select Shim

Need to Know:

- Thread form — TPI or pitch (2,5mm pitch).
- Pitch diameter (40mm).
- Helix method (reverse).
  See Laydown (LT) shim selection chart.

Select SM-YI3

NOTE: For this application, the standard shim supplied should be replaced with the recommended shim, SM-YI3.

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.

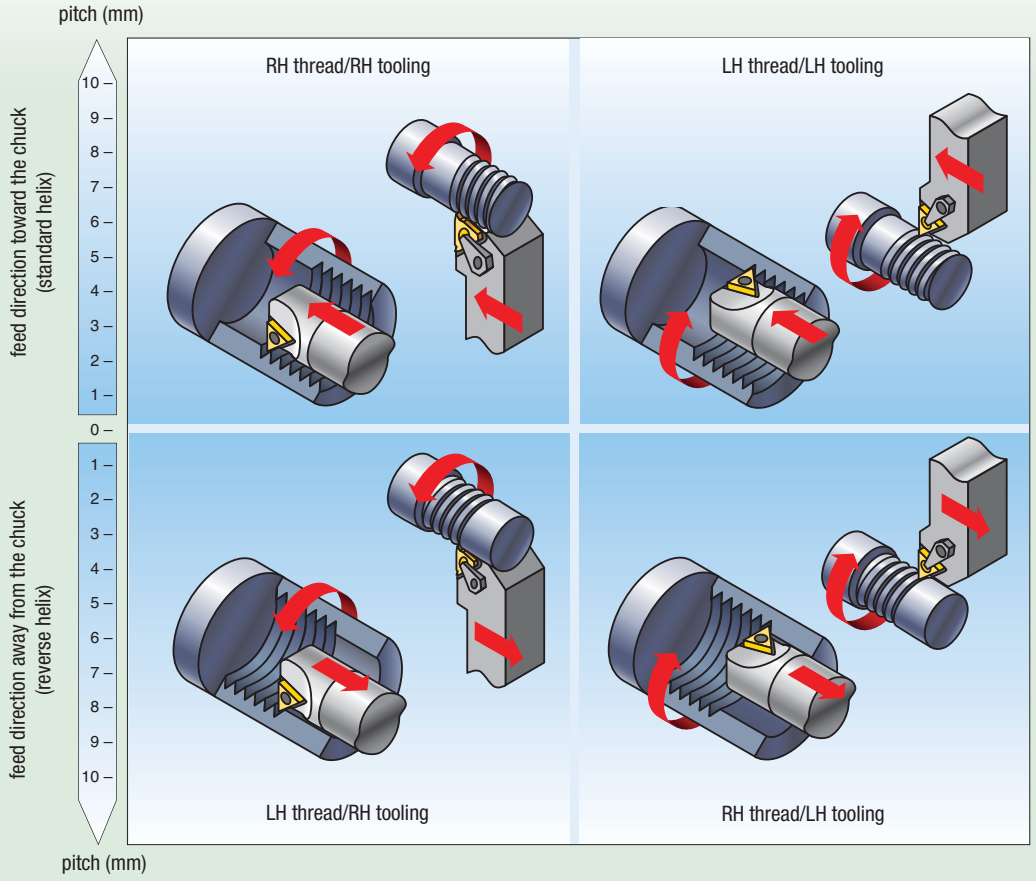
E — Select speed.

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:

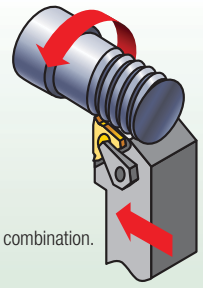
$$\beta = \text{Arctan}\ \frac{P \bullet S}{\pi\ De}$$

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

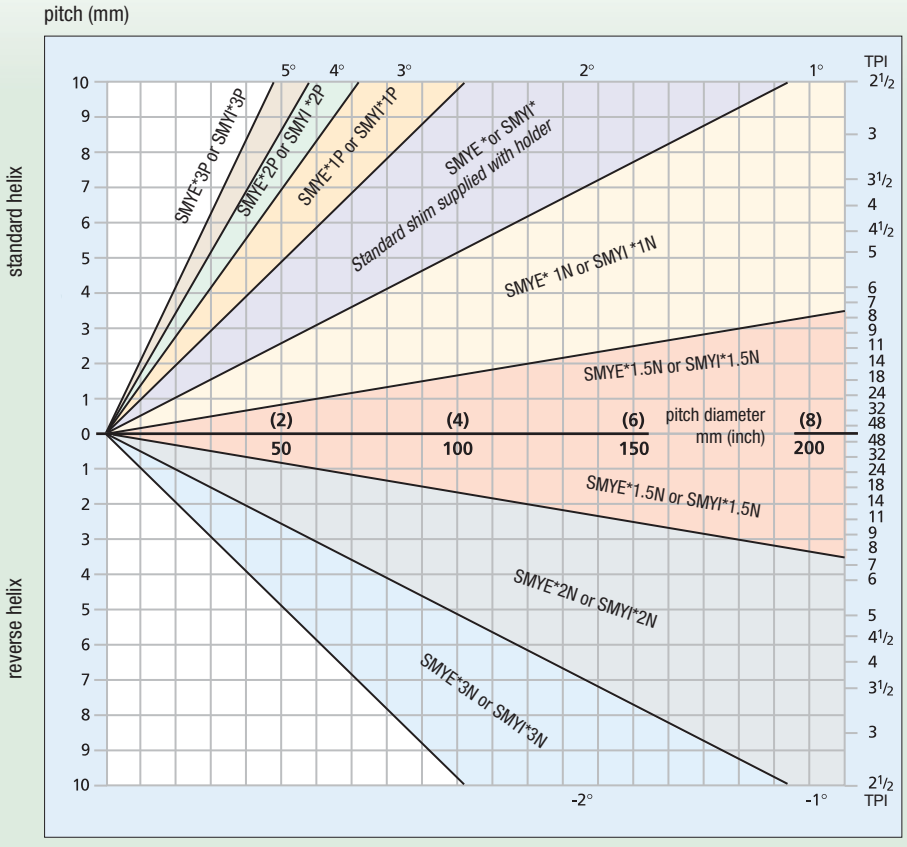
NOTE: Arctan equals Tan[-1] (see chart below for approximate lead angles).

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.



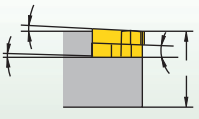
Laydown Selection Chart



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

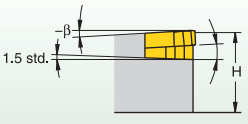
standard helix method:

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 • Metric

	toolholder									
insert size	external	internal	shim ordering code (mm)							
						standard				
3 (9,52)	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 (9,52)	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 (12,7)	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 (12,7)	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 (mm)							
72						3,1–8	8–21,4	>21,4	21,4–8	8–3,1
		0,35				3,0–8	8–21,3	>21,3	21,3–8	3–8
64						3,4–9	9–24,1	>24,1	24,1–9	9–3,4
		0,40				3,5–9,1	9,1–24,3	>24,3	24,3–9,1	9,1–3,5
56		0,45				3,9–10,3	10,3–27,6	>27,6	27,6–10,3	10,3–3,9
		0,50			2,8–4,3	4,3–11,4	11,4–30,4	>30,4	30,4–11,4	11,4–4,3
48					3–4,6	4,6–12,1	12,1–32,2	>32,2	32,2–12,1	12,1–4,6
44					3,3–5	5–13,2	13,2–35,1	>35,1	35,1–13,2	13,2–5
		0,60		2,6–3,4	3,4–5,2	5,2–13,7	13,7–36,5	>36,5	36,5–13,7	13,7–5,2
40				2,8–3,6	3,6–5,5	5,5–14,5	14,5–38,6	>38,6	38,6–14,5	14,5–5,5
		0,70		3,0–4	4–6,1	6,1–16	16–42,6	>42,6	42,6–16	16–6,1
36				3,1–4	4–6,1	6,1–16,1	16,1–42,9	>42,9	42,9–16,1	16,1–6,1
		0,75	2,8–3,2	3,3–4,3	4,3–6,5	6,5–17,1	17,1–45,6	>45,6	45,6–17,1	17,1–6,5
32			3–3,4	3,4–4,5	4,5–6,9	6,9–18,1	18,1–48,3	>48,3	48,3–18,1	18,1–6,9
		0,80	3–3,5	3,5–4,6	4,6–6,9	6,9–18,2	18,2–48,6	>48,6	48,6–18,2	18,2–6,9
28			3,4–3,9	3,9–5,2	5,2–7,9	7,9–20,7	20,7–55,1	>55,1	55,1–20,7	20,7–7,9
27			3,6–4,1	4,1–5,4	5,4–8,2	8,2–21,4	21,4–57,2	>57,2	57,2–21,4	21,4–8,2
		1,00	3,8–4,3	4,3–5,7	5,7–8,7	8,7–22,8	22,8–60,8	>60,8	60,8–22,8	22,8–8,7
24			4–4,6	4,6–6	6–9,2	9,2–24,1	24,1–64,3	>64,3	64,3–24,1	24,1–9,2
		1,25	4,7–5,4	5,4–7,1	7,1–10,8	10,9–28,5	28,5–76	>76,0	76–28,5	28,5–10,8
20			4,8–5,5	5,5–7,2	7,2–11	11–28,9	29–77,2	>77,2	77,2–28,9	29–11
18			5,3–6,1	6,1–8	8–12,2	12,2–32,2	32,2–85,8	>85,8	85,8–32,2	32,2–12,2
		1,50	5,7–6,5	6,5–8,5	8,5–13	13–34,2	34,2–91,2	>91,2	91,2–34,2	34,2–13
16			6–6,9	6,9–9	9–13,8	13,8–36,2	36,2–96,5	>96,5	96,5–36,2	36,2–13,8
		1,75	6,6–7,96	7,6–10	10–15,2	15,2–39,9	39,9–106,4	>106,4	106,4–39,9	39,9–15,2
14			6,9–7,9	7,9–10,3	10,3–15,7	15,7–41,4	41,4–110,3	>110,3	110,3–41,4	41,4–15,7
13			7,4–8,5	8,5–11,1	11,1–17	17–44,5	44,5–118,8	>118,8	118,8–44,5	44,5–17
		2,00	7,6–8,7	8,7–11,4	11,4–17,4	17,4–45,6	45,6–121,6	>121,6	121,6–45,6	45,6–17,4
12			8–9,2	9,2–12	12,1–18,4	18,4–48,2	48,3–128,7	>128,7	128,7–48,2	48,2–18,4
11,5			8,4–9,6	9,6–12,6	12,6–19,2	19,2–50,3	50,3–134,3	>134,3	134,3–50,3	50,3–19,2
11			8,8–10	10–13,1	13,1–20	20–52,6	52,6–140,4	>140,4	140,4–52,6	52,6–20
		2,50	9,5–10,8	10,8–14,2	14,2–21,7	21,7–57	57–152	>152,0	152–57	57–21,7
10			9,6–11	11–14,5	14,5–22	22–57,9	57,9–154,4	>154,4	154,4–57,9	57,9–22
9			10,7–12,2	12,2–16,1	16,1–24,5	24,5–64,3	64,3–171,6	>171,6	171,6–64,3	64,3–24,5
		3,00	11,4–13	13–17,1	17,1–26	26–68,4	68,4–182,4	>182,4	182,4–68,4	68,4–26
8			12–13,8	13,8–18,1	18,1–27,6	27,6–72,4	72,4–193	>193,0	193–72,4	72,4–27,6
		3,50	13,3–15,2	15,2–19,9	19,9–30,4	30,4–79,8	79,8–212,8	>212,8	212,8–79,8	79,8–30,4
7			13,8–15,7	15,7–20,7	20,7–31,5	31,5–82,7	82,7–220,6	>220,6	220,6–82,7	82,7–31,5
		4,00	15,2–17,3	17,3–22,8	22,8–34,7	34,7–91,2	91,2–243,2	>243,2	243,2–91,2	91,2–34,7
6			16–18,3	18,3–24,1	24,1–36,7	36,7–96,5	96,5–257,4	>257,4	257,4–96,5	96,5–36,7
		5,00	19–21,7	21,7–28,5	28,5–43,4	43,4–114	114–304	>304,0	304–114	114–43,4
5			19,3–22	22–28,9	28,9–44,1	44,1–115,8	115,8–308,8	>308,8	308,8–115,8	115,8–44,1
4,5			21,4–24,5	24,5–32,1	32,1–49	49–128,7	128,7–343,1	>343,1	343,1–128,7	128,7–49
		6,00	22,7–26	26–34,2	34,2–52,1	52,1–136,8	136,8–364,8	>364,8	364,8–136,8	136,8–52,1
4			24,1–27,5	27,5–36,2	36,2–55,1	55,1–144,8	144,8–386	>386	386–144,8	144,8–55,1
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 TP 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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- Ideal choice for fine-pitch threads, high-helix/multi-start threads, and single-point threading in small diameter bores.

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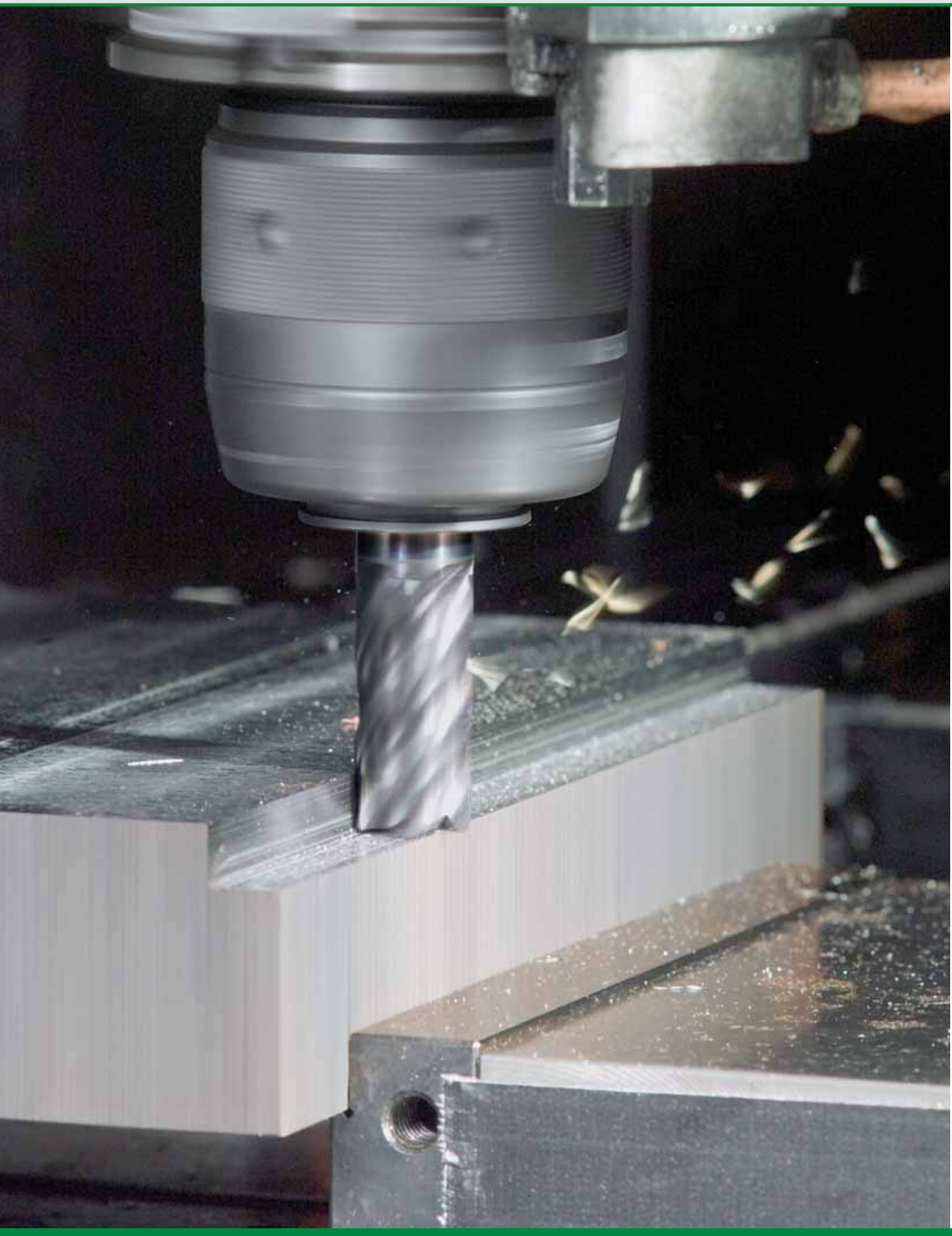
WIDIA™



Solid End Milling

● First Choice
○ Alternate Choice

	Series	Range of Diameter Ø min–Ø max mm	Number of Flutes	Cutting Centre	Uncoated	TiCN	AlTiN	TiAlN	DCL TiB_2	Diamond	PCD
High-Performance Solid Carbide End Mills • VariMill™											
VariMill I™											
	4777	4–25	4	Yes				X			
	4778	4–25	4	Yes			X				
	4717	6–20	4	Yes				X			
	4727	12–20	4	Yes				X			
	47N7 TIALN	4–20	4	Yes				X			
	47N7 ALTIN	4–20	4	Yes			X				
	47N6	6–20	4	Yes				X			
	47N0	5–20	4	Yes				X			
VariMill II™											
	5777	4–25	5	No			X				
	577C	6–20	5	Yes			X				
	57N8	6–25	5	No			X				
VariMill II™ Long											
	5718	6–25	5	No			X				
VariMill II™ ER											
	577E	10–25	5	Yes			X				
	57NE	10–25	5	Yes			X				
High-Performance Solid Carbide End Mills • Hard Materials											
Vision Plus™ Micro											
	7N02/7N12/7N22	0,3–3	2	Yes			X	X			
	423034	0,5–3	2	Yes			X				
	7N01	1–12	2	Yes				X			
	7N21	0,5–3	2	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 Catalogue (A-13-03144EN_me)		WIDIA™ Solid End Mills & Holemaking Catalogue (A-09-02077EN_me)	
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)*																	
●	●	○	○	●	○			●	○	○	○	●		B16–B17	B24	A18–A19	A27
●	○	●	●	●	○			○	●	●	●	●		B18	B24	A22	A29
●	●	●	●	●	○			●	●	●	●	●		B21	B26	—	—
●	●	●	●	●	○			●	●	●	●	●		B21	B26	—	—
●	●	○	○	●	○			●	○	○	○	●		B19	B25	—	—
●	●	●	●	●	○			●	●	●	●	●		B20	B25	—	—
●	●	○	○	●	○			●	○	○	○	●		B22	B27	—	—
●	●	○	○	●	○			●	●	●	●	●		B23	B27	A21	A28
VariMill II™ *(continued)*																	
●	●	●	●	●	○			●	○	○	○	●		B30	B34	A20	A28
●	●	●	●	●	○			●	○	○	○	●		B31	B34	—	—
●	○	●	●	○	○			○	●	●	●	●		B32–B33	B35	A24–A25	A29
VariMill II™ Long *(continued)*																	
●	●	●	●	●	○			○	●	●	●	●		B38–B39	B39	—	—
VariMill II™ ER *(continued)*																	
●	○	●	●	●	○			●	●	●	●	●		B42	B44	—	—
●	○	●	●	●	○			●	●	●	●	●		B43	B44	—	—
High-Performance Solid Carbide End Mills • Hard Materials *(continued)*																	
Vision Plus™ Micro *(continued)*																	
○	●	○			○							●	○	—	—	A32–A34	A36
○	○											●	○	—	—	A35	A64
○	○											●	○	—	—	A36	A65
○	○											●	○	—	—	A37	A66

● First Choice
○ Alternate Choice

	Series	Range of Diameter Ø min–Ø max mm	Number of Flutes	Cutting Centre	Uncoated	TiCN	ALTiN	TiAlN	DCL TiB_2	Diamond	PCD
High–Performance Solid Carbide End Mills • Hard Materials											
Vision Plus™											
	75N2	3–12	2	Yes				X			
	422875	2–12	2	Yes			X				
	7151	1–20	2	Yes				X			
	7061	1–12	2	Yes				X			
	70N1	1–12	2	Yes				X			
	422869/422868	1–16	2	Yes			X				
	422870	2–16	2	Yes			X				
	7505/7545/7515/7525	3–25	4/5/6	Yes				X			
	7585/7595	3–25	4/5	Yes				X			
	75N5	3–25	4/5	Yes				X			
	75N8	6–12	6	Yes				X			
	422876/422878	4–12	4	Yes			X				
	7150	2–20	4	Yes				X			
	7050/7060	2–20	4	Yes				X			
	422871	3–10	4	Yes			X				
	D618	3–18	4/6	Yes				X			
	422837/422831	3–20	6/8	No			X				
	7670	4–25	4/6	Yes				X			
Vision Plus™ X–Feed™											
	70N7	6–20	6	No			X				
	70N6/71N6	6–20	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 Catalogue (A-13-03144EN_me)		WIDIA™ Solid End Mills & Holemaking Catalogue (A-09-02077EN_me)	
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 • Hard Materials *(continued)*																	
Vision Plus™ *(continued)*																	
○	○											●	○	—	—	A38	A67
○	○											●	○	—	—	A39	A67
○	○											●	○	—	—	A40	A68
○	○											●	○	—	—	A41	A69
○	○											●	○	—	—	A41	A70
○	●											○	○	—	—	A42	A71
○	●											○	○	—	—	A43	A72
○	○											●	○	—	—	A45	A74
○	○											●	○	—	—	A46–A47	A75
○	○											●	○	—	—	A48–A49	A75
○	○											●	○	—	—	A50	A76
○	●											○	○	—	—	A52–A53	A76
○	○											●	○	—	—	A54	A77
○	○											●	○	—	—	A55	A78
○	○											●	○	—	—	A56	A79
○	○											●	○	—	—	A57	A80
○	●											○	○	—	—	A58	A80
○	○	○	○	○	○							●	○	—	—	A62	A82
Vision Plus™ X–Feed™ *(continued)*																	
											●	●		—	—	A60	A81
	●										●			—	—	A61	A81

● First Choice
○ Alternate Choice

	Series	Range of Diameter Ø min–Ø max mm	Number of Flutes	Cutting Centre	Uncoated	TiCN	AlTiN	TiAlN	DCL TiB_2	Diamond	PCD
High–Performance Solid Carbide End Mills • Aluminium											
	524149	3–12	1	Yes					X		
	022849	2–12	1	Yes	X						
	D502	3–20	2	Yes	X			X			
	022814/022817	4–20	2	Yes	X						
	4102	1,5–20	2	Yes	X						
	524152/022852	3–16	2	Yes	X				X		
	024101	6–12	2	Yes							X
	4103	3–20	3	Yes	X						
	4909	6–25	3	Yes	X						
	4979	6–25	3	Yes	X	X					
	49N9	6–20	3	Yes	X						
	49G9	8–25	3	Yes		X					
AluSurf™											
	5102	1,5–20	2	Yes	X						
	5103	3–20	3	Yes	X						
	51N3	6–20	3	Yes	X						
High–Performance Solid Carbide End Mills • Finishing											
	423007/023007	0,4–3	2	Yes	X		X				
	4001 JJ	2–20	2	Yes	X			X			
	D503/D513	2–20	3	Yes	X			X			
	DC03	3–20	3	Yes				X			
	4503 JJ	1–20	3	Yes				X			
	422802/322802/022802	2–20	3	Yes	X	X		X			
	422806/322806/022806	2–20	3	Yes	X	X		X			
	4603	3–20	3	Yes				X			
	D507/D517	6–20	6	Yes				X			
	422827	6–25	6/8	No			X				
Vision Plus™											
	D518	4–25	4/6/8	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 Catalogue (A–13–03144EN_me)		WIDIA™ Solid End Mills & Holemaking Catalogue (A–09–02077EN_me)	
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 • Aluminium *(continued)*																		
							●	●							—	—	A86	A103
							○								—	—	A86	A103
							○								—	—	A87	A103
							○								—	—	A88	A104
							○								—	—	A89	A104
							●	●							—	—	A92–A93	A105
							●	○							—	—	A94	A105
							○								—	—	A95	A105
							○								—	—	A99	A106
							●								—	—	A100	A107
							●								—	—	A101	A107
							●								—	—	A102	A107
AluSurf™ *(continued)*																		
							●								—	—	A91	A104
							●								—	—	A97	A106
							●								—	—	A98	A106
High–Performance Solid Carbide End Mills • Finishing *(continued)*																		
	●	●	○	○	○		○		●		●				—	—	A112	A127
	●	●			○		○								—	—	A113	A127
	●	●	○	○	○	○			●	●	●	●	○		—	—	A114	A128
	●	●	○	○	○	○			○	○	○	●	○		—	—	A115	A129
	●	●	○	○	○	○			○	○	○	○	○		—	—	A116	A130
	●	●	○	○	○	○			○	○	○	○	○		—	—	A117–A118	A130
	●	●	○	○	○	○			○	○	○	○	○		—	—	A117–A118	A130
	○	●	○	○	○	○			○	○	○	○	○		—	—	A119	A131
	●	●	○	○	○	○			○	○	○	○	○		—	—	A120	A132
	●	●	○	○	○	○			○	○	○	○	○		—	—	A121	A133
Vision Plus™ *(continued)*																		
	○	○	●	●	●	○			●	●	●	●			—	—	A122	A134

● First Choice
○ Alternate Choice

	Series	Range of Diameter Ø min–Ø max mm	Number of Flutes	Cutting Centre	Uncoated	TiCN	AlTiN	TiAlN	DCL TiB_2	Diamond	PCD
High–Performance Solid Carbide End Mills • Roughing											
	DQ13	3–20	3	Yes				X			
	49H6	8–20	3/4	Yes				X			
	422152/422150	6–25	4	Yes			X				
	4976	4–25	3/4/5	Yes			X				
	422824/422820	6–25	4	Yes			X				
	422141/422140/422143/422142	6–20	4	Yes			X				
	4940	6–25	4/6	Yes				X			
	4970	6–25	4/6	Yes				X			
	49N6	4–25	3/4/5	Yes			X				
	4969	5–20	3/4	Yes				X			
High–Performance Carbide–Tipped End Mills											
	022761	25–40	2	Yes	X						
	422773/022773	20–40	3/4/6	No	X			X			
	422779	25–50	4/6	No				X			
High–Performance HSS–E–PM End Mills • Finishing											
	1N0M JJ	3–25	4	Yes				X			
	1N77	6–30	4	Yes		X					
High–Performance HSS–E–PM End Mills • Roughing											
	6N06	6–30	4/5/6	Yes				X			
	6N70	6–32	4/6	Yes				X			
	6NL6	10–25	4/6	Yes				X			
WavCut™											
	664W/660W/661W	25–50	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 Catalogue (A–13–03144EN_me)		WIDIA™ Solid End Mills & Holemaking Catalogue (A–09–02077EN_me)	
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 • Roughing *(continued)*																	
●	○	○	○	●	○			○	○	●	●	○		—	—	A141	A149
●	●	○		○	○			○		○		●		—	—	A142	A149
●	●	○			○			○				○		—	—	A143	A150
●	●	○	○	○	○			○	○	○	○	○		—	—	A144	A150
●	●	○	○	○	○			○				○		—	—	A145	A151
●	●	○	○	○	○			○				○		—	—	A146	A152
○	●	○	○	○	○			○	○	●	●	●	○	—	—	A147	A153
○	●	○	○	○	○			○	○	●	●	●	○	—	—	A148	A153
●	●	○	○	○	●			○	○	○	○	●	●	B48	B50	—	—
●	●	○	○	○	●			○	○	○	○	●		B49	B50	—	—
High–Performance Carbide–Tipped End Mills *(continued)*																	
						●								—	—	A156	A160
○	○	○	○	○		○		○	○	○	○			—	—	A157	A161
○	○	○	○	○		○		○	○	○	○			—	—	A158	A162
High–Performance HSS–E–PM End Mills • Finishing *(continued)*																	
○	○	○	○	○	○			○	○	○	○			—	—	A171	A175
○	○	○	○	○	○			○	○	○	○			—	—	A172	A176
High–Performance HSS–E–PM End Mills • Roughing *(continued)*																	
○		○		○	○			○	○	○	○			—	—	A181	A185
○		○		○	○			○	○	○	○			—	—	A182	A186
○		○		○	○			○	○	○	○			—	—	A183	A186
WavCut™																	
		○		○						●	●			—	—	A184	A187

● First Choice
○ Alternate Choice

	Series	Range of Diameter Ø min–Ø max mm	Number of Flutes	Cutting Centre	Uncoated	TiCN	AlTiN	TiAlN	DCL TiB_2	Diamond	PCD
General Purpose+ Solid Carbide End Mills • Roughing/Finishing											
	D002/D012	2–20	2	Yes	X			X			
	422838/0 22838	2–20	2	Yes				X			
	D001/D011	3–20	2	Yes				X			
	D501	1–18	2	Yes				X			
	D003/D013	2–20	3	Yes				X			
	422809/422810/422861/422862	2–20	3	Yes				X			
	422821/022821	2–20	3	Yes	X			X			
	D009	3–18	3	Yes				X			
	DC19	3–20	3	Yes				X			
	D004/D014	2–25	4	Yes	X			X			
	422811/422812/422864/422863	2–20	4	Yes				X			
	422825/022825	2–20	4	Yes	X			X			
	422848/022848	2–20	4	Yes	X		X				
	D000/D010	3–20	4	Yes	X			X			
	422826/422822	6–25	6/8	No			X				
	4632	0,4–1,5	2	Yes	X	X		X			
	4002/4012/4022	1–25	2	Yes	X	X		X			
	422815/022815	3–20	2	Yes	X			X			
	4651	1,0–2,0	2	Yes	X			X			
	4001/4011/4021	1–20	2	Yes	X			X			
	4633	0,4–1,8	3	Yes	X			X			
	4003/4013	1–25	3	Yes	X			X			
	422858	3–25	3	Yes			X				
	4004/4014/4024	1–25	4	Yes	X			X			
	422816	4–20	4	Yes				X			
	4000/4010	3–20	4	Yes	X			X			
	422845/022845	3–16	4	Yes	X		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 Catalogue (A-13-03144EN_me)		WIDIA™ Solid End Mills & Holemaking Catalogue (A-09-02077EN_me)	
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)*																	
○	○			○	○	○								—	—	A196–A197	A248
○	○			○	○	○								—	—	A202	A250
○	○			○	○	○								—	—	A203	A251
○	○			○	○	○								—	—	A204	A252
○	○			○	○	○								—	—	A205–A206	A253
○	○			○	○	○								—	—	A207–A208	A254
○	○			○	○	○								—	—	A209	A255
○	○			○	○	○								—	—	A210	A256
○	○	○	○	○	○	○		○	○	○	○	○		—	—	A211	A256
○	○			○	○									—	—	A212–A213	A257
○	○			○	○									—	—	A214–A215	A258
○	○			○	○									—	—	A216	A259
○	○			○	○	○								—	—	A217	A259
○	○			○	○	○								—	—	A218	A260
○	○			○	○									—	—	A129	A261
○	○			○	○	○								—	—	A221	A261
○	○			○	○	○								—	—	A222–A223	A262–A263
○	○			○	○	○								—	—	A224	A264
○	○			○	○	○								—	—	A225	A264
○	○			○	○	○								—	—	A226–A227	A265–A266
○	○			○	○	○								—	—	A229	A267
○	○			○	○	○								—	—	A230–A231	A267–A268
○	○			○	○	○								—	—	A232	A268
○	○			○	○									—	—	A234–A235	A269–A270
○	○			○	○									—	—	A236	A270
○	○			○	○		○							—	—	A237	A271
○	○			○	○									—	—	A238	A272

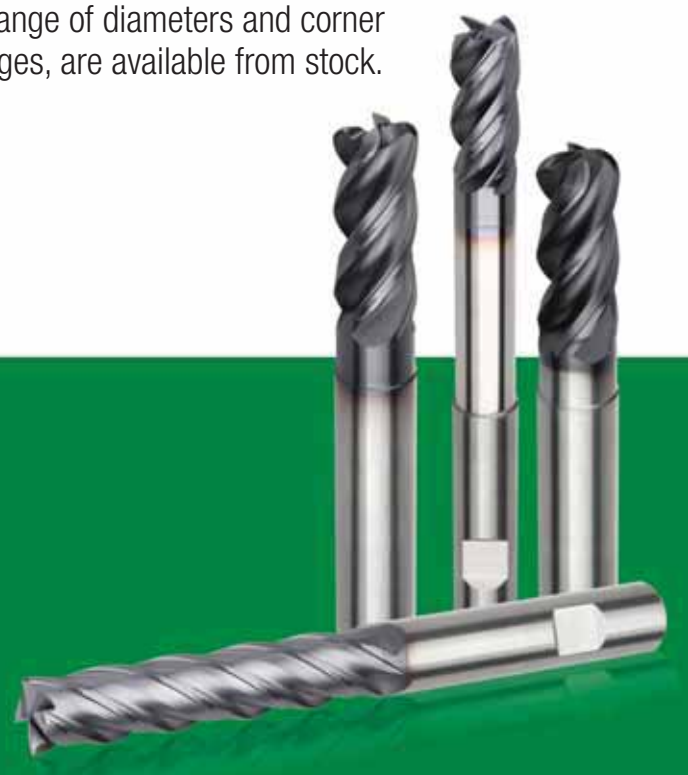
● First Choice
○ Alternate Choice

	Series	Range of Diameter Ø min–Ø max mm	Number of Flutes	Cutting Centre	Uncoated	TiCN	AlTiN	TiAlN	DCL TiB_2	Diamond	PCD
General Purpose+ Solid Carbide End Mills • Roughing/Finishing *(continued)*											
	422813/022813	6–25	3	Yes	X			X			
	422818	6–20	3	Yes				X			
	422846	6–25	4/6	Yes				X			
	4906	4–25	3/4/5	Yes		X		X			
	4966	5–25	3/4	Yes				X			
NINA™											
	423002/323002/ 423001/323001	2–12	3	Yes		X		X			
	423004/423003	4–12	4	Yes			X				
	423048/423047	2–12	2	Yes			X				
	423039/423038	2–12	2	Yes			X				
	423036/423037	6–10	4	No				X			
General Purpose+ HSS-E End Mills • Roughing/Finishing											
	1602	2–32	2	Yes				X			
	1652 JJ	2–50	2	Yes	X						
	3605/3615	3–30	3/4	Yes				X			
	1605	3–20	4	Yes				X			
	1634 JJ	2–20	4	Yes	X	X					
	1600	3–25	4/6	Yes		X					
	6609/6619	6–32	3	Yes	X						
	6645	4–20	3/4	Yes				X			
	6605	28–40	4/5/6	No				X			
	6606/6616	4–25	4/5/6	Yes				X			
	6604	6–25	3/4/5	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 Catalogue (A-13-03144EN_me)		WIDIA™ Solid End Mills & Holemaking Catalogue (A-09-02077EN_me)	
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)*																	
○	○			○	○									—	—	A240	A272
○	○			○	○									—	—	A241	A273
○	○			○	○									—	—	A242	A273
○		○	○	○	○	○		○		○		○		—	—	A243	A274
○		○	○	○	○	○		○		○		○		—	—	A244	A274
NINA™ *(continued)*																	
○	○			○	○	○								—	—	A190	A245
○	○			○	○									—	—	A191	A245
○	○			○	○	○								—	—	A192	A246
○	○			○	○	○								—	—	A193	A246
○	○	○	○	○	○	○		○	○	○	○	○		—	—	A194	A247
General Purpose+ HSS-E End Mills • Roughing/Finishing *(continued)*																	
○		○		○	○	○		○	○	○	○			—	—	A278–A279	A300
○		○		○	○	○		○	○	○	○			—	—	A281	A302
○		○		○	○	○		○	○	○	○			—	—	A284	A304
○		○		○	○	○		○	○	○	○			—	—	A285–A286	A305
○		○		○	○	○		○	○	○	○			—	—	A287	A306
○		○		○	○	○		○	○	○	○			—	—	A289	A307
						○								—	—	A291	A308–A309
○		○		○	○			○	○	○	○			—	—	A292	A309
○		○		○	○	○		○	○	○	○			—	—	A293	A310
○		○		○	○	○		○	○	○	○			—	—	A294–A295	A310
		○		○	○			○	○	○	○			—	—	A298	A312

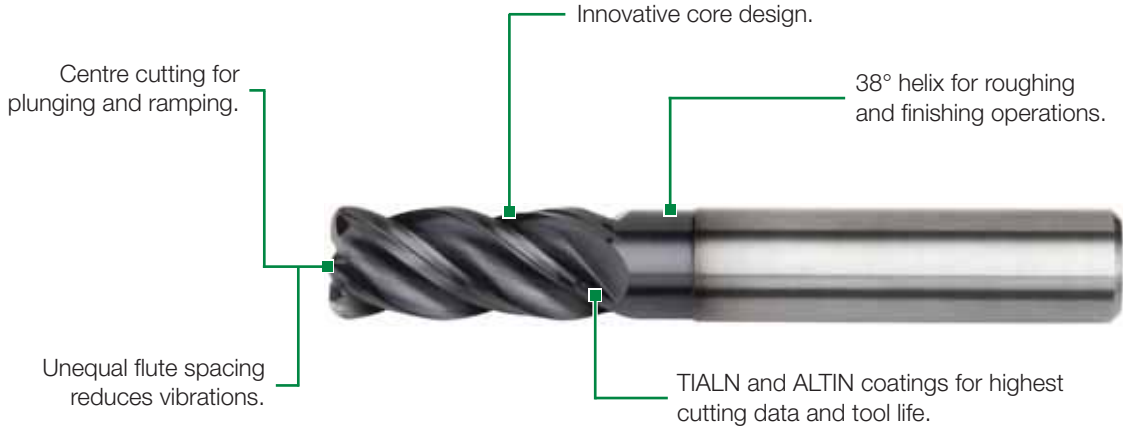
High-Performance Solid Carbide End Mills • **VariMill I™**

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 (not recommended for 4717 and 4727).

4777 Series

- High metal removal rates and tool life in:
  - — Stainless steels, steels, and alloyed steels
  - — High-temperature alloys and titanium

4778 ALTIN Series

- Titanium geometry design.
- Corner radii.

4717 Series

- Stainless steel and steel geometry design.
- 3,5 x D length of cut.
- Less passes necessary for long wall machining.

4727 TIALN Series

- Stainless steel and steel geometry design.
- 5–6 x D length of cut.
- Less passes necessary for long wall machining.

47N7 TIALN Series

- Stainless steel and steel geometry design.
- Radii corner and neck design for cutting depths requiring additional passes.

47N7 ALTIN Series

- Titanium and stainless steel geometry design.
- Radii corner and neck design for cutting depths requiring additional passes.

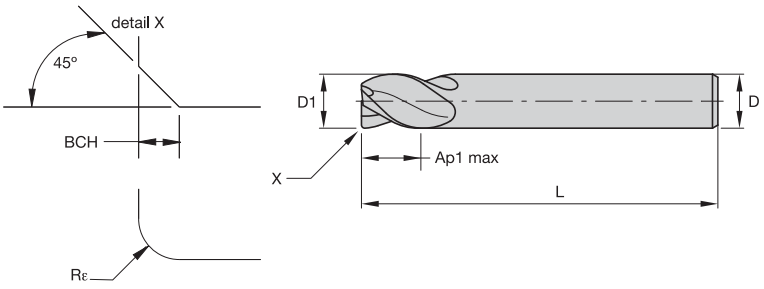
47N6 Series

- Stainless steel and steel geometry design.
- Benefit from long reach and neck design for deep cavities.

47N0 Series

- Stainless steel and steel geometry design.
- Centre cutting ball nose.

- Unequal flute spacing.
- Centre 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 e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

	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 4777 • VariMill I

TIALN-LT	TIALN-LW	D1	D	length of cut Ap1 max	length L	Rε	BCH
477704002LT	**477704002LW**	4,0	6	12,00	55	–	0,40
477704012LT	**–**	4,0	6	12,00	55	0,20	–
4777040Z2LT	**–**	4,0	6	12,00	55	–	–
477705002LT	**477705002LW**	5,0	6	13,00	57	–	0,40
477705012LT	**–**	5,0	6	13,00	57	0,20	–
4777050Z2LT	**–**	5,0	6	13,00	57	–	–
477706002LT	**477706002LW**	6,0	6	13,00	57	–	0,40
477706012LT	**–**	6,0	6	13,00	57	0,20	–
4777060Z2LT	**–**	6,0	6	13,00	57	–	–
477707003LT	**477707003LW**	7,0	8	16,00	63	–	0,40
477707013LT	**–**	7,0	8	16,00	63	0,20	–
4777070Z3LT	**–**	7,0	8	16,00	63	–	–
477708003LT	**477708003LW**	8,0	8	16,00	63	–	0,40
477708013LT	**–**	8,0	8	16,00	63	0,20	–
4777080Z3LT	**–**	8,0	8	16,00	63	–	–
477709004LT	**477709004LW**	9,0	10	19,00	72	–	0,50
477709014LT	**–**	9,0	10	19,00	72	0,20	–
4777090Z4LT	**–**	9,0	10	19,00	72	–	–

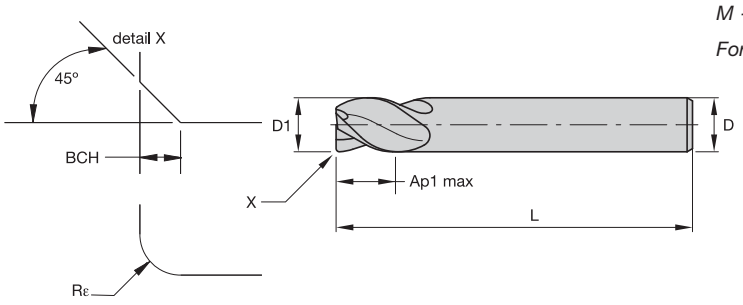
(continued)

(Series 4777 • 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	●	●	●	●	○	○	●	●	●	○	○	○	●	○	○	○	●

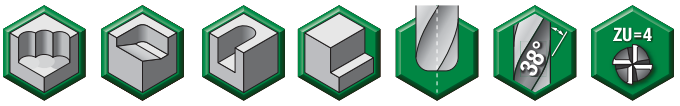
P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

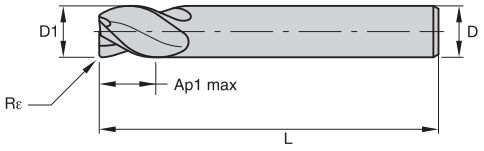
For application data, see page B24.



TIALN-LT	TIALN-LW	D1	D	length of cut Ap1 max	length L	Rε	BCH
477710004LT	**477710004LW**	10,0	10	22,00	72	–	0,50
4777100Z4LT	**–**	10,0	10	22,00	72	–	–
477710024LT	**–**	10,0	10	22,00	72	0,30	–
4777110Z5LT	**–**	11,0	12	26,00	83	–	–
477712005LT	**477712005LW**	12,0	12	26,00	83	–	0,50
4777120Z5LT	**–**	12,0	12	26,00	83	–	–
477712025LT	**–**	12,0	12	26,00	83	0,30	–
477714014LT	**477714014LW**	14,0	14	26,00	83	–	0,50
477716006LT	**477716006LW**	16,0	16	32,00	92	–	0,50
4777160Z6LT	**–**	16,0	16	32,00	92	–	–
477716026LT	**–**	16,0	16	32,00	92	0,30	–
477718018LT	**477718018LW**	18,0	18	32,00	92	–	0,50
477720007LT	**477720007LW**	20,0	20	38,00	104	–	0,50
4777200Z7LT	**–**	20,0	20	38,00	104	–	–
477720027LT	**–**	20,0	20	38,00	104	0,30	–
477725008LT	**477725008LW**	25,0	25	45,00	121	–	0,50

- Unequal flute spacing.
- Centre cutting.
- Optimised 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 e8	D	tolerance h6 + / -
≤ 3	-0,014 / -0,028	≤ 3	0/0,006
> 3–6	-0,020 / -0,038	> 3–6	0/0,008
> 6–10	-0,025 / -0,047	> 6–10	0/0,009
> 10–18	-0,032 / -0,059	> 10–18	0/0,011
> 18–30	-0,040 / -0,073	> 18–30	0/0,013

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
ALTIN	●	●	○	○	●	●	●	●	●	○	○	○	○	●	●	●	●

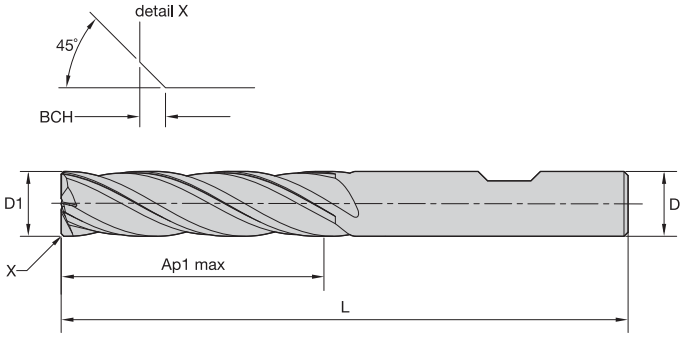
P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

For application data, see page B24.

Series 4778 • VariMill I

ALTIN-MT	ALTIN-MW	D1	D	length of cut Ap1 max	length L	Rε
477804002MT	477804002MW	4,0	6	12,00	55	0,20
477805002MT	477805002MW	5,0	6	13,00	57	0,20
477806002MT	477806002MW	6,0	6	13,00	57	0,20
477807003MT	477807003MW	7,0	8	16,00	63	0,20
477808003MT	477808003MW	8,0	8	16,00	63	0,20
477809004MT	477809004MW	9,0	10	19,00	72	0,30
477810004MT	477810004MW	10,0	10	22,00	72	0,30
477812005MT	477812005MW	12,0	12	26,00	83	0,30
477814014MT	477814014MW	14,0	14	26,00	83	0,30
477816006MT	477816006MW	16,0	16	32,00	92	0,30
477818018MT	477818018MW	18,0	18	32,00	92	0,30
477820007MT	477820007MW	20,0	20	38,00	104	0,30
477825008MT	477825008MW	25,0	25	45,00	121	0,30

- Unequal flute spacing.
- Centre cutting.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤3	-0,014/-0,028	≤3	0/0,006
>3–6	-0,020/-0,038	>3–6	0/0,008
>6–10	-0,025/-0,047	>6–10	0/0,009
>10–18	-0,032/-0,059	>10–18	0/0,011
>18–30	-0,040/-0,073	>18–30	0/0,013

	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*

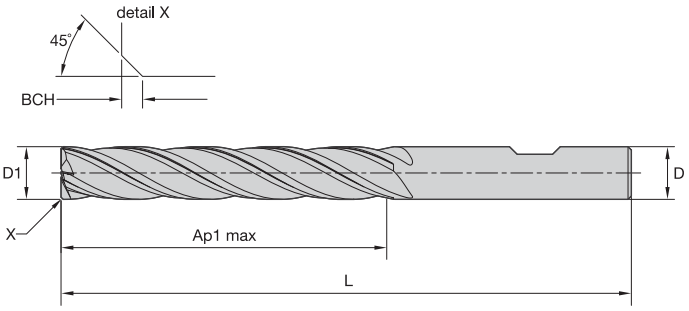
For application data, see page B25.

NEW!

Series 4717 • VariMill I • Extended Length of Cut

TIALN-LW	D1	D	length of cut Ap1 max	length L	BCH
471706002LW	6,0	6	32,00	76	0,40
471708003LW	8,0	8	32,00	87	0,40
471710004LW	10,0	10	38,00	89	0,50
471712005LW	12,0	12	51,00	100	0,50
471716006LW	16,0	16	57,00	125	0,50
471720007LW	20,0	20	57,00	125	0,50

- Unequal flute spacing.
- Centre cutting.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤3	-0,014/-0,028	≤3	0/0,006
>3–6	-0,020/-0,038	>3–6	0/0,008
>6–10	-0,025/-0,047	>6–10	0/0,009
>10–18	-0,032/-0,059	>10–18	0/0,011
>18–30	-0,040/-0,073	>18–30	0/0,013

	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*

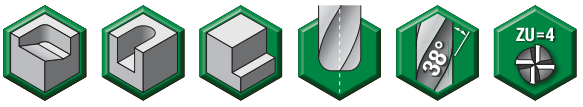
For application data, see page B25.

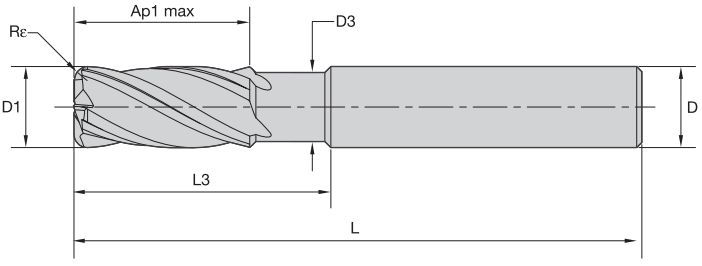
NEW!

Series 4727 • VariMill I • Extended Length of Cut

TIALN-LW	D1	D	length of cut Ap1 max	length L	BCH
472712005LW	12,0	12	76,00	125	0,50
472716006LW	16,0	16	76,00	150	0,50
472720007LW	20,0	20	102,00	175	0,50

- Unequal flute spacing.
- Centre 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 e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

	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*

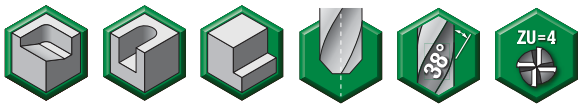
For application data, see page B26.

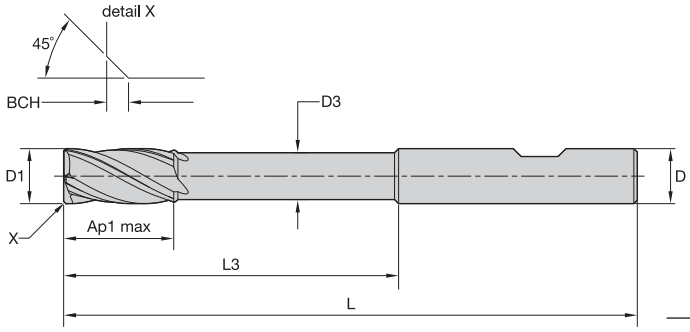
NEW!

Series 47N7 • VariMill I™ • With Neck

TIALN-LT	ALTIN-MT	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
47N704002LT	–	4,0	6,000	3,60	12,00	16,00	55,00	0,40
47N704012LT	47N704012MT	4,0	6,000	3,60	12,00	16,00	55,00	0,50
47N704022LT	–	4,0	6,000	3,60	12,00	16,00	55,00	1,00
47N705002LT	–	5,0	6,000	4,60	13,00	18,00	57,00	0,50
47N705012LT	47N705012MT	5,0	6,000	4,60	13,00	18,00	57,00	1,00
47N706002LT	47N706002MT	6,0	6,000	5,50	13,00	21,00	57,00	0,50
47N706012LT	47N706012MT	6,0	6,000	5,50	13,00	21,00	57,00	1,00
47N706022LT	–	6,0	6,000	5,50	13,00	21,00	57,00	1,50
47N708003LT	47N708003MT	8,0	8,000	7,50	16,00	27,00	63,00	0,50
47N708013LT	47N708013MT	8,0	8,000	7,50	16,00	27,00	63,00	1,00
47N708023LT	–	8,0	8,000	7,50	16,00	27,00	63,00	1,50
47N708033LT	–	8,0	8,000	7,50	16,00	27,00	63,00	2,00
47N710004LT	47N710004MT	10,0	10,000	9,50	22,00	32,00	72,00	0,50
47N710014LT	47N710014MT	10,0	10,000	9,50	22,00	32,00	72,00	1,00
47N710024LT	–	10,0	10,000	9,50	22,00	32,00	72,00	1,50
47N710034LT	47N710034MT	10,0	10,000	9,50	22,00	32,00	72,00	2,00
47N712005LT	47N712005MT	12,0	12,000	11,50	26,00	38,00	83,00	0,50
47N712015LT	47N712015MT	12,0	12,000	11,50	26,00	38,00	83,00	1,00
47N712025LT	–	12,0	12,000	11,50	26,00	38,00	83,00	1,50
47N712035LT	47N712035MT	12,0	12,000	11,50	26,00	38,00	83,00	2,00
47N712045LT	47N712045MT	12,0	12,000	11,50	26,00	38,00	83,00	4,00
47N716006LT	47N716006MT	16,0	16,000	15,00	32,00	44,00	92,00	1,00
47N716016LT	47N716016MT	16,0	16,000	15,00	32,00	44,00	92,00	2,00
47N716026LT	47N716026MT	16,0	16,000	15,00	32,00	44,00	92,00	4,00
47N720007LT	47N720007MT	20,0	20,000	19,00	38,00	55,00	104,00	1,00
47N720017LT	47N720017MT	20,0	20,000	19,00	38,00	55,00	104,00	2,00
47N720027LT	47N720027MT	20,0	20,000	19,00	38,00	55,00	104,00	4,00

- Unequal flute spacing.
- Centre 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 e8	D	tolerance h6 + / -
≤3	-0,014/-0,028	≤3	0/0,006
>3–6	-0,020/-0,038	>3–6	0/0,008
>6–10	-0,025/-0,047	>6–10	0/0,009
>10–18	-0,032/-0,059	>10–18	0/0,011
>18–30	-0,040/-0,073	>18–30	0/0,013

	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*

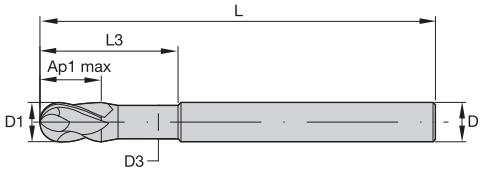
For application data, see page B27.

NEW!

Series 47N6 • VariMill I • Extended Reach with Neck

TIALN-LW	D1	D	D3	length of cut Ap1 max	L3	length L	BCH
47N606002LW	6,0	6	5,50	12,00	42,00	100	0,40
47N608003LW	8,0	8	7,30	16,00	62,00	100	0,40
47N610004LW	10,0	10	9,10	20,00	60,00	100	0,50
47N612005LW	12,0	12	11,00	24,00	73,00	125	0,50
47N616006LW	16,0	16	14,56	32,00	100,00	150	0,50
47N620007LW	20,0	20	18,20	40,00	98,00	175	0,50

- Unequal flute spacing.
- Centre 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 e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

	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 B27.

Series 47N0 • VariMill I • Ball Nose

TIALN-LT	D1	D	D3	length of cut Ap1 max	L3	length L
47N005002LT	5,0	6	4,70	9,00	15,00	57
47N006002LT	6,0	6	5,64	10,00	15,00	57
47N008003LT	8,0	8	7,52	12,00	20,00	63
47N010004LT	10,0	10	9,40	14,00	25,00	72
]47N012005LT	12,0	12	11,28	16,00	30,00	83
47N016006LT	16,0	16	15,04	22,00	38,00	92
47N020007LT	20,0	20	18,80	26,00	50,00	104

Series 4777 • VariMill

Material Group		A ap	A ae	B ap	TIAIN Cutting Speed — vc m/min min		TIAIN Cutting Speed — vc m/min max	Recommended feed per tooth (fz=mm/th) for side milling (A). For slotting (B), reduce fz by 20%. D1 — Diameter mm	4,0	6,0	8,0	10,0	12,0	16,0	20,0	25,0
P	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	3	1,5 x D	0,5 x D	1 x D	120	–	160	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088	0,098
	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065	0,071
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065	0,071
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	110	–	130	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	100	–	130	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,013	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	3	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,016	0,026	0,037	0,045	0,052	0,064	0,074	0,084
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088	0,098

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 centres, please adjust parameters accordingly on >12mm diameters.

Series 4778 • VariMill

Material Group		A ap	A ae	B ap	ALTIN Cutting Speed — vc m/min min		ALTIN Cutting Speed — vc m/min max	Recommended feed per tooth (fz=mm/th) for side milling (A). For slotting (B), reduce fz by 20%. D1 — Diameter mm	4,0	6,0	8,0	10,0	12,0	16,0	20,0	25,0
P	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	3	1,5 x D	0,5 x D	1 x D	120	–	160	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088	0,098
	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065	0,071
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065	0,071
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	110	–	130	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	100	–	130	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,013	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	3	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,016	0,026	0,037	0,045	0,052	0,064	0,074	0,084
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088	0,098

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 centres, please adjust parameters accordingly on >12mm diameters.

Series 4717 • VariMill I

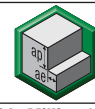
Side Milling (A)

Material Group		Finish A ap	Finish A ae	Finish TIALN Cutting Speed — vc m/min min		Finish TIALN Cutting Speed — vc m/min max	Rough A ap	Rough A ae	Rough TIALN Cutting Speed — vc m/min min		Rough TIALN Cutting Speed — vc m/min max	Recommended feed per tooth (fz= mm/th) for side milling (A). D1 — Diameter mm	6,0	8,0	10,0	12,0	16,0	20,0
P	1	Ap1 max	0,05 x D*	300	–	400	Ap1 max	0,2 x D	150	–	200	fz	0,044	0,060	0,072	0,083	0,092	0,114
	2	Ap1 max	0,05 x D*	280	–	380	Ap1 max	0,2 x D	140	–	190	fz	0,044	0,060	0,072	0,083	0,092	0,114
	3	Ap1 max	0,05 x D*	240	–	320	Ap1 max	0,2 x D	120	–	160	fz	0,036	0,050	0,061	0,070	0,079	0,101
	4	Ap1 max	0,05 x D*	180	–	300	Ap1 max	0,2 x D	90	–	150	fz	0,033	0,045	0,054	0,062	0,070	0,088
	5	Ap1 max	0,05 x D*	120	–	200	Ap1 max	0,2 x D	60	–	100	fz	0,029	0,040	0,048	0,056	0,063	0,081
	6	Ap1 max	0,05 x D*	100	–	150	Ap1 max	0,2 x D	50	–	75	fz	0,025	0,034	0,040	0,047	0,052	0,065
M	1	Ap1 max	0,05 x D*	180	–	230	Ap1 max	0,2 x D	90	–	115	fz	0,036	0,050	0,061	0,070	0,079	0,101
	2	Ap1 max	0,05 x D*	120	–	160	Ap1 max	0,2 x D	60	–	80	fz	0,029	0,040	0,048	0,056	0,063	0,081
	3	Ap1 max	0,05 x D*	120	–	140	Ap1 max	0,2 x D	60	–	70	fz	0,025	0,034	0,040	0,047	0,052	0,065
K	1	Ap1 max	0,05 x D*	240	–	300	Ap1 max	0,2 x D	120	–	150	fz	0,044	0,060	0,072	0,083	0,092	0,114
	2	Ap1 max	0,05 x D*	220	–	260	Ap1 max	0,2 x D	110	–	130	fz	0,036	0,050	0,061	0,070	0,079	0,101
	3	Ap1 max	0,05 x D*	200	–	260	Ap1 max	0,2 x D	100	–	130	fz	0,029	0,040	0,048	0,056	0,063	0,081
S	1	Ap1 max	0,05 x D*	100	–	180	Ap1 max	0,2 x D	50	–	90	fz	0,036	0,050	0,061	0,070	0,079	0,101
	2	Ap1 max	0,05 x D*	50	–	80	Ap1 max	0,2 x D	25	–	40	fz	0,036	0,050	0,061	0,070	0,079	0,101
	3	Ap1 max	0,05 x D*	120	–	160	Ap1 max	0,2 x D	60	–	80	fz	0,019	0,026	0,032	0,037	0,042	0,054
	4	Ap1 max	0,05 x D*	100	–	120	Ap1 max	0,2 x D	50	–	60	fz	0,026	0,037	0,045	0,052	0,058	0,074
H	1	Ap1 max	0,05 x D*	160	–	280	Ap1 max	0,2 x D	80	–	140	fz	0,033	0,045	0,054	0,062	0,070	0,088

**For cutting data above, use ae ≤ 0,8mm.*

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 centres, please adjust parameters accordingly on >12mm diameters.

Series 4727 • VariMill I



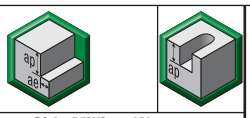
Side Milling (A)

Material Group		Finish A ap	Finish A ae	Finish TIALN Cutting Speed — vc m/min min		Finish TIALN Cutting Speed — vc m/min max	Rough A ap	Rough A ae	Rough TIALN Cutting Speed — vc m/min min		Rough TIALN Cutting Speed — vc m/min max	Recommended feed per tooth (fz= mm/th) for side milling (A). D1 — Diameter mm	12,0	16,0	20,0
P	1	Ap1 max	0,05 x D*	300	–	400	Ap1 max	0,2 x D	150	–	200	fz	0,083	0,101	0,114
	2	Ap1 max	0,05 x D*	280	–	380	Ap1 max	0,2 x D	140	–	190	fz	0,083	0,101	0,114
	3	Ap1 max	0,05 x D*	240	–	320	Ap1 max	0,2 x D	120	–	160	fz	0,070	0,087	0,101
	4	Ap1 max	0,05 x D*	180	–	300	Ap1 max	0,2 x D	90	–	150	fz	0,062	0,077	0,088
	5	Ap1 max	0,05 x D*	120	–	200	Ap1 max	0,2 x D	60	–	100	fz	0,056	0,070	0,081
	6	Ap1 max	0,05 x D*	100	–	150	Ap1 max	0,2 x D	50	–	75	fz	0,047	0,057	0,065
M	1	Ap1 max	0,05 x D*	180	–	230	Ap1 max	0,2 x D	90	–	115	fz	0,070	0,087	0,101
	2	Ap1 max	0,05 x D*	120	–	160	Ap1 max	0,2 x D	60	–	80	fz	0,056	0,070	0,081
	3	Ap1 max	0,05 x D*	120	–	140	Ap1 max	0,2 x D	60	–	70	fz	0,047	0,057	0,065
K	1	Ap1 max	0,05 x D*	240	–	300	Ap1 max	0,2 x D	120	–	150	fz	0,083	0,101	0,114
	2	Ap1 max	0,05 x D*	220	–	260	Ap1 max	0,2 x D	110	–	130	fz	0,070	0,087	0,101
	3	Ap1 max	0,05 x D*	200	–	260	Ap1 max	0,2 x D	100	–	130	fz	0,056	0,070	0,081
S	1	Ap1 max	0,05 x D*	100	–	180	Ap1 max	0,2 x D	50	–	90	fz	0,070	0,087	0,101
	2	Ap1 max	0,05 x D*	50	–	80	Ap1 max	0,2 x D	25	–	40	fz	0,070	0,087	0,101
	3	Ap1 max	0,05 x D*	120	–	160	Ap1 max	0,2 x D	60	–	80	fz	0,037	0,046	0,054
	4	Ap1 max	0,05 x D*	100	–	120	Ap1 max	0,2 x D	50	–	60	fz	0,052	0,064	0,074
H	1	Ap1 max	0,05 x D*	160	–	280	Ap1 max	0,2 x D	80	–	140	fz	0,062	0,077	0,088

**For cutting data above, use ae ≤ 0,8mm.*

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 centres, please adjust parameters accordingly on >12mm diameters.

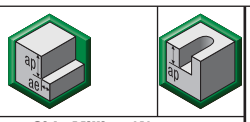
Series 47N7 ALTIN • VariMill I



Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	ALTIN Cutting Speed — vc m/min min		max	Recommended feed per tooth (fz=mm/th) for side milling (A). For slotting (B), reduce fz by 10%. D1 — Diameter mm	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	120	–	160	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088
	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	110	–	130	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101
	3	1,5 x D	0,5 x D	1 x D	100	–	130	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,013	0,019	0,026	0,032	0,037	0,046	0,054
	3	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,016	0,026	0,037	0,045	0,052	0,064	0,074
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088

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 centres, please adjust parameters accordingly on >12mm diameters.

Series 47N7 TIALN • VariMill I



Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	TIALN Cutting Speed — vc m/min min		max	Recommended feed per tooth (fz=mm/th) for side milling (A). For slotting (B), reduce fz by 10%. D1 — Diameter mm	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	120	–	160	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088
	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	110	–	130	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101
	3	1,5 x D	0,5 x D	1 x D	100	–	130	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,013	0,019	0,026	0,032	0,037	0,046	0,054
	3	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,016	0,026	0,037	0,045	0,052	0,064	0,074
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088

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 centres, please adjust parameters accordingly on >12mm diameters.

Series 47N6 • VariMill I

Material Group		Side Milling (A) and Slotting (B) A ap	ae	B ap	TIALN Cutting Speed – vc m/min min		max	Recommended feed per tooth (fz=mm/th) for side milling (A). For slotting (B), reduce fz by 10%. D1 – Diameter mm	6,0	8,0	10,0	12,0	16,0	20,0
P	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,044	0,060	0,072	0,083	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,044	0,060	0,072	0,083	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	120	–	160	fz	0,036	0,050	0,061	0,070	0,087	0,101
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	fz	0,033	0,045	0,054	0,062	0,077	0,088
	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,029	0,040	0,048	0,056	0,070	0,081
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,025	0,034	0,040	0,047	0,057	0,065
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,036	0,050	0,061	0,070	0,087	0,101
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,029	0,040	0,048	0,056	0,070	0,081
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,025	0,034	0,040	0,047	0,057	0,065
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,044	0,060	0,072	0,083	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	110	–	130	fz	0,036	0,050	0,061	0,070	0,087	0,101
	3	1,5 x D	0,5 x D	1 x D	100	–	130	fz	0,029	0,040	0,048	0,056	0,070	0,081
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,036	0,050	0,061	0,070	0,087	0,101
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,046	0,054
	3	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,029	0,040	0,048	0,056	0,070	0,081
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,026	0,037	0,045	0,052	0,064	0,074
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,033	0,045	0,054	0,062	0,077	0,088

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 centres, please adjust parameters accordingly on >12mm diameters.

Series 47N0 • VariMill I

Material Group		A ap	ae	B ap	TIALN Cutting Speed – vc m/min min		max	Recommended feed per tooth (fz=mm/th) for side milling (A). For slotting (B), reduce fz by 20%. D1 – Diameter mm	5,0	6,0	8,0	10,0	12,0	16,0	20,0
P	1	1,5 x D	0,5 x D	1 x D	150	—	200	fz	0,036	0,044	0,060	0,072	0,083	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	140	—	190	fz	0,036	0,044	0,060	0,072	0,083	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	120	—	160	fz	0,030	0,036	0,050	0,061	0,070	0,087	0,101
	4	1,5 x D	0,5 x D	0,75 x D	90	—	150	fz	0,027	0,033	0,045	0,054	0,062	0,077	0,088
	5	1,5 x D	0,5 x D	1 x D	60	—	100	fz	0,024	0,029	0,040	0,048	0,056	0,070	0,081
	6	1,5 x D	0,5 x D	0,75 x D	50	—	75	fz	0,020	0,025	0,034	0,040	0,047	0,057	0,065
M	1	1,5 x D	0,5 x D	1 x D	90	—	115	fz	0,030	0,036	0,050	0,061	0,070	0,087	0,101
	2	1,5 x D	0,5 x D	1 x D	60	—	80	fz	0,024	0,029	0,040	0,048	0,056	0,070	0,081
	3	1,5 x D	0,5 x D	1 x D	60	—	70	fz	0,020	0,025	0,034	0,040	0,047	0,057	0,065
K	1	1,5 x D	0,5 x D	1 x D	120	—	150	fz	0,036	0,044	0,060	0,072	0,083	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	110	—	130	fz	0,030	0,036	0,050	0,061	0,070	0,087	0,101
	3	1,5 x D	0,5 x D	1 x D	100	—	130	fz	0,024	0,029	0,040	0,048	0,056	0,070	0,081
S	1	1,5 x D	0,3 x D	0,3 x D	50	—	90	fz	0,030	0,036	0,050	0,061	0,070	0,087	0,101
	2	1,5 x D	0,3 x D	0,3 x D	25	—	40	fz	0,016	0,019	0,026	0,032	0,037	0,046	0,054
	3	1,5 x D	0,5 x D	1 x D	60	—	80	fz	0,024	0,029	0,040	0,048	0,056	0,070	0,081
	4	1,5 x D	0,5 x D	1 x D	50	—	60	fz	0,021	0,026	0,037	0,045	0,052	0,064	0,074
H	1	1,5 x D	0,5 x D	0,75 x D	80	—	140	fz	0,027	0,033	0,045	0,054	0,062	0,077	0,088

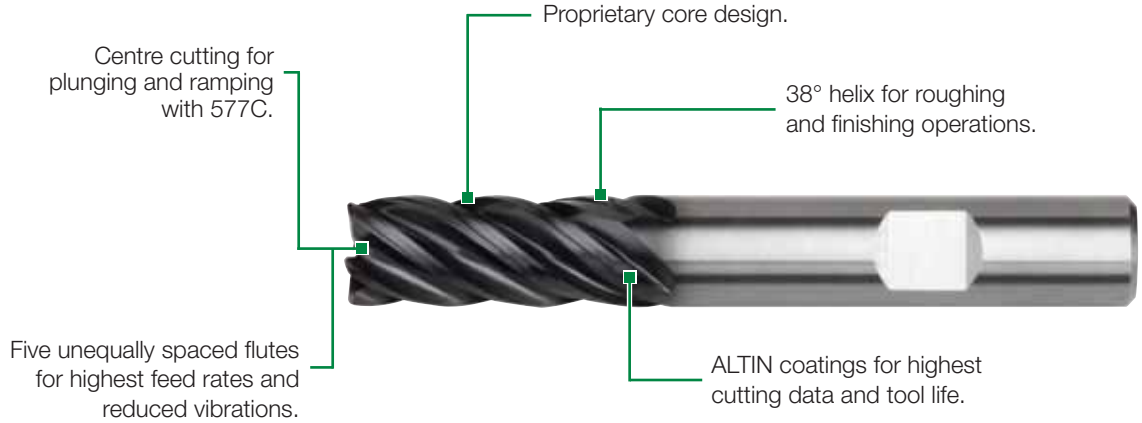
NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on >12mm diameters.

High-Performance Solid Carbide End Mills • **VariMill II**™

VariMill II end mills are the proven leaders in the field of high-performance, chatter-free machining. They are designed to provide maximum metal removal rates and to achieve supreme surface conditions. Utilising 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 that 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.

5777 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.
- Non-centre cutting.
- Ramping >3°.

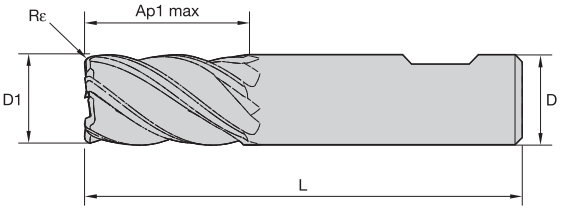
577C Series

- Highest metal removal rates due to five flute centre cutting design.
- Increased tool life with stainless steels and steels.
- Centre cutting.
- Ramping >3°.

57N8 Series

- Titanium and stainless steel geometry design.
- Radii corner and neck design for depths requiring additional passes.
- Non-centre cutting.
- Ramping >3°.

- Unequal flute spacing.
- Non-centre 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 e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
ALTIN	●	●	●	●	●	●	●	●	●	○	○	○	●	○	○	○	●

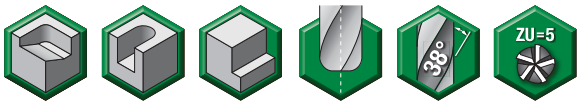
P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

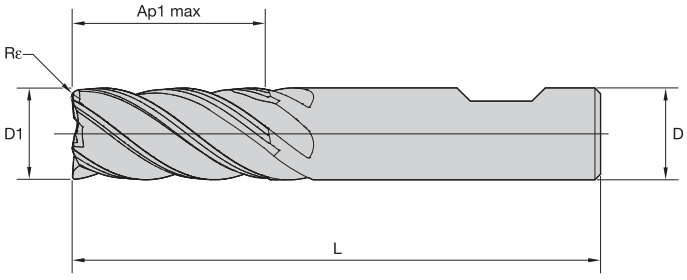
For application data, see page B34.

Series 5777 • VariMill II

ALTIN-MT	ALTIN-MW	D1	D	length of cut Ap1 max	length L	Rε
577704002MT	577704002MW	4,0	6	11,00	55	0,25
577704012MT	–	4,0	6	11,00	55	–
577705002MT	577705002MW	5,0	6	13,00	57	0,25
577706002MT	577706002MW	6,0	6	13,00	57	0,40
577706012MT	–	6,0	6	13,00	57	–
577707003MT	577707003MW	7,0	8	16,00	63	0,40
577708003MT	577708003MW	8,0	8	19,00	63	0,50
577708013MT	–	8,0	8	19,00	63	–
577709004MT	577709004MW	9,0	9	19,00	72	0,50
577710004MT	577710004MW	10,0	10	22,00	72	0,50
577710014MT	–	10,0	10	22,00	72	–
577712005MT	577712005MW	12,0	12	26,00	83	0,75
577712015MT	–	12,0	12	26,00	83	–
577714004MT	577714004MW	14,0	14	26,00	83	0,75
577714014MT	–	14,0	14	26,00	83	–
577716006MT	577716006MW	16,0	16	32,00	92	0,75
577716016MT	–	16,0	16	32,00	92	–
577718008MT	577718008MW	18,0	18	32,00	92	0,75
577720007MT	577720007MW	20,0	20	38,00	104	0,75
577720017MT	–	20,0	20	38,00	104	–
577725008MT	577725008MW	25,0	25	45,00	121	0,75

- Unequal flute spacing.
- Centre cutting.
- 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 e8	D	tolerance h6 + / -
≤3	-0,014/-0,028	≤3	0/0,006
>3–6	-0,020/-0,038	>3–6	0/0,008
>6–10	-0,025/-0,047	>6–10	0/0,009
>10–18	-0,032/-0,059	>10–18	0/0,011
>18–30	-0,040/-0,073	>18–30	0/0,013

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
ALTIN-MW	●	●	●	●	●	●	●	●	●	○	○	○	●	○	○	○	●

P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

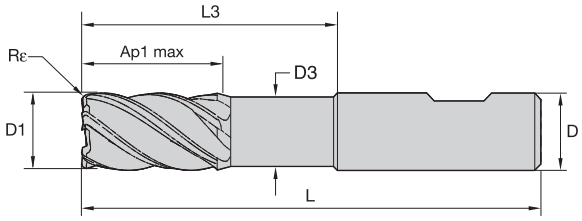
For application data, see page B34.

NEW!

Series 577C • VariMill II • With Centre Cut

ALTIN-MW	D1	D	length of cut Ap1 max	length L	Rε
577C06002MW	6,0	6	13,00	57	0,40
577C08003MW	8,0	8	16,00	63	0,50
577C10004MW	10,0	10	22,00	72	0,50
577C12005MW	12,0	12	26,00	83	0,75
577C16006MW	16,0	16	32,00	92	0,75
577C20007MW	20,0	20	38,00	104	0,75

- Unequal flute spacing.
- Non-centre cutting.
- Maximum ramp angle = 3°.
- Optimised geometry for titanium machining.
- 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 e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

	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*

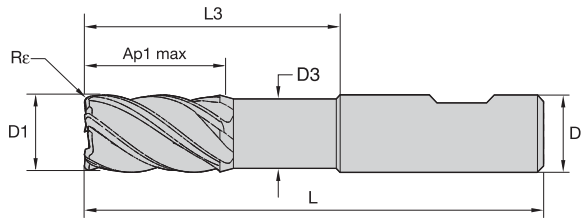
For application data, see page B35.

Series 57N8 • VariMill II • With Neck

ALTIN-MT	ALTIN-MW	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
57N806022MT	**57N806022MW**	6,0	6	5,40	13,00	18,00	63	0,50
57N806032MT	**57N806032MW**	6,0	6	5,40	13,00	18,00	63	1,00
–	**57N806042MW**	6,0	6	5,40	13,00	18,00	63	1,50
57N806002MT	**–**	6,0	6	5,40	13,00	18,00	63	–
57N808023MT	**57N808023MW**	8,0	8	7,20	19,00	24,00	76	0,50
57N808033MT	**57N808033MW**	8,0	8	7,20	19,00	24,00	76	1,00
–	**57N808053MW**	8,0	8	7,20	19,00	24,00	76	2,00
57N808003MT	**–**	8,0	8	7,20	19,00	24,00	76	–
57N810024MT	**57N810024MW**	10,0	10	9,00	22,00	30,00	76	0,50
57N810034MT	**57N810034MW**	10,0	10	9,00	22,00	30,00	76	1,00
57N810054MT	**57N810054MW**	10,0	10	9,00	22,00	30,00	76	2,00
57N810004MT	**–**	10,0	10	9,00	22,00	30,00	76	–
57N812025MT	**57N812025MW**	12,0	12	11,28	26,00	36,00	83	0,50
57N812035MT	**57N812035MW**	12,0	12	11,28	26,00	36,00	83	1,00

(continued)

(Series 57N8 • VariMill II • With Neck 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.

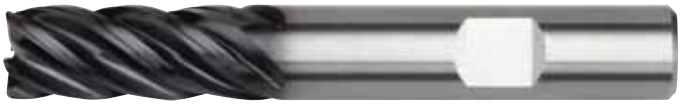
ALTIN-MT	ALTIN-MW	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
57N812055MT	**57N812055MW**	12,0	12	11,28	26,00	36,00	83	2,00
57N812005MT	**–**	12,0	12	11,28	26,00	36,00	83	–
57N816026MT	**57N816026MW**	16,0	16	14,40	32,00	48,00	100	0,50
57N816036MT	**57N816036MW**	16,0	16	14,40	32,00	48,00	100	1,00
57N816056MT	**57N816056MW**	16,0	16	14,40	32,00	48,00	100	2,00
57N816076MT	**57N816076MW**	16,0	16	14,40	32,00	48,00	100	3,00
57N816006MT	**–**	16,0	16	14,40	32,00	48,00	100	–
57N820027MT	**57N820027MW**	20,0	20	18,80	38,00	60,00	115	0,50
57N820037MT	**57N820037MW**	20,0	20	18,80	38,00	60,00	115	1,00
57N820057MT	**57N820057MW**	20,0	20	18,80	38,00	60,00	115	2,00
57N820077MT	**57N820077MW**	20,0	20	18,80	38,00	60,00	115	3,00
57N820087MT	**57N820087MW**	20,0	20	18,80	38,00	60,00	115	4,00
57N820007MT	**–**	20,0	20	18,80	38,00	60,00	115	–
57N825028MT	**57N825028MW**	25,0	25	24,00	45,00	75,00	135	0,50
57N825038MT	**57N825038MW**	25,0	25	24,00	45,00	75,00	135	1,00
57N825058MT	**57N825058MW**	25,0	25	24,00	45,00	75,00	135	2,00
57N825078MT	**57N825078MW**	25,0	25	24,00	45,00	75,00	135	3,00
57N825088MT	**57N825088MW**	25,0	25	24,00	45,00	75,00	135	4,00
57N825008MT	**–**	25,0	25	24,00	45,00	75,00	135	–

Series 5777 • VariMill II

Material Group		A		B	ALTIN			Recommended feed per tooth (fz=mm/th) for side milling (A). For slotting (B), reduce fz by 20%.								
					Cutting Speed — vc m/min			D1 — Diameter								
		ap	ae	ap	min		max	mm	4,0	6,0	8,0	10,0	12,0	16,0	20,0	25,0
P	1	1,5 x D	0,5 x D	1 x D	150	-	200	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	140	-	190	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	3	1,5 x D	0,5 x D	1 x D	120	-	160	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	4	1,5 x D	0,5 x D	0,75 x D	90	-	150	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088	0,098
	5	1,5 x D	0,5 x D	1 x D	60	-	100	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	6	1,5 x D	0,5 x D	0,75 x D	50	-	75	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065	0,071
M	1	1,5 x D	0,5 x D	1 x D	90	-	115	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	60	-	80	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	3	1,5 x D	0,5 x D	1 x D	60	-	70	fz	0,016	0,025	0,034	0,040	0,047	0,057	0,065	0,071
K	1	1,5 x D	0,5 x D	1 x D	120	-	150	fz	0,028	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	110	-	130	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	100	-	130	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
S	1	1,5 x D	0,3 x D	0,3 x D	50	-	90	fz	0,023	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,3 x D	0,3 x D	25	-	40	fz	0,013	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	3	1,5 x D	0,5 x D	1 x D	60	-	80	fz	0,019	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	4	1,5 x D	0,5 x D	1 x D	50	-	60	fz	0,016	0,026	0,037	0,045	0,052	0,064	0,074	0,084
H	1	1,5 x D	0,5 x D	0,75 x D	80	-	140	fz	0,021	0,033	0,045	0,054	0,062	0,077	0,088	0,098

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 centres, please adjust parameters accordingly on >12mm diameters.

Series 577C • VariMill II



Side Milling (A) and Slotting (B)

Material Group		A		B	ALTIN			Recommended feed per tooth (fz=mm/th) for side milling (A). For slotting (B), reduce fz by 10%.						
					Cutting Speed — vc m/min				D1 — Diameter					
		ap	ae	ap	min		max	mm	6,0	8,0	10,0	12,0	16,0	20,0
P	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,044	0,060	0,072	0,083	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,044	0,060	0,072	0,083	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	120	–	160	fz	0,036	0,050	0,061	0,070	0,087	0,101
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	fz	0,033	0,045	0,054	0,062	0,077	0,088
	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,029	0,040	0,048	0,056	0,070	0,081
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,025	0,034	0,040	0,047	0,057	0,065
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,036	0,050	0,061	0,007	0,087	0,101
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,029	0,040	0,048	0,056	0,070	0,081
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,025	0,034	0,040	0,047	0,057	0,065
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,044	0,060	0,072	0,083	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	110	–	130	fz	0,036	0,050	0,061	0,070	0,087	0,101
	3	1,5 x D	0,5 x D	1 x D	100	–	130	fz	0,029	0,040	0,048	0,056	0,070	0,081
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,036	0,050	0,061	0,070	0,087	0,101
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,046	0,054
	3	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,029	0,040	0,048	0,056	0,070	0,081
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,026	0,037	0,045	0,052	0,064	0,074
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,033	0,045	0,054	0,062	0,077	0,088

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 centres, please adjust parameters accordingly on >12mm diameters.

Series 57N8 • VariMill II															
															
		A		B	ALTIN			Recommended feed per tooth (fz=mm/th) for side milling (A). For slotting (B), reduce fz by 20%.							
					Cutting Speed — vc m/min			D1 — Diameter							
Material Group		ap	ae	ap	min		max	mm	6,0	8,0	10,0	12,0	16,0	20,0	25,0
P	1	1,5 x D	0,5 x D	1 x D	150	–	200	fz	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	140	–	190	fz	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	3	1,5 x D	0,5 x D	1 x D	120	–	160	fz	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	fz	0,033	0,045	0,054	0,062	0,077	0,088	0,098
	5	1,5 x D	0,5 x D	1 x D	60	–	100	fz	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	fz	0,025	0,034	0,040	0,047	0,057	0,065	0,071
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	fz	0,036	0,050	0,061	0,007	0,087	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	3	1,5 x D	0,5 x D	1 x D	60	–	70	fz	0,025	0,034	0,040	0,047	0,057	0,065	0,071
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	fz	0,044	0,060	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	110	–	130	fz	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	100	–	130	fz	0,029	0,040	0,048	0,056	0,070	0,081	0,091
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	fz	0,036	0,050	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	fz	0,019	0,026	0,032	0,037	0,046	0,054	0,061
	3	1,5 x D	0,5 x D	1 x D	60	–	80	fz	0,029	0,040	0,048	0,056	0,070	0,081	0,091
	4	1,5 x D	0,5 x D	1 x D	50	–	60	fz	0,026	0,037	0,045	0,052	0,064	0,074	0,084
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	fz	0,033	0,045	0,054	0,062	0,077	0,088	0,098

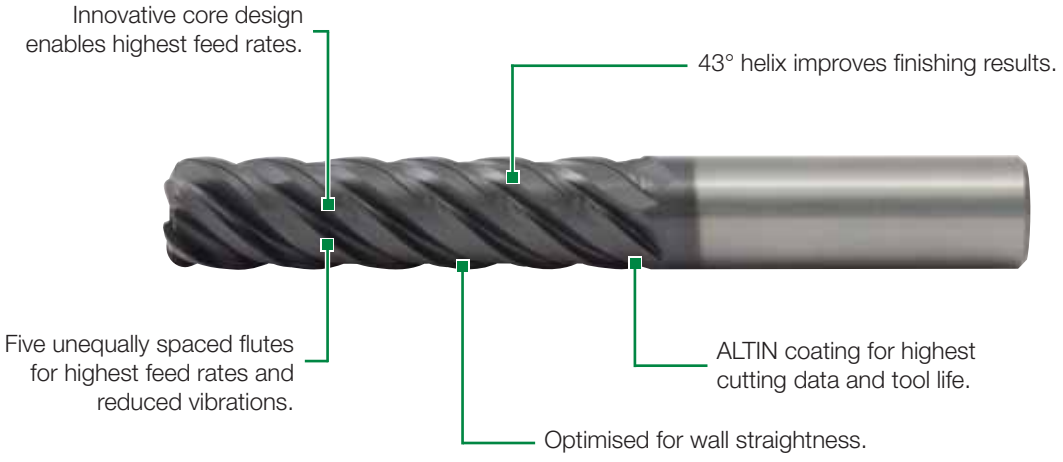
NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on diameters >12mm diameters.

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 from semi-finishing to 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.



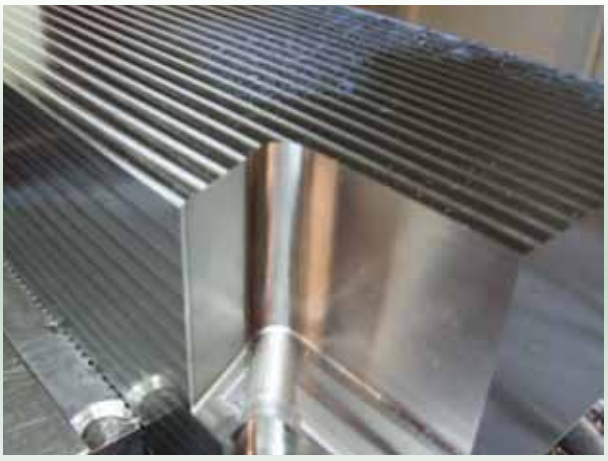
*To learn more, **scan here**.*
For instructions on how to scan, please see page xvii.

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 ae constant.

5718 Series

- Highest surface quality and tool life in:
  - Titanium
  - Stainless steels
- Corner radii and sharp edges.
- 4 x D length of cut.

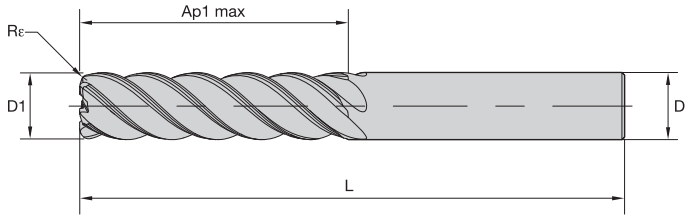


Application Example

Side milling 60° angled corner with constant feed rate.

Workpiece material:	Titanium 6Al-4V
Tool:	D = 15,875mm
Cutting data:	ap = 63mm ae = 0,5mm vc = 100 m/min fz = 0,06 mm/z
Result:	Surface finish Ra 0,4 µm

- Unequal flute spacing.
- Non-centre cutting.
- For finishing and semi-finishing applications.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

	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 B39.

NEW!

Series 5718 • VariMill II Long • 4 x D Length of Cut

ALTIN-MT	D1	D	length of cut Ap1 max	length L	Rε
571806012MT	6,0	6	24,00	76	0,50
571806022MT	6,0	6	24,00	76	1,00
571806002MT	6,0	6	24,00	76	–
571808013MT	8,0	8	32,00	76	0,50
571808023MT	8,0	8	32,00	76	1,00
571808003MT	8,0	8	32,00	76	–
571810014MT	10,0	10	40,00	100	0,50
571810024MT	10,0	10	40,00	100	1,00
571810034MT	10,0	10	40,00	100	2,00
571810044MT	10,0	10	40,00	100	2,50
571810004MT	10,0	10	40,00	100	–
571812015MT	12,0	12	48,00	125	0,50
571812025MT	12,0	12	48,00	125	1,00
571812035MT	12,0	12	48,00	125	2,00
571812045MT	12,0	12	48,00	125	2,50
571812005MT	12,0	12	48,00	125	–
571814024MT	14,0	14	56,00	120	1,00
571814034MT	14,0	14	56,00	120	2,00
571814044MT	14,0	14	56,00	120	3,00
571814054MT	14,0	14	56,00	120	4,00
571814014MT	14,0	14	56,00	120	–
571816016MT	16,0	16	64,00	141	0,50
571816026MT	16,0	16	64,00	141	1,00
571816036MT	16,0	16	64,00	141	2,00
571816046MT	16,0	16	64,00	141	3,00
571816056MT	16,0	16	64,00	141	4,00
571816006MT	16,0	16	64,00	141	–
571818028MT	18,0	18	72,00	150	1,00

(continued)

(Series 5718 • VariMill II Long • 4 x D Length of Cut continued)

ALTIN-MT	D1	D	length of cut Ap1 max	length L	Rε
571818038MT	18,0	18	72,00	150	2,00
571818048MT	18,0	18	72,00	150	3,00
571818058MT	18,0	18	72,00	150	4,00
571818018MT	18,0	18	72,00	150	–
571820017MT	20,0	20	80,00	150	0,50
571820027MT	20,0	20	80,00	150	1,00
571820037MT	20,0	20	80,00	150	2,00
571820047MT	20,0	20	80,00	150	3,00
571820057MT	20,0	20	80,00	150	4,00
571820007MT	20,0	20	80,00	150	–
571825018MT	25,0	25	100,00	170	0,50
571825028MT	25,0	25	100,00	170	1,00
571825038MT	25,0	25	100,00	170	2,00
571825048MT	25,0	25	100,00	170	3,00
571825058MT	25,0	25	100,00	170	4,00
571825008MT	25,0	25	100,00	170	–

Series 5718

A

ALTIN

Recommended feed per tooth (fz=mm/th) for side milling (A).

Cutting Speed — vc m/min

D1 — Diameter

Material Group		ap	ae	min	max	mm	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	1	Ap1 max	0,05 x D*	300	400	fz	0,044	0,060	0,060	0,072	0,083	0,092	0,101	0,114	0,124
	2	Ap1 max	0,05 x D*	280	380	fz	0,044	0,060	0,060	0,072	0,083	0,092	0,101	0,114	0,124
	3	Ap1 max	0,05 x D*	240	320	fz	0,036	0,050	0,050	0,061	0,070	0,079	0,087	0,101	0,114
	4	Ap1 max	0,05 x D*	180	300	fz	0,033	0,045	0,045	0,054	0,062	0,070	0,077	0,088	0,098
	5	Ap1 max	0,05 x D*	120	200	fz	0,029	0,040	0,040	0,048	0,056	0,063	0,070	0,081	0,091
	6	Ap1 max	0,05 x D*	100	150	fz	0,025	0,034	0,034	0,040	0,047	0,052	0,057	0,065	0,071
M	1	Ap1 max	0,05 x D*	180	230	fz	0,036	0,050	0,050	0,061	0,070	0,079	0,087	0,101	0,114
	2	Ap1 max	0,05 x D*	120	160	fz	0,029	0,040	0,040	0,048	0,056	0,063	0,070	0,081	0,091
	3	Ap1 max	0,05 x D*	120	140	fz	0,025	0,034	0,034	0,040	0,047	0,052	0,057	0,065	0,071
K	1	Ap1 max	0,05 x D*	240	300	fz	0,044	0,060	0,060	0,072	0,083	0,092	0,101	0,114	0,124
	2	Ap1 max	0,05 x D*	220	260	fz	0,036	0,050	0,050	0,061	0,070	0,079	0,087	0,101	0,114
	3	Ap1 max	0,05 x D*	200	260	fz	0,029	0,040	0,040	0,048	0,056	0,063	0,070	0,081	0,091
S	1	Ap1 max	0,05 x D*	100	180	fz	0,036	0,050	0,050	0,061	0,070	0,079	0,087	0,101	0,114
	2	Ap1 max	0,05 x D*	100	180	fz	0,019	0,026	0,050	0,061	0,070	0,079	0,087	0,101	0,114
	3	Ap1 max	0,05 x D*	50	80	fz	0,029	0,040	0,026	0,032	0,037	0,042	0,046	0,054	0,061
	4	Ap1 max	0,05 x D*	100	120	fz	0,026	0,037	0,037	0,045	0,052	0,058	0,064	0,074	0,084
H	1	Ap1 max	0,05 x D*	140	160	fz	0,033	0,045	0,045	0,054	0,062	0,070	0,077	0,088	0,098

** For the above cutting data, do not exceed an overall ae of 0,8mm.*

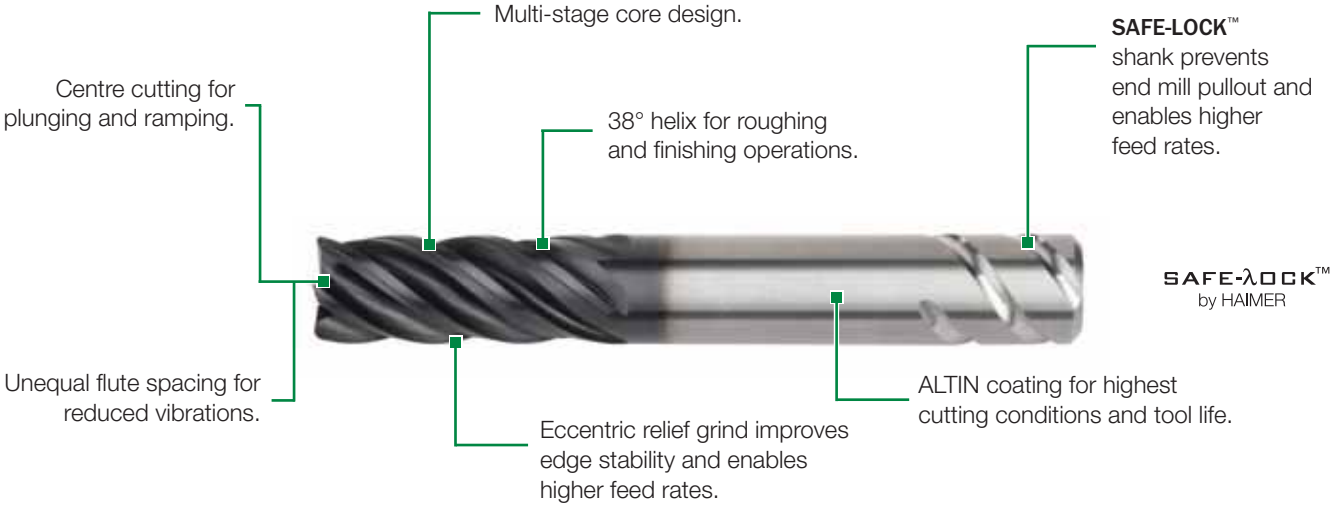
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machinining centres, please adjust parameters accordingly on >0,5mm diameters.

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.

577E Metric Series

- Extensive radii corner offering.
- Highest metal removal rates (MRR) due to five flute centre cutting design.

57NE Metric Series

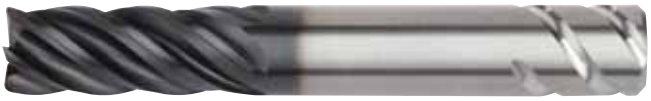
- Extensive radii corner offering.
- Neck design for depths requiring additional passes.

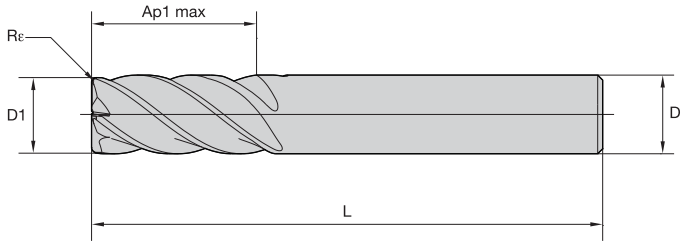
Application Example

Side milling of INCONEL® 718 component

Workpiece material:	INCONEL 718
Tool:	D = 15.875mm
Cutting data:	ap = 27,43mm ae = 1,27mm vc = 20 m/min fz = 0.05 mm/z
Result:	Increased tool life from 2 workpieces to 5

- Unequal flute spacing.
- Centre cutting.
- Optimised 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 e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

	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*

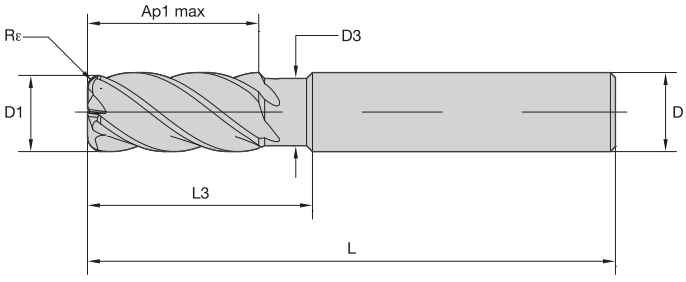
For application data, see page B44.

NEW!

Series 577E • VariMill II ER

ALTIN-MT	ALTIN-MV	ALTIN-MW	D1	D	length of cut Ap1 max	length L	Rε
577E10024MT	–	**577E10024MW**	10,0	10	22,00	72	0,50
577E10004MT	–	–	10,0	10	22,00	72	–
–	**577E12015MV**	**577E12015MW**	12,0	12	26,00	83	0,75
–	**577E12005MV**	–	12,0	12	26,00	83	–
–	**577E16016MV**	**577E16016MW**	16,0	16	32,00	92	0,75
–	**577E16006MV**	–	16,0	16	32,00	92	–
–	**577E20017MV**	**577E20017MW**	20,0	20	38,00	104	0,75
–	**577E20007MV**	–	20,0	20	38,00	104	–
–	**577E25018MV**	**577E25018MW**	25,0	25	45,00	121	0,75

- Unequal flute spacing.
- Centre cutting.
- Optimised 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 e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

	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 B44.

NEW!

Series 57NE • VariMill II ER • With Neck

ALTIN-MT	ALTIN-MV	ALTIN-MW	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
57NE10024MT	–	57NE10024MW	10,0	10	9,40	22,00	30,00	76	0,50
57NE10034MT	–	57NE10034MW	10,0	10	9,40	22,00	30,00	76	1,00
57NE10054MT	–	57NE10054MW	10,0	10	9,40	22,00	30,00	76	2,00
57NE10004MT	–	–	10,0	10	9,40	22,00	30,00	76	–
–	57NE12025MV	57NE12025MW	12,0	12	11,28	26,00	36,00	83	0,50
–	57NE12035MV	57NE12035MW	12,0	12	11,28	26,00	36,00	83	1,00
–	57NE12055MV	57NE12055MW	12,0	12	11,28	26,00	36,00	83	2,00
–	57NE12005MV	–	12,0	12	11,28	26,00	36,00	83	–
–	57NE16026MV	57NE16026MW	16,0	16	15,04	32,00	48,00	100	0,50
–	57NE16036MV	57NE16036MW	16,0	16	15,04	32,00	48,00	100	1,00
–	57NE16056MV	57NE16056MW	16,0	16	15,04	32,00	48,00	100	2,00
–	57NE16006MV	–	16,0	16	15,04	32,00	48,00	100	–
–	57NE20027MV	57NE20027MW	20,0	20	18,80	38,00	60,00	115	0,50
–	57NE20037MV	57NE20037MW	20,0	20	18,80	38,00	60,00	115	1,00
–	57NE20057MV	57NE20057MW	20,0	20	18,80	38,00	60,00	115	2,00
–	57NE20087MV	57NE20087MW	20,0	20	18,80	38,00	60,00	115	4,00
–	57NE20007MV	–	20,0	20	18,80	38,00	60,00	115	–
–	57NE25028MV	57NE25028MW	25,0	25	23,50	45,00	75,00	135	0,50
–	57NE25038MV	57NE25038MW	25,0	25	23,50	45,00	75,00	135	1,00
–	57NE25058MV	57NE25058MW	25,0	25	23,50	45,00	75,00	135	2,00
–	57NE25088MV	57NE25088MW	25,0	25	23,50	45,00	75,00	135	4,00
–	57NE25008MV	–	25,0	25	23,50	45,00	75,00	135	–

Series 577E • VariMill II ER

Material Group		A		B	ALTIN			Recommended feed per tooth (fz=mm/th) for side milling (A). For slotting (B), reduce fz by 20%.					
					Cutting Speed — vc m/min			D1 — Diameter					
		ap	ae	ap	min		max	mm	10,0	12,0	16,0	20,0	25,0
P	1	1,5 x D	0,5 x D	1 x D	150	-	200	fz	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	140	-	190	fz	0,072	0,083	0,101	0,114	0,124
	3	1,5 x D	0,5 x D	1 x D	120	-	160	fz	0,061	0,070	0,087	0,101	0,114
	4	1,5 x D	0,5 x D	0,75 x D	90	-	150	fz	0,054	0,062	0,077	0,088	0,098
	5	1,5 x D	0,5 x D	1 x D	60	-	100	fz	0,048	0,056	0,070	0,081	0,091
	6	1,5 x D	0,5 x D	0,75 x D	50	-	75	fz	0,040	0,047	0,057	0,065	0,071
M	1	1,5 x D	0,5 x D	1 x D	90	-	115	fz	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	60	-	80	fz	0,048	0,056	0,070	0,081	0,091
	3	1,5 x D	0,5 x D	1 x D	60	-	70	fz	0,040	0,047	0,057	0,065	0,071
K	1	1,5 x D	0,5 x D	1 x D	120	-	150	fz	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	110	-	130	fz	0,061	0,070	0,087	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	110	-	130	fz	0,048	0,056	0,070	0,081	0,091
S	1	1,5 x D	0,3 x D	0,3 x D	50	-	90	fz	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,3 x D	0,3 x D	25	-	40	fz	0,032	0,037	0,046	0,054	0,061
	3	1,5 x D	0,5 x D	1 x D	60	-	80	fz	0,048	0,056	0,070	0,081	0,091
	4	1,5 x D	0,5 x D	1 x D	50	-	60	fz	0,045	0,052	0,064	0,074	0,084
H	1	1,5 x D	0,5 x D	0,75 x D	80	-	140	fz	0,054	0,062	0,077	0,088	0,098

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 centres, please adjust parameters accordingly on >12mm diameters.

Series 57NE • VariMill II ER

Material Group		A		B	ALTIN			Recommended feed per tooth (fz=mm/th) for side milling (A). For slotting (B), reduce fz by 20%.					
					Cutting Speed — vc m/min			D1 — Diameter					
		ap	ae	ap	min		max	mm	10,0	12,0	16,0	20,0	25,0
P	1	1,5 x D	0,5 x D	1 x D	150	-	200	fz	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	140	-	190	fz	0,072	0,083	0,101	0,114	0,124
	3	1,5 x D	0,5 x D	1 x D	120	-	160	fz	0,061	0,070	0,087	0,101	0,114
	4	1,5 x D	0,5 x D	0,75 x D	90	-	150	fz	0,054	0,062	0,077	0,088	0,098
	5	1,5 x D	0,5 x D	1 x D	60	-	100	fz	0,048	0,056	0,070	0,081	0,091
	6	1,5 x D	0,5 x D	0,75 x D	50	-	75	fz	0,040	0,047	0,057	0,065	0,071
M	1	1,5 x D	0,5 x D	1 x D	90	-	115	fz	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,5 x D	1 x D	60	-	80	fz	0,048	0,056	0,070	0,081	0,091
	3	1,5 x D	0,5 x D	1 x D	60	-	70	fz	0,040	0,047	0,057	0,065	0,071
K	1	1,5 x D	0,5 x D	1 x D	120	-	150	fz	0,072	0,083	0,101	0,114	0,124
	2	1,5 x D	0,5 x D	1 x D	110	-	130	fz	0,061	0,070	0,087	0,101	0,114
	3	1,5 x D	0,5 x D	1 x D	110	-	130	fz	0,048	0,056	0,070	0,081	0,091
S	1	1,5 x D	0,3 x D	0,3 x D	50	-	90	fz	0,061	0,070	0,087	0,101	0,114
	2	1,5 x D	0,3 x D	0,3 x D	25	-	40	fz	0,032	0,037	0,046	0,054	0,061
	3	1,5 x D	0,5 x D	1 x D	60	-	80	fz	0,048	0,056	0,070	0,081	0,091
	4	1,5 x D	0,5 x D	1 x D	50	-	60	fz	0,045	0,052	0,064	0,074	0,084
H	1	1,5 x D	0,5 x D	0,75 x D	80	-	140	fz	0,054	0,062	0,077	0,088	0,098

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 centres, please adjust parameters accordingly on >12mm diameters.

WIN WITH WIDIA™

AluSurf™ Carbide End Mills for High Metal Removal Rates and Superior Surface Finishes

Designed to significantly reduce machining time in aluminium!

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

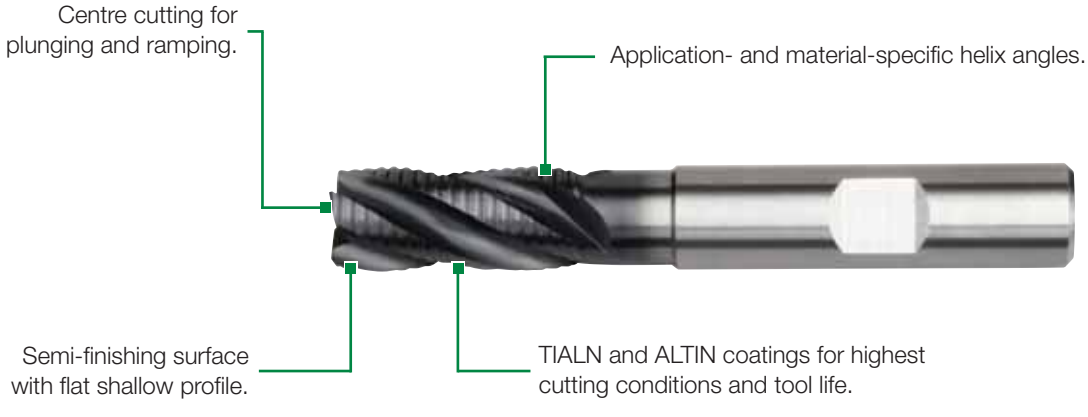
WIDIA™

High-Performance Solid Carbide End Mills • **HP Rougher**

WIDIA-Hanita™ high-performance roughing end mills are market-leading, universal, and consistently performing tools for use in a wide range of workpiece materials and types of operations.

HP ROUGHER

- High-performance universal tools for almost all cutting materials.
- Lower cutting forces and spindle power consumption.
- High Metal Removal Rates (MRR) even on unstable machines or with unstable workpiece clamping.
- Roughing profile enables roughing and semi-finishing.



High-Performance Roughing Series

- Increase your output with less tool changes using roughing and semi-finishing capabilities.
- Benefit from low cutting forces, full length of cut usage, and exceptionally good tool life in slotting applications.

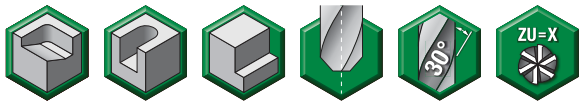
49N6 Series

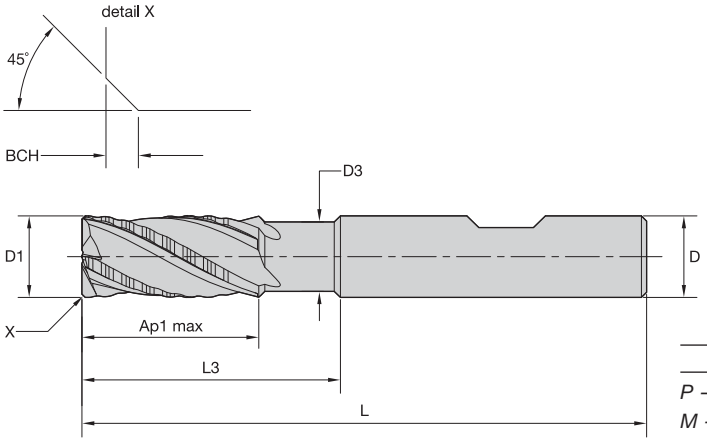
- High Metal Removal Rates (MRR) and highest tool life in:
  - — Stainless steels, steels, and alloyed steels
  - — Cast iron
- Necked for extended reach.

4969 Series

- High MRR and highest tool life in:
  - — Stainless steels, steels, and alloyed steels
  - — Cast iron
  - — Titanium
  - — Hardened steels
- Benefit from flat shallow profile with the ball nose section.

- Centre cutting.
- Flat shallow profile.
- Standard items listed. Additional styles and coatings made to order.





End Mill Tolerances

D1	tolerance d11	D	tolerance h6 + / -
≤3	-0,020/-0,080	≤3	0/0,006
>3–6	-0,030/-0,105	>3–6	0/0,008
>6–10	-0,040/-0,130	>6–10	0/0,009
>10–18	-0,050/-0,160	>10–18	0/0,011
>18–30	-0,065/-0,195	>18–30	0/0,013

	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
ALTIN	●	●	●	●	○	○	○	○	○	●	●	●	○	○	○	○	●

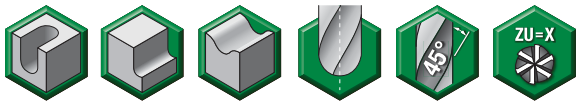
P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

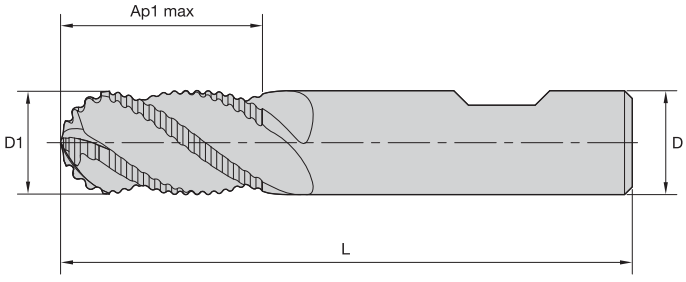
For application data, see page B50.

Series 49N6 • With Neck

ALTIN-MW	D1	D	D3	length of cut Ap1 max	L3	length L	BCH	Z U
49N604002MW	4,0	6	–	8,00	–	57	0,30	3
49N605002MW	5,0	6	–	13,00	–	57	0,30	3
49N606002MW	6,0	6	5,50	13,00	21,00	57	0,30	3
49N608003MW	8,0	8	7,50	16,00	27,00	63	0,30	3
49N610004MW	10,0	10	9,50	22,00	32,00	72	0,50	4
49N612005MW	12,0	12	11,00	26,00	38,00	83	0,50	4
49N614014MW	14,0	14	13,00	26,00	38,00	83	0,50	4
49N616006MW	16,0	16	15,00	32,00	44,00	92	0,50	4
49N618018MW	18,0	18	17,00	32,00	44,00	92	0,50	4
49N620007MW	20,0	20	19,00	38,00	54,00	104	0,50	4
49N625008MW	25,0	25	24,00	45,00	65,00	121	0,50	5

- Centre cutting.
- Flat shallow profile.
- Standard items listed. Additional styles and coatings made to order.
- Roughing profile also on radii portion of end mill.





End Mill Tolerances

D1	tolerance d11	D	tolerance h6 + / -
≤3	-0,020/-0,080	≤3	0/0,006
>3–6	-0,030/-0,105	>3–6	0/0,008
>6–10	-0,040/-0,130	>6–10	0/0,009
>10–18	-0,050/-0,160	>10–18	0/0,011
>18–30	-0,065/-0,195	>18–30	0/0,013

	P						M			K			S				H		
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1	2	3
TIALN	●	●	●	●	○	○	○	○	○	●	●	●	○	○	○	○	●	●	○

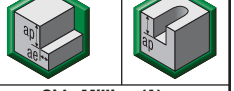
P — Steels *K — Cast Iron* *S — High-Temp Alloys*
M — Stainless Steels *N — Non-Ferrous* *H — Hard Materials*

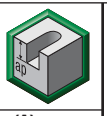
For application data, see page B50.

Series 4969

TIALN-LW	D1	D	length of cut Ap1 max	length L	Z U
496905002LW	5,0	6	13,00	57	3
496906002LW	6,0	6	13,00	57	3
496908003LW	8,0	8	16,00	63	4
496910004LW	10,0	10	22,00	72	4
496912005LW	12,0	12	26,00	83	4
496914014LW	14,0	14	26,00	83	4
496916006LW	16,0	16	32,00	92	4
496918018LW	18,0	18	32,00	92	4
496920007LW	20,0	20	38,00	104	4

Series 49N6



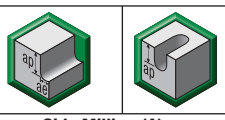


Side Milling (A) and Slotting (B)

Material Group		A ap	A ae	B ap	ALTIN Cutting Speed — vc m/min min		max	Recommended feed per tooth (fz=mm/th) for side milling (A). For slotting (B), reduce fz by 10%. D1 — Diameter mm	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	1	1.5 x D	0.5 x D	1 x D	150	–	200	fz	0,024	0,031	0,037	0,049	0,059	0,072	0,080	0,087	0,093	0,098	0,105
	2	1.5 x D	0.5 x D	1 x D	140	–	190	fz	0,024	0,031	0,037	0,049	0,059	0,072	0,080	0,087	0,093	0,098	0,105
	3	1.5 x D	0.4 x D	0.75 x D	120	–	160	fz	0,020	0,025	0,031	0,041	0,049	0,061	0,068	0,075	0,082	0,087	0,097
	4	1 x D	0.3 x D	0.5 x D	90	–	150	fz	0,018	0,023	0,028	0,037	0,044	0,054	0,060	0,066	0,072	0,076	0,083
	5	1.5 x D	0.4 x D	0.75 x D	60	–	100	fz	0,016	0,021	0,025	0,033	0,039	0,049	0,055	0,060	0,065	0,070	0,077
M	1	1 x D	0.4 x D	0.75 x D	80	–	100	fz	0,020	0,025	0,031	0,041	0,049	0,061	0,068	0,075	0,082	0,087	0,097
	2	1 x D	0.4 x D	0.75 x D	60	–	80	fz	0,016	0,021	0,025	0,033	0,039	0,049	0,055	0,060	0,065	0,070	0,077
	3	1 x D	0.4 x D	0.75 x D	60	–	80	fz	0,014	0,017	0,021	0,026	0,032	0,039	0,044	0,048	0,052	0,056	0,060
K	1	1.5 x D	0.5 x D	1 x D	120	–	160	fz	0,024	0,031	0,037	0,049	0,059	0,072	0,080	0,087	0,093	0,098	0,105
	2	1.5 x D	0.4 x D	1 x D	110	–	140	fz	0,020	0,025	0,031	0,041	0,049	0,061	0,068	0,075	0,082	0,087	0,097
	3	1.5 x D	0.4 x D	1 x D	100	–	130	fz	0,016	0,021	0,025	0,033	0,039	0,049	0,055	0,060	0,065	0,070	0,077
S	1	1.5 x D	0.4 x D	0.75 x D	50	–	90	fz	0,020	0,025	0,031	0,041	0,049	0,061	0,068	0,075	0,082	0,087	0,097
	3	1.5 x D	0.4 x D	0.75 x D	50	–	80	fz	0,016	0,021	0,025	0,033	0,039	0,049	0,055	0,060	0,065	0,070	0,077
H	1	1.0 x D	0.3 x D	0.5 x D	80	–	140	fz	0,018	0,023	0,028	0,037	0,044	0,054	0,060	0,066	0,072	0,076	0,083

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 centres, please adjust parameters accordingly on >12mm diameters.

Series 4969



Side Milling (A) and Slotting (B)

Material Group		A ap	A ae	B ap	TIALN Cutting Speed — vc m/min min		max	Recommended feed per tooth (fz=mm/th) for side milling (A). For slotting (B), reduce fz by 10%. D1 — Diameter mm	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	1	1,5 x D	0.5 x D	1 x D	150	–	200	fz	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,107	0,114
	2	1,5 x D	0.5 x D	1 x D	140	–	190	fz	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,107	0,114
	3	1,5 x D	0.4 x D	0.75 x D	120	–	160	fz	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,094	0,101
	4	1,5 x D	0.3 x D	0.3 x D	90	–	150	fz	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,082	0,088
	5	1,5 x D	0.4 x D	0.75 x D	60	–	100	fz	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,075	0,081
	6	1,5 x D	0.3 x D	0.3 x D	50	–	75	fz	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
M	1	1,5 x D	0.4 x D	0.75 x D	80	–	100	fz	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,094	0,101
	2	1,5 x D	0.4 x D	0.75 x D	60	–	80	fz	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,075	0,081
	3	1,5 x D	0.4 x D	0.75 x D	60	–	80	fz	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
K	1	1,5 x D	0.5 x D	1 x D	120	–	160	fz	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,107	0,114
	2	1,5 x D	0.4 x D	1 x D	110	–	140	fz	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,094	0,101
	3	1,5 x D	0.4 x D	1 x D	100	–	130	fz	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,075	0,081
S	1	1,5 x D	0.4 x D	0.75 x D	90	–	115	fz	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,094	0,101
	2	1,5 x D	0.3 x D	0.3 x D	20	–	40	fz	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054
	3	1,5 x D	0.4 x D	0.75 x D	50	–	80	fz	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,075	0,081
	4	1,5 x D	0.3 x D	0.75 x D	45	–	65	fz	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074
H	1	1,5 x D	0.3 x D	0.3 x D	100	–	140	fz	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,082	0,088
	2	1,5 x D	0.2 x D	0.2 x D	70	–	120	fz	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065
	3	1,5 x D	0.2 x D	0.2 x D	60	–	90	fz	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054

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 centres, please adjust parameters accordingly on >12mm diameters.

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 0,6mm per tooth on a 20mm 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 maximises metal removal rates.
- High metal removal rates lower manufacturing costs.

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

WIDIA™

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.

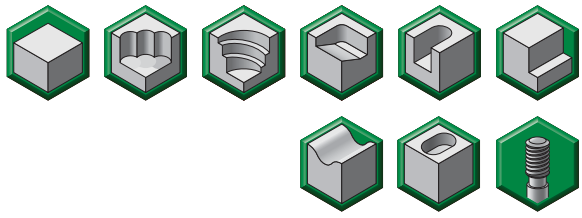
M370

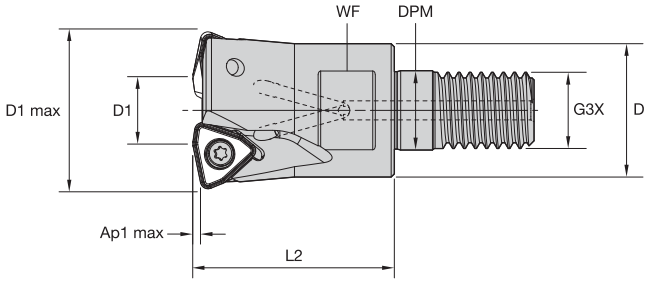
- Double-sided design offers six cutting edges per insert.
- Extremely high metal removal rates.
- First choice for high-feed roughing applications.

8mm iC Insert WOEJ0804
Up to 1,25mm Ap max
Diameter range 25–80mm

12mm iC Insert WOEJ1207
Up to 2mm Ap max
Diameter range 42–125mm

- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.





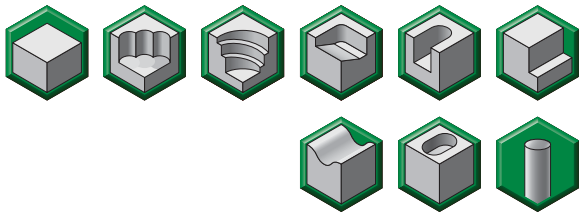
Screw-On End Mills

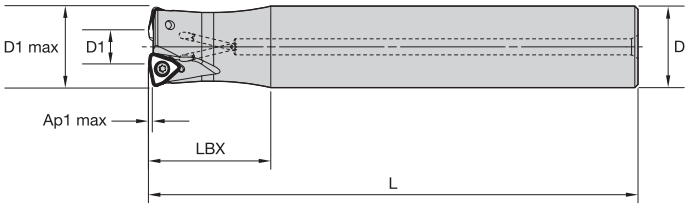
order number	catalogue number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	kg
4056186	**M370D025Z02M12WO08**	25	11	21	12,5	M12	35	17	1,25	2	46000	Yes	0,09
4170918	**M370D025Z03M12WO08**	25	11	21	12,5	M12	35	17	1,25	3	46000	Yes	0,09
4056187	**M370D032Z04M16WO08**	32	18	29	17,0	M16	43	24	1,25	4	38700	Yes	0,21
4056188	**M370D042Z05M16WO08**	42	28	29	17,0	M16	43	24	1,25	5	32500	Yes	0,57

Spare Parts

D1 max	insert screw	Nm	wrench
25	**MS2219**	1,8	**DT9IP**
32	**MS2219**	1,8	**DT9IP**
42	**MS2219**	1,8	**DT9IP**

- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.





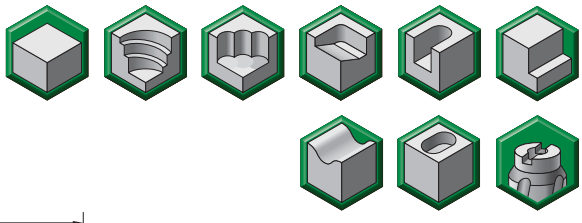
Cylindrical End Mills

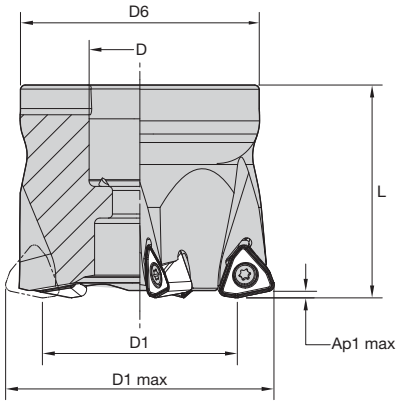
order number	catalogue number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	kg
4008281	**M370D025Z02A25WO08L200**	25	11	25	200	50	1,25	2	46000	Yes	0,68
4170920	**M370D025Z02A25WO08L300**	25	11	25	300	40	1,25	2	46000	Yes	1,08
4056189	**M370D025Z03A25WO08L150**	25	11	25	150	40	1,25	3	46000	Yes	0,50
4170919	**M370D025Z03A25WO08L200**	25	11	25	200	40	1,25	3	46000	Yes	0,69
4056190	**M370D028Z03A25WO08L200**	28	14	25	200	40	1,25	3	42400	Yes	0,70
4170921	**M370D032Z03A32WO08L300**	32	18	32	300	40	1,25	3	38700	Yes	0,84
4056191	**M370D032Z04A32WO08L150**	32	18	32	150	40	1,25	4	38700	Yes	0,84
4056192	**M370D032Z04A32WO08L200**	32	18	32	200	50	1,25	4	38700	Yes	1,14

Spare Parts

D1 max	insert screw	Nm	wrench
25	**MS2219**	1,8	**DT9IP**
28	**MS2219**	1,8	**DT9IP**
32	**MS2219**	1,8	**DT9IP**

- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.





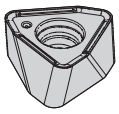
Shell Mills

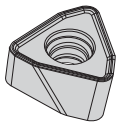
order number	catalogue number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	kg
4056193	**M370D040Z04WO08**	40	26	16	37	40	1,25	4	33500	Yes	0,19
4170922	**M370D040Z05WO08**	40	26	16	37	40	1,25	5	33500	Yes	0,19
4008276	**M370D050Z05WO08**	50	36	22	44	40	1,25	5	29200	Yes	0,29
4171223	**M370D050Z06WO08**	50	36	22	44	40	1,25	6	29200	Yes	0,29
4056194	**M370D052Z05WO08**	52	38	22	44	50	1,25	5	28600	Yes	0,41
4171224	**M370D052Z06WO08**	52	38	22	44	50	1,25	6	28600	Yes	0,40
4056195	**M370D063Z06WO08.**	63	49	22	60	50	1,25	6	25500	Yes	0,74
4008277	**M370D066Z06WO08**	66	52	27	60	50	1,25	6	24900	Yes	0,77
4171225	**M370D080Z07WO08**	80	66	27	60	50	1,25	7	24900	Yes	2,36

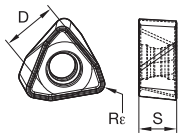
Spare Parts



D1 max	insert screw	Nm	Torx Plus driver	socket-head cap screw
40	**MS2219**	1,8	**DT9IP**	**125.825**
50	**MS2219**	1,8	**DT9IP**	**12146120500**
52	**MS2219**	1,8	**DT9IP**	**12146120500**
63	**MS2219**	1,8	**DT9IP**	**12146120500**
66	**MS2219**	1,8	**DT9IP**	**MS2038**
80	**MS2219**	1,8	**DT9IP**	**MS2038**


WOEJ-MM


WOEJ-MH



- -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.

● first choice
○ alternate choice

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

■ WOEJ-MM

catalogue number	cutting edges	D	S	Rε	TN5515	TN6520	TN6525	TN6540	TN7535
WOEJ080412SRMM	6	7,79	5	1,22		●	●	●	●

■ WOEJ-MH

catalogue number	cutting edges	D	S	Rε	TN5515	TN6520	TN6525	TN6540	TN7535
WOEJ080412SRMH	6	7,79	4,75	1,22	●	●	●	●	●

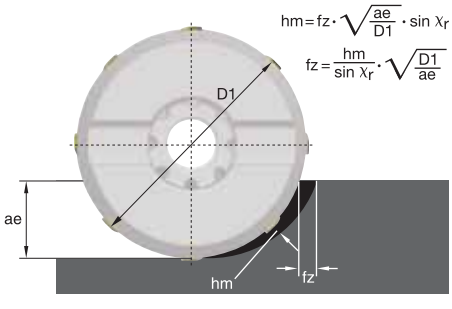
		TN5515			TN6520			TN6525			TN6540			TN7535		
Edge Geometry		feed per tooth fz (mm)														
..-MM		0,35	**0,8**	1,5	0,35	**0,8**	1,5	0,35	**0,8**	1,5	0,35	**0,9**	1,6	0,35	**0,9**	1,6
..-MH		0,35	**1,1**	1,8	0,35	**1,0**	1,6	0,35	**1,0**	1,6	0,35	**1,1**	1,8	0,35	**1,1**	1,8
Material Group		vc (m/min)														
P	1	–	—	–	–	—	–	350	**270**	230	290	**220**	190	360	**280**	240
	2	—	—	—	—	—	—	240	**180**	160	200	**150**	130	250	**190**	165
	3	–	—	–	–	—	–	200	**150**	130	170	**130**	110	210	**160**	140
	4	—	—	—	—	—	—	210	**160**	130	170	**130**	110	215	**165**	140
	5	–	—	–	–	—	–	170	**130**	110	140	**100**	90	180	**130**	110
	6	—	—	—	230	**170**	140	230	**170**	140	190	**140**	120	240	**180**	150
	7	–	—	–	170	**130**	120	170	**130**	120	140	**110**	100	180	**140**	120
	8	—	—	—	150	**120**	100	150	**120**	100	130	**100**	80	160	**120**	100
	9	–	—	–	130	**100**	80	130	**100**	80	110	**80**	60	140	**100**	80
	10	—	—	—	170	**140**	130	170	**140**	130	140	**120**	100	180	**145**	130
	11	–	—	–	120	**90**	70	120	**90**	70	100	**70**	60	120	**90**	70
	12	—	—	—	—	—	—	220	**170**	140	180	**140**	120	230	**175**	150
	13.1	–	—	–	–	—	–	190	**140**	120	160	**120**	100	200	**145**	120
	13.2	—	—	—	—	—	—	100	**70**	60	80	**60**	50	100	**75**	60
M	14.1	–	—	–	–	—	–	190	**120**	90	160	**100**	70	200	**120**	90
	14.2	—	—	—	—	—	—	150	**90**	70	130	**80**	60	160	**95**	70
	14.3	–	—	–	–	—	–	120	**70**	50	100	**60**	40	120	**70**	55
	14.4	—	—	—	—	—	—	100	**60**	40	80	**50**	40	100	**60**	45
K	15	530	**390**	280	380	**280**	200	–	—	–	–	—	–	–	—	–
	16	410	**310**	230	300	**220**	170	—	—	—	—	—	—	—	—	—
	17	460	**310**	230	340	**220**	170	240	**180**	160	200	**150**	130	250	**190**	165
	18	300	**220**	170	220	**160**	120	200	**150**	130	170	**130**	110	210	**160**	140
	19	370	**290**	220	270	**210**	160	–	—	–	–	—	–	–	—	–
	20	310	**230**	180	220	**170**	130	—	—	—	—	—	—	—	—	—
N	21	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	23	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	25	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	27	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	29	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S	31	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	33	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	35	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	36	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	37	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
H	38.1	–	—	–	–	—	–	120	**90**	70	–	—	–	–	—	–
	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

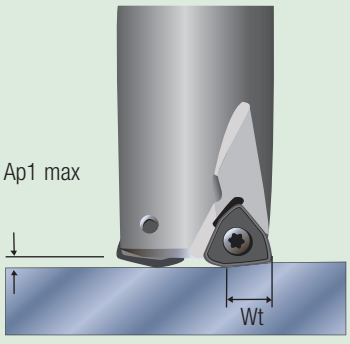
$$hm = fz \cdot \sqrt{\frac{ae}{D1}} \cdot \sin \chi_r$$

$$fz = \frac{hm}{\sin \chi_r} \cdot \sqrt{\frac{D1}{ae}}$$

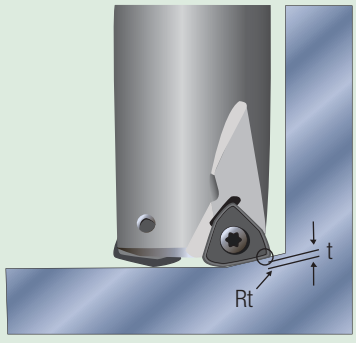


Applying High-Feed Tools

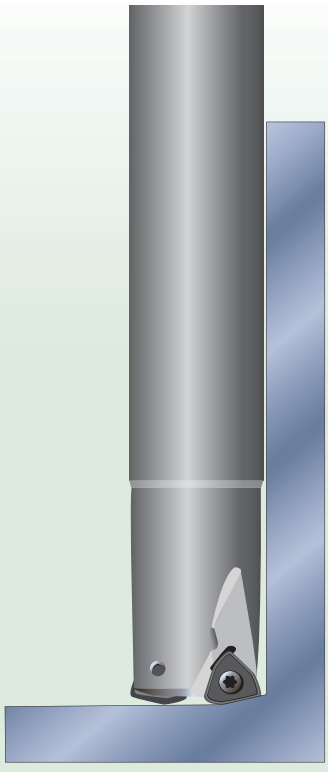
The High-Feed concept bases its strategy on small depth of cut and higher fz values, which result in a higher MRR and productivity with low radial forces.



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.

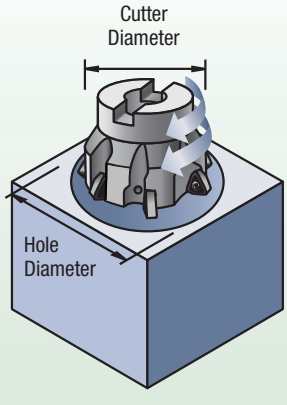
General Programming Information for Applying M370

L/D ratio	starting Ap1	starting fz range
<3	0,9mm	1–1,3mm
>3–<5	0,6mm	1–1,3mm
>5–<7	0,4mm	0,6–1mm

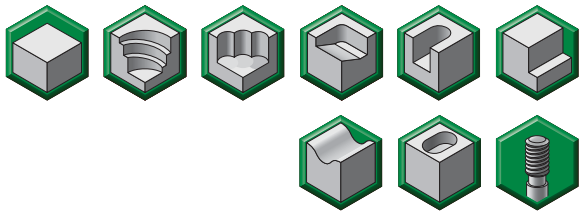
Rt	t	Wt
2,5mm	1mm	7,5mm

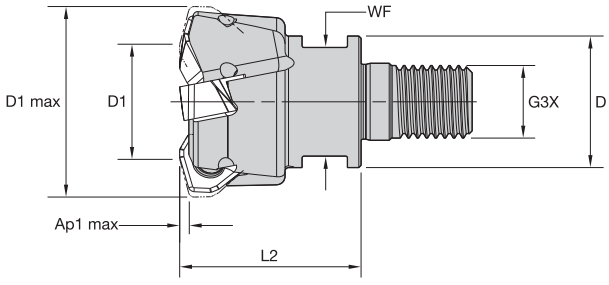
Maximum Linear Ramping and Helical Interpolation from Solid

cutter diameter	max linear ramp angle (straight line)	min hole diameter	max hole diameter	Ap1 max per revolution
25	3,1°	30,2	49,5	1,25
28	2,6°	36,1	55,5	1,25
32	2,9°	44,1	63,5	1,25
40	1,6°	60	79,5	1,25
42	1,5°	64	83,5	1,25
50	1,3°	80	99,5	1,25
52	1,2°	84	103,5	1,25
63	1°	106	125,5	1,25
66	1°	112	131,5	1,25
80	0,8°	140	155,5	1,25



- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.





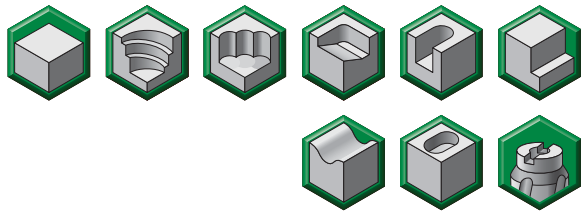
Screw-On End Mills

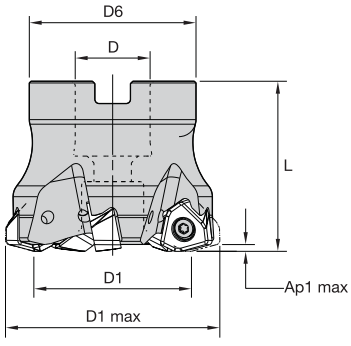
order number	catalogue number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	kg
5338912	**M370D42Z03M16WO12**	42	25	29	17,0	M16	40	24	2,00	3	21310	Yes	0,22

Spare Parts

D1 max	insert screw	Nm	Torx Plus driver
42	**MS2085**	4,0	**DT15IP**

- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.





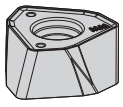
Shell Mills

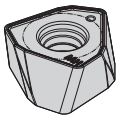
order number	catalogue number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	kg
5338913	M370D50Z04WO12	50	33	22	42	50	2,00	4	19530	Yes	0,38
5338914	M370D52Z04WO12	52	35	22	49	50	2,00	4	19160	Yes	0,47
5338915	M370D63Z04WO12	63	46	22	49	50	2,00	4	17400	Yes	0,56
5338916	M370D63Z05WO12	63	46	22	49	50	2,00	5	17400	Yes	0,57
5338917	M370D66Z05WO12	66	49	27	60	50	2,00	5	17000	Yes	0,79
5338918	M370D80Z05WO12	80	63	27	60	50	2,00	5	15440	Yes	0,94
5338919	M370D80Z06WO12	80	63	27	60	50	2,00	6	15440	Yes	0,94
5338920	M370D100Z06WO12	100	83	32	78	50	2,00	6	13810	Yes	1,56
5338921	M370D100Z07WO12	100	83	32	78	50	2,00	7	13810	Yes	1,57
5338922	M370D125Z07WO12	125	108	40	90	63	2,00	7	12350	Yes	2,92
5338923	M370D125Z09WO12	125	108	40	90	63	2,00	9	12350	Yes	2,94

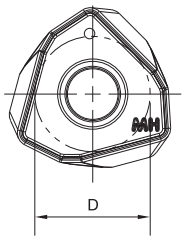
Spare Parts

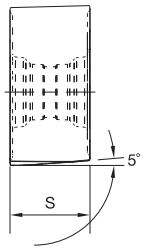



D1 max	insert screw	Nm	Torx Plus driver	socket-head cap screw	coolant lock screw assembly
50	MS2085	4,0	DT15IP	12146120500	–
52	MS2085	4,0	DT15IP	12146120500	–
63	MS2085	4,0	DT15IP	125.025	–
66	MS2085	4,0	DT15IP	125.230	–
80	MS2085	4,0	DT15IP	125.230	–
100	MS2085	4,0	DT15IP	–	MS2195C
125	MS2085	4,0	DT15IP	–	MS2187C


WOEJ-MM


WOEJ-MH





- -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.

● first choice
○ alternate choice

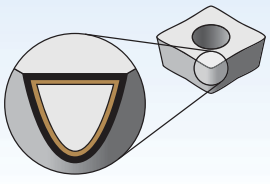
P			●	●	●	●
M			○	●	○	●
K	●		○	○	○	
N						
S				●		●
H			○	○		

■ WOEJ-MM

catalogue number	cutting edges	D	S	Rε	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
WOEJ120712SRMM	6	12,00	7,30	1,27		●	●	●	●

■ WOEJ-MH

catalogue number	cutting edges	D	S	Rε	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
WOEJ120712SRMH	6	12,00	7,30	1,27	●	●	●	●	●



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

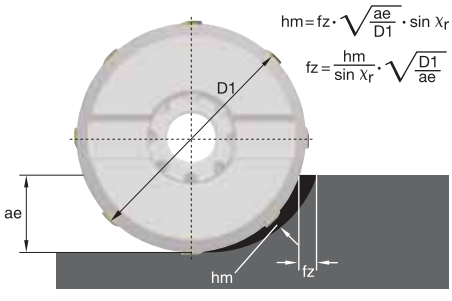
Grade

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 (mm)														
..-MM		—	—	—	0,39	**0,75**	1,75	0,39	**0,80**	1,75	0,39	**0,90**	1,75	0,39	**0,90**	1,75
..-MH		0,39	**0,75**	2,00	0,39	**0,80**	2,00	0,39	**0,85**	2,00	0,39	**1,00**	2,00	0,39	**1,00**	2,00
Material Group		vc (m/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	410	**460**	505	435	**390**	350	220	**250**	275	–	—	–	285	**320**	355
	16	410	**460**	505	435	**390**	350	220	**250**	275	—	—	—	285	**320**	355
	17	330	**355**	400	345	**310**	280	180	**195**	215	–	—	–	230	**255**	280
	18	330	**355**	400	345	**310**	280	180	**195**	215	—	—	—	230	**255**	280
	19	275	**300**	335	290	**255**	240	145	**160**	180	–	—	–	195	**210**	235
	20	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



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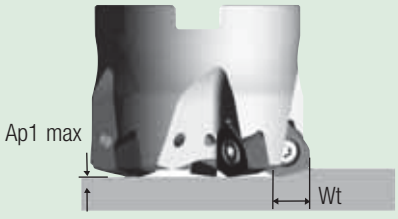
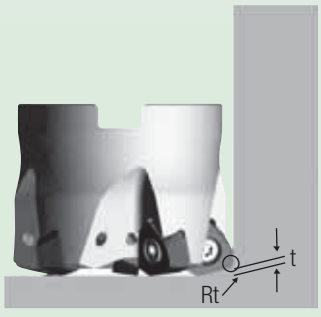


Small Ap1 values and higher feed rates generate lower cutting forces versus traditional milling strategies.



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
mm value	3,2	9	1,4

Maximum Linear Ramping and Helical Interpolation from Solid • Metric

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)
42	5,1°	1,44°	1,66	57,36	65,29	84
50	3,7°	1,09°	1,66	73,07	81,24	100
52	3,5°	1,03°	1,66	77,03	85,24	104
63	2,6°	0,78°	1,66	98,88	107,20	126
66	2,4°	0,74°	1,66	104,85	113,20	132
80	1,8°	0,57°	1,66	132,77	141,18	160
100	1,3°	0,43°	1,66	172,70	181,16	200
125	1°	0,33°	1,66	222,66	231,15	250

WIN WITH WIDIA™

WIDIA™

Victory™ M1200™ Face Mill Series

M1200 45° | M1200 High-Feed | M1200 Mini

Twelve cutting edges per insert — run quieter at higher speeds and feeds, using far less power versus ANY competetive double-sided platform.

Productivity: Exceptional chip forming and evacuation in any material.
Performance: Superb surface finishes.
Value: Extraordinary tool life — in all workpieces and cutting conditions.

M1200 High-Feed

- Feed rates up to 2,5mm per tooth.
- 15° lead angle enables superior chip thinning.

M1200 Mini

- Ideal for low depth of cut work.
- Axial depth of cut up to 3,5mm.

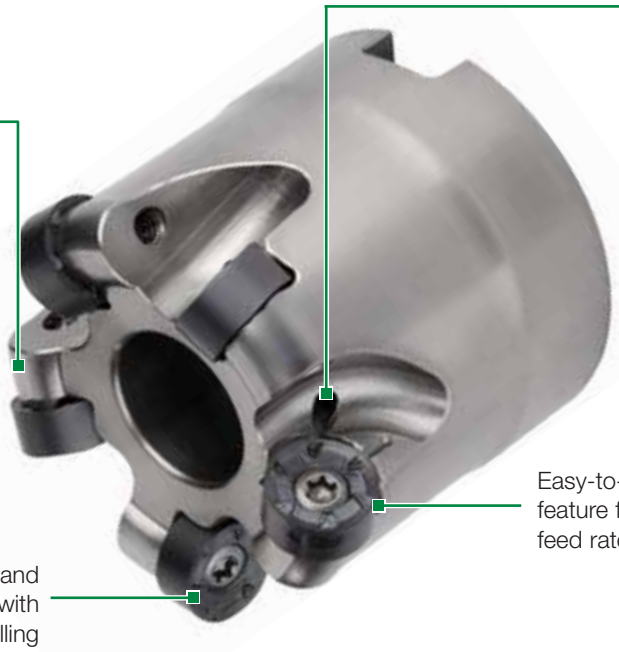
To learn more about our innovations, contact your local Authorised Distributor or visit **www.widia.com**.

WIDIA VICTORY

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.

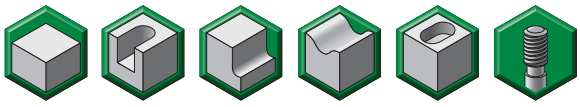
- Up to 12 cutting edges per insert.
- Effective anti-rotation feature.
- Able to apply in all type of materials and milling applications.
- Latest WIDIA™ Victory™ grades offered.

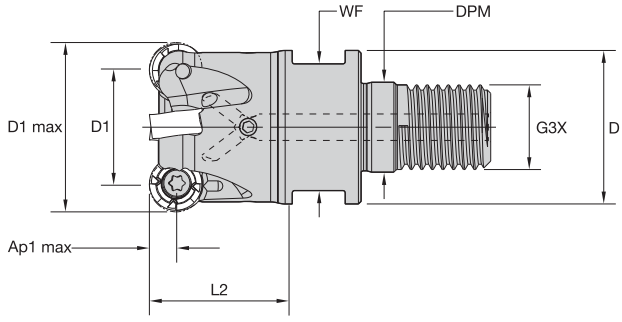
M200 iC 10
10mm iC insert
8 cutting edges

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.





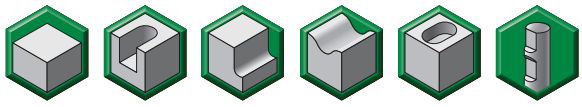
Screw-On End Mills

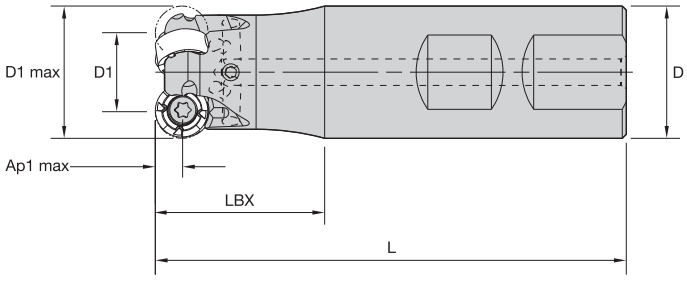
order number	catalogue number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	kg
5210273	**M200D25Z03M12RN10**	25	15	21	12,5	M12	32	17	5,00	3	54700	Yes	0,07
5210274	**M200D32Z04M16RN10**	32	22	29	17,0	M16	40	24	5,00	4	48300	Yes	0,18
5210275	**M200D35Z05M16RN10**	35	24	29	17,0	M16	40	24	5,00	5	46200	Yes	0,20
5210276	**M200D42Z06M16RN10**	42	32	29	17,0	M16	40	24	5,00	6	42200	Yes	0,24

Spare Parts

D1 max	insert screw	Nm	Torx driver
25	**191.848**	2,0	**170.025**
32	**191.848**	2,0	**170.025**
35	**191.848**	2,0	**170.025**
42	**191.848**	2,0	**170.025**

- Double-sided, eight cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





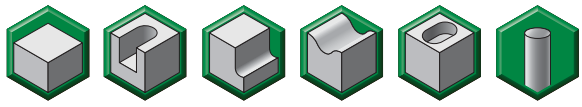
Weldon End Mills

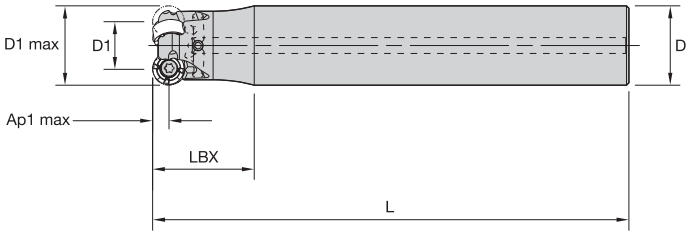
order number	catalogue number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	kg
5210277	**M200D25Z03B25RN10**	25	15	25	89	40	5,0	3	54700	Yes	0,27
5210278	**M200D32Z04B32RN10**	32	22	32	101	40	5,0	4	48300	Yes	0,52

Spare Parts

D1 max	insert screw	Nm	Torx driver
25	**191.848**	2,0	**170.025**
32	**191.848**	2,0	**170.025**

- Double-sided, eight cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





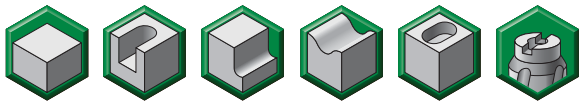
Cylindrical End Mills

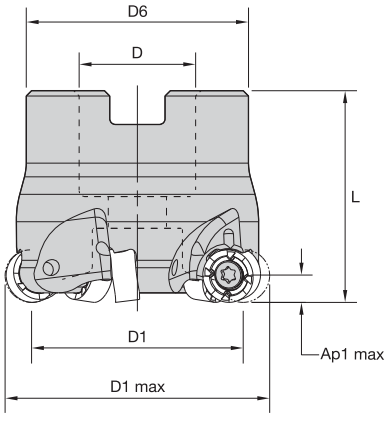
order number	catalogue number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	kg
5210279	**M200D25Z03A25RN10L150**	25	15	25	150	32	5,00	3	54700	Yes	0,50
5210300	**M200D25Z03A25RN10L200**	25	15	25	200	32	5,00	3	54700	Yes	0,69
5210301	**M200D25Z03A32RN10L250**	25	15	32	250	32	5,00	3	54700	Yes	1,41
5210302	**M200D28Z03A25RN10L200**	28	18	25	200	40	5,00	3	51600	Yes	0,70
5210303	**M200D32Z04A32RN10L150**	32	22	32	150	40	5,00	4	48300	Yes	0,83
5210304	**M200D32Z03A32RN10L200**	32	22	32	200	40	5,00	3	48300	Yes	1,44

Spare Parts

D1 max	 insert screw	Nm	 Torx driver
25	**191.848**	2,0	**170.025**
28	**191.848**	2,0	**170.025**
32	**191.848**	2,0	**170.025**

- Double-sided, eight cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





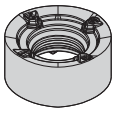
Shell Mills

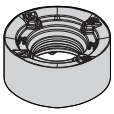
order number	catalogue number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	kg
5210305	**M200D40Z04RN10**	40	30	16	38	40	5,00	4	43200	Yes	0,23
5210306	**M200D40Z06RN10**	40	30	16	38	40	5,00	6	43200	Yes	0,24
5210307	**M200D50Z05RN10**	50	40	22	42	40	5,00	5	38600	Yes	0,32
5210308	**M200D50Z06RN10**	50	40	22	42	40	5,00	6	38600	Yes	0,32
5210309	**M200D52Z06RN10**	52	42	22	49	50	5,00	6	37900	Yes	0,52

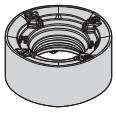
Spare Parts

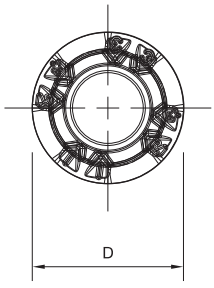


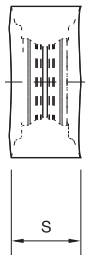
D1 max	insert screw	Nm	Torx driver	socket-head cap screw
40	**191.848**	2,0	**170.025**	**MS1294**
50	**191.848**	2,0	**170.025**	**125.025**
52	**191.848**	2,0	**170.025**	**MS1242**


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

catalogue number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNGJ10T3M0EML	8	10,00	4,76			●	●	●

RNGJ-MM

catalogue number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNGJ10T3M0SMM	8	10,00	4,76			●	●	

RNPJ-MM

catalogue number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNPJ10T3M0SMM	8	10,00	4,76		●	●		●

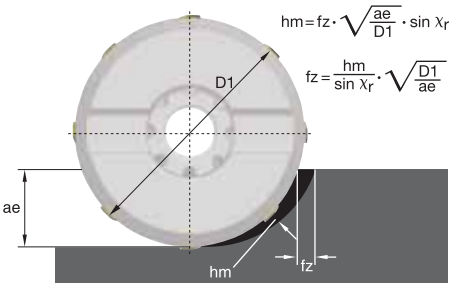
RNPJ-MH

catalogue number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNPJ10T3M0SMH	8	10,00	4,76	●	●	●	●	●

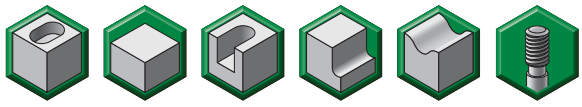
		WK15CM			WP20CM			WP25PM			WU35PM			WP35CM		
Edge Geometry		feed per tooth fz (mm)														
..-ML		0,05	**0,17**	0,19	0,05	**0,17**	0,20	0,05	**0,17**	0,20	0,05	**0,17**	0,20	0,05	**0,17**	0,20
..-MM		0,12	**0,25**	0,39	0,12	**0,25**	0,40	0,12	**0,25**	0,40	0,12	**0,25**	0,40	0,12	**0,25**	0,40
..-MH		0,20	**0,28**	0,42	0,20	**0,28**	0,45	0,20	**0,28**	0,45	0,20	**0,28**	0,45	0,20	**0,28**	0,45
Material Group		vc (m/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	410	**460**	505	435	**390**	350	220	**250**	275	—	—	—	285	**320**	355
	16	410	**460**	505	435	**390**	350	220	**250**	275	—	—	—	285	**320**	355
	17	330	**355**	400	345	**310**	280	180	**195**	215	—	—	—	230	**255**	280
	18	330	**355**	400	345	**310**	280	180	**195**	215	—	—	—	230	**255**	280
	19	275	**300**	335	290	**255**	240	145	**160**	180	—	—	—	195	**210**	235
	20	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	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

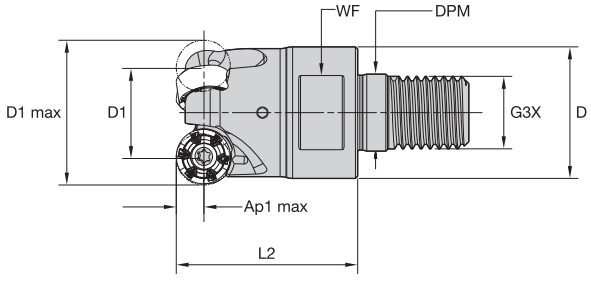
*NOTE: First choice starting feed (fz) is in **bold** type.*
Use corresponding speed (vc).
fz and vc are valid for ae ≥0,4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

ae/D1 =	0,2	0,3	0,4
fz-Factor	1,5	1,3	1,0
vc-Factor	1,3	1,2	1,1



- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





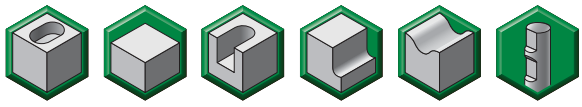
Screw-On End Mills

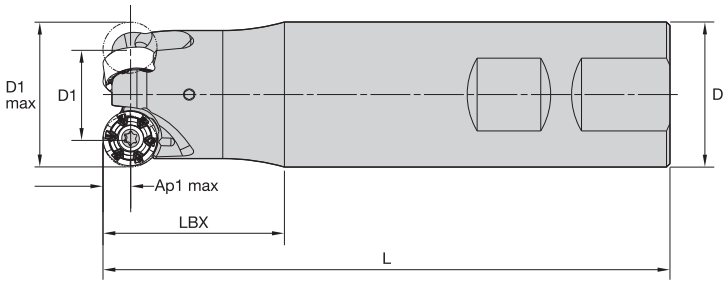
order number	catalogue number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	kg
4147560	**M200D32Z03M16RN12**	32	20	29	17,0	M16	40	24	3,00	3	39160	Yes	0,18
4147561	**M200D35Z03M16RN12**	35	23	29	17,0	M16	40	24	3,00	3	37440	Yes	0,19
4147562	**M200D42Z04M16RN12**	42	30	29	17,0	M16	40	24	3,00	4	34180	Yes	0,24

Spare Parts

D1 max	insert screw	Nm	Torx driver
32	**193.492**	4,0	**170.025**
35	**193.492**	4,0	**170.025**
42	**193.492**	4,0	**170.025**

- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





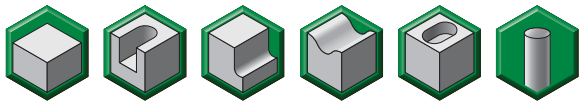
Weldon End Mills

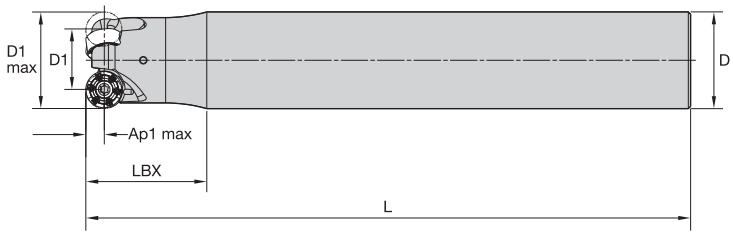
order number	catalogue number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	kg
4147564	**M200D32Z03B32RN12**	32	20	32	125	40	3,0	3	39160.0	Yes	0,65

Spare Parts

D1 max	insert screw	Nm	Torx driver
32	**193.492**	4,0	**170.025**

- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





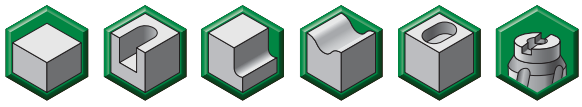
Cylindrical End Mills

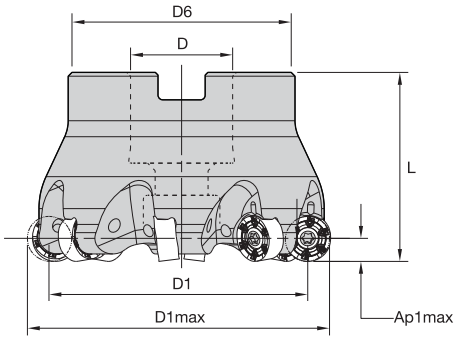
order number	catalogue number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	kg
4147566	**M200D32Z03A32RN12L200**	32	20	32	200	40	3,00	3	39160	Yes	1,10
4147567	**M200D32Z02A32RN12L250**	32	20	32	250	40	3,00	2	39160	Yes	1,41

Spare Parts

D1 max	insert screw	Nm	Torx driver
32	**193.492**	4,0	**170.025**

- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





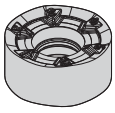
Shell Mills

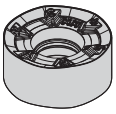
order number	catalogue number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	kg
4147568	**M200D40Z04RN12**	40	28	16	38	40	3,00	4	35020	Yes	0,22
4147569	**M200D50Z04RN12**	50	38	22	42	40	3,00	4	31330	Yes	0,30
4147570	**M200D50Z05RN12**	50	38	22	42	40	3,00	5	31330	Yes	0,29
4147571	**M200D52Z05RN12**	52	40	22	49	50	3,00	5	30720	Yes	0,49
4147572	**M200D63Z05RN12**	63	51	22	49	50	3,00	5	27910	Yes	0,63
4147573	**M200D63Z07RN12**	63	51	22	49	50	3,00	7	27910	Yes	0,63
4147574	**M200D66Z07RN12**	66	54	27	60	50	3,00	7	27260	Yes	0,82
4147575	**M200D80Z06RN12**	80	68	27	60	50	3,00	6	24760	Yes	1,02
4147576	**M200D80Z08RN12**	80	68	27	60	50	3,00	8	24760	Yes	1,02
4147577	**M200D100Z07RN12**	100	88	32	78	50	3,00	7	22150	Yes	1,66
4147578	**M200D100Z09RN12**	100	88	32	78	50	3,00	9	22150	Yes	1,63

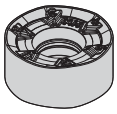
Spare Parts




D1 max	insert screw	Nm	Torx driver	socket-head cap screw	coolant lock screw assembly
40	**193.492**	4,0	**170.025**	**MS1294**	**–**
50	**193.492**	4,0	**170.025**	**MS1336**	**–**
52	**193.492**	4,0	**170.025**	**MS1242**	**–**
63	**193.492**	4,0	**170.025**	**MS1242**	**–**
66	**193.492**	4,0	**170.025**	**MS2038**	**–**
80	**193.492**	4,0	**170.025**	**MS2038**	**–**
100	**193.492**	4,0	**170.025**	**–**	**MS2195C**


RNGJ-ML


RNGJ-MM
RNPJ-MM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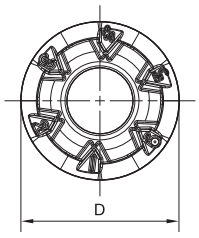
RNPJ-MH



- -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

catalogue number	cutting edges	D	S	WK15PM	WP25PM	WU35PM	WP35CM
RNGJ1204M0EML	12	12,00	4,75		●	●	●

■ RNGJ-MM

catalogue number	cutting edges	D	S	WK15PM	WP25PM	WU35PM	WP35CM
RNGJ1204M0SMM	12	12,00	4,75	●	●	●	●

■ RNGJ-MH

catalogue number	cutting edges	D	S	WK15PM	WP25PM	WU35PM	WP35CM
RNGJ1204M0SMH	12	12,00	4,75	●	●	●	●

■ RNPJ-MM

catalogue number	cutting edges	D	S	WK15PM	WP25PM	WU35PM	WP35CM
RNPJ1204M0SMM	12	12,00	4,75		●	●	●

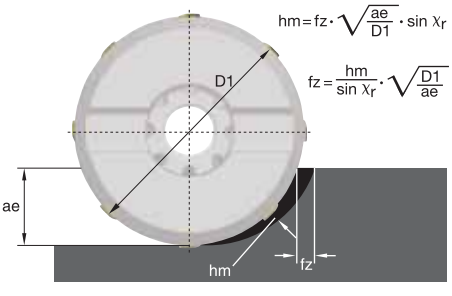
■ RNPJ-MH

catalogue number	cutting edges	D	S	WK15PM	WP25PM	WU35PM	WP35CM
RNPJ1204M0SMH	12	12,00	4,75		●	●	●

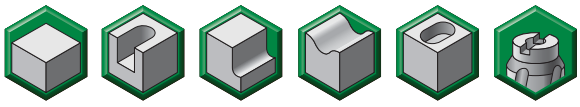
		WK15PM			WK15CM			WP20CM			WP25PM			WU35PM			WP35CM		
Edge Geometry		feed per tooth fz (mm)																	
..-ML		0,05	**0,09**	0,15	0,05	**0,09**	0,15	0,05	**0,09**	0,16	0,05	**0,09**	0,16	0,05	**0,09**	0,16	0,05	**0,09**	0,16
..-MM		0,12	**0,21**	0,35	0,12	**0,21**	0,33	0,12	**0,21**	0,35	0,12	**0,21**	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 (m/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	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

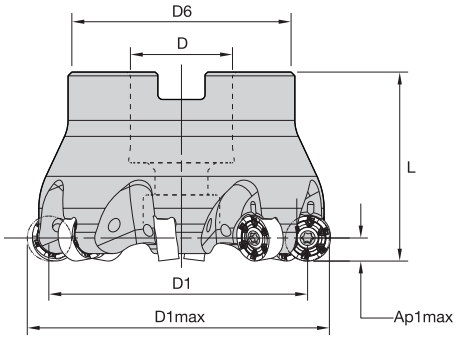
*NOTE: First choice starting feed (fz) is in **bold** type.*
Use corresponding speed (vc).
fz and vc are valid for ae ≥0,4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

ae/D1 =	0,2	0,3	0,4
fz-Factor	1,5	1,3	1,0
vc-Factor	1,3	1,2	1,1



- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.



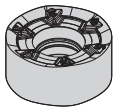


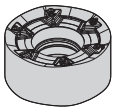
Shell Mills

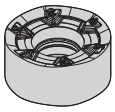
order number	catalogue number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	kg
5209989	**M200D50Z04RN16**	50	34	22	42	50	4	4	26700	Yes	0,36
5210210	**M200D52Z04RN16**	52	36	22	42	50	4	4	26000	Yes	0,39
5210211	**M200D63Z04RN16**	63	47	22	49	50	4	4	22700	Yes	0,58
5210212	**M200D63Z06RN16**	63	47	22	49	50	4	6	22700	Yes	0,57
5210213	**M200D66Z05RN16**	66	50	27	60	50	4	5	22000	Yes	0,69
5210214	**M200D80Z05RN16**	80	64	27	60	50	4	5	19500	Yes	0,88
5210215	**M200D80Z07RN16**	80	64	27	60	50	4	7	19500	Yes	0,89
5210216	**M200D100Z06RN16**	100	84	32	78	50	4	6	17000	Yes	1,51
5210217	**M200D100Z08RN16**	100	84	32	78	50	4	8	17000	Yes	1,52
5210218	**M200D125Z08RN16**	125	109	40	90	63	4	8	14900	Yes	2,88

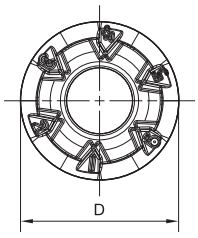
Spare Parts

D1 max	insert screw	Nm	Torx driver	socket-head cap screw	coolant lock screw assembly
50	**193.343**	4,0	**170.025**	**MS1242**	**–**
52	**193.343**	4,0	**170.025**	**MS1242**	**–**
63	**193.343**	4,0	**170.025**	**MS1242**	**–**
66	**193.343**	4,0	**170.025**	**MS2038**	**–**
80	**193.343**	4,0	**170.025**	**MS2038**	**–**
100	**193.343**	4,0	**170.025**	**–**	**MS2195C**
125	**193.343**	4,0	**170.025**	**–**	**MS2187C**


RNGJ-ML


RNPJ-MM


RNPJ-MH



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- -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			○	○		

RNGJ-ML

catalogue number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNGJ1605M0EML	12	16,00	6,35			●	●	●

RNPJ-MM

catalogue number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNPJ1605M0SMM	12	16,00	6,35		●	●	●	●

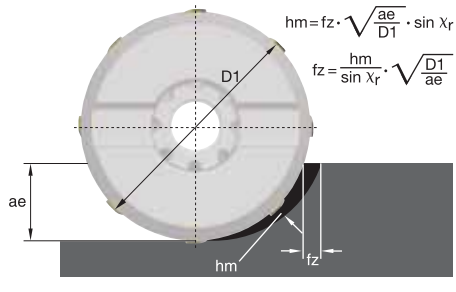
RNPJ-MH

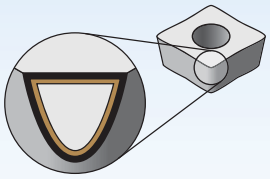
catalogue number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNPJ1605M0SMH	12	16,00	6,35	●	●	●	●	●

		WK15CM			WP20CM			WP25PM			WU35PM			WP35CM		
Edge Geometry		feed per tooth fz (mm)														
..-ML		0,05	**0,17**	0,21	0,05	**0,17**	0,24	0,05	**0,17**	0,24	0,05	**0,17**	0,24	0,05	**0,17**	0,24
..-MM		0,12	**0,25**	0,33	0,12	**0,25**	0,36	0,12	**0,25**	0,36	0,12	**0,25**	0,36	0,12	**0,25**	0,36
..-MH		0,23	**0,30**	0,42	0,23	**0,30**	0,47	0,23	**0,30**	0,47	0,23	**0,30**	0,47	0,23	**0,30**	0,47
Material Group		vc (m/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	410	**460**	505	435	**390**	350	220	**250**	275	—	—	—	285	**320**	355
	16	410	**460**	505	435	**390**	350	220	**250**	275	—	—	—	285	**320**	355
	17	330	**355**	400	345	**310**	280	180	**195**	215	—	—	—	230	**255**	280
	18	330	**355**	400	345	**310**	280	180	**195**	215	—	—	—	230	**255**	280
	19	275	**300**	335	290	**255**	240	145	**160**	180	—	—	—	195	**210**	235
	20	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





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

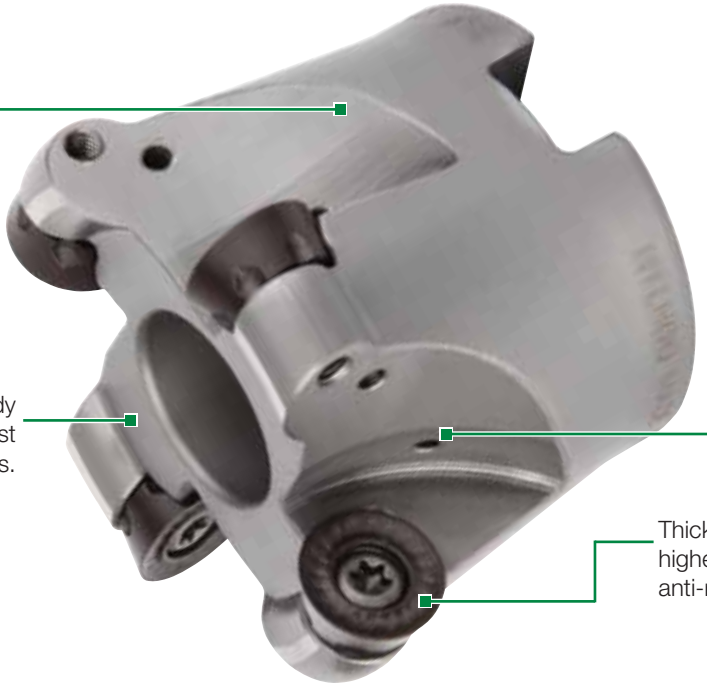
Grade

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.

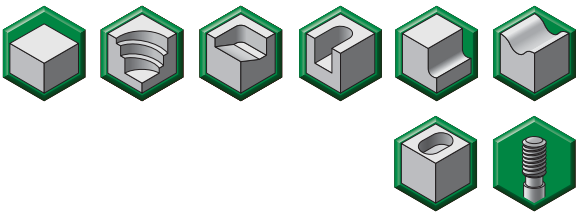
M100

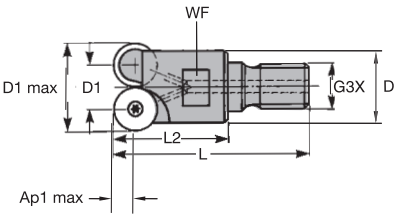


- Thick inserts ensure reliability and consistent results.
- Anti-rotation systems in larger iC inserts provide higher MRR capabilities.
- Increased chip evacuation and through tool coolant for enhanced performance.
- New -MMX geometry: High precision pressed insert that significantly improves performance 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.





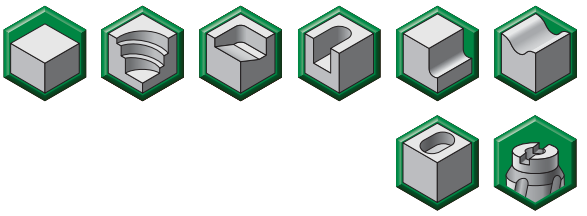
Screw-On End Mills

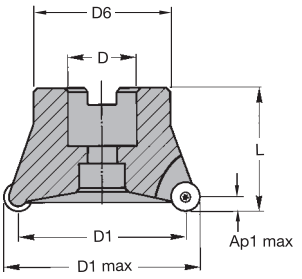
order number	catalogue number	D1 max	D1	D	G3X	L	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
2021374	**12391050200**	24	12	22	M12	52	30	19	6,0	2	10.0°	23000	Yes	0,1
2021378	**12391051000**	35	23	28	M16	63	40	22	6,0	3	10.8°	19000	Yes	0,2
2021379	**12391051200**	40	28	28	M16	63	40	22	6,0	4	8.3°	17000	Yes	0,3

Spare Parts

D1 max	insert screw	Nm	Torx driver
24	**12148038800**	3,0	**12148000600**
35	**12148038800**	3,0	**12148000600**
40	**12148038800**	3,0	**12148000600**

- General-purpose face and copy milling.
- Excellent variety of grades and geometries available.
- Anti-rotation feature for top security.





Shell Mills

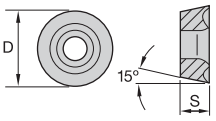
order number	catalogue number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
2021342	**12391020000**	50	38	22	40	40	6,0	4	6.8°	15000	Yes	0,2
2021361	**12391024000**	52	40	22	40	40	6,0	4	6.5°	15000	No	0,2
2021343	**12391020200**	63	51	27	48	40	6,0	5	4.5°	14000	Yes	0,3
2021344	**12391020400**	80	68	27	60	50	6,0	6	3.5°	12000	Yes	0,9
2021345	**12391020600**	100	88	32	78	50	6,0	6	2.5°	11000	No	1,2
2021346	**12391020800**	125	113	40	89	50	6,0	7	2.0°	10000	No	1,7

Spare Parts

D1 max	insert screw	Nm	Torx driver
50	**12148038800**	3,0	**12148000600**
52	**12148038800**	3,0	**12148000600**
63	**12148038800**	3,0	**12148000600**
80	**12148038800**	3,0	**12148000600**
100	**12148038800**	3,0	**12148000600**
125	**12148038800**	3,0	**12148000600**


RDHT-TX


RDHW-ML
RDHW-MH



● first choice
○ alternate choice

	TN2510	TN6525	TN6540	TN7525	TN7535
P	○	●	●	●	●
M		○	●	○	○
K	●	○	○		○
N					
S			●		
H	●				

RDHT-TX

catalogue number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDHT1204M0TX	12,00	4,76	0,12				●	

RDHW-ML

catalogue number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDHW1204M0ML	12,00	4,76	0,10	●				

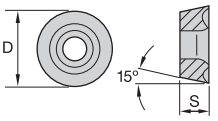
RDHW-MH

catalogue number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDHW1204M0MH	12,00	4,76	0,14	●				


RDPT-MMX


RDMT-TX


RDMW-TX



RDPT-MMX

catalogue number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDPT1204M0SMMX	12,00	4,76	0,18			●		●

RDMT-TX

catalogue number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDMT1204M0TX	12,00	4,76	0,15	●	●	●	●	●

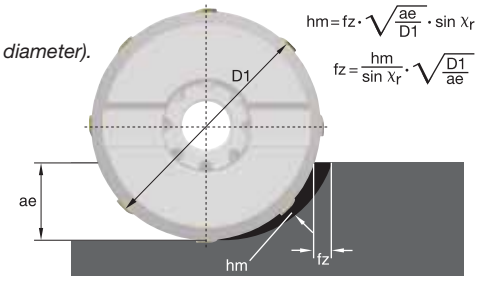
RDMW-TX

catalogue number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDMW1204M0TX	12,00	4,76	0,15	●		●	●	●

		TN2510			TN6525			TN6540			TN7525			TN7535		
Edge Geometry		feed per tooth fz (mm)														
	..ML	0,08	**0,14**	0,16												
	..M0TX	0,08	**0,18**	0,24	0,08	**0,18**	0,25	0,11	**0,24**	0,33	0,08	**0,18**	0,24	0,10	**0,22**	0,30
	..MH	0,08	**0,18**	0,24												
	..MMX							0,10	**0,25**	0,40						
Material Group		vc (m/min)														
P	1	390	**290**	250	350	**260**	230	290	**220**	190	410	**320**	280	360	**280**	240
	2	260	**200**	180	240	**180**	160	200	**150**	130	290	**220**	190	250	**190**	165
	3	220	**180**	140	200	**160**	130	170	**130**	110	240	**180**	160	210	**160**	140
	4	220	**180**	140	200	**160**	130	170	**130**	110	250	**190**	160	215	**165**	140
	5	190	**130**	120	170	**120**	110	140	**100**	90	210	**150**	130	180	**130**	110
	6	250	**190**	150	230	**170**	140	190	**140**	120	280	**210**	170	240	**180**	150
	7	190	**140**	130	170	**130**	120	140	**110**	100	210	**160**	140	180	**140**	120
	8	180	**130**	110	160	**120**	100	130	**100**	80	180	**140**	120	160	**120**	100
	9	140	**110**	80	130	**100**	70	110	**80**	60	160	**120**	90	140	**100**	80
	10	190	**150**	130	170	**140**	120	140	**120**	100	210	**170**	150	180	**145**	130
	11	130	**90**	80	120	**80**	70	100	**70**	60	140	**100**	80	120	**90**	70
	12	240	**220**	150	220	**170**	140	180	**140**	120	260	**200**	170	230	**175**	150
	13.1	210	**150**	130	190	**140**	120	160	**120**	100	230	**170**	140	200	**145**	120
	13.2	110	**80**	70	100	**70**	60	80	**60**	50	120	**90**	70	100	**75**	60
M	14.1	–	—	–	230	**190**	130	190	**160**	110	280	**230**	160	240	**200**	140
	14.2	–	—	–	180	**180**	120	150	**150**	100	220	**210**	140	190	**185**	125
	14.3	–	—	–	130	**130**	100	110	**110**	80	160	**160**	110	140	**135**	95
	14.4	–	—	–	120	**100**	70	100	**80**	60	140	**120**	80	120	**100**	70
K	15	460	**340**	280	–	—	–	–	—	–	–	—	–	–	—	–
	16	350	**260**	220	–	—	–	–	—	–	–	—	–	–	—	–
	17	390	**280**	230	240	**180**	160	200	**150**	130	–	—	–	240	**180**	160
	18	280	**170**	140	200	**160**	130	170	**130**	110	–	—	–	200	**160**	130
	19	390	**230**	190	–	—	–	–	—	–	–	—	–	–	—	–
	20	310	**190**	160	–	—	–	–	—	–	–	—	–	–	—	–
N	21	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	22	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	23	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	24	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	25	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	26	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	27	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	28	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	29	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
	30	–	—	–	–	—	–	–	—	–	–	—	–	–	—	–
S	31	–	—	–	–	—	–	60	**50**	45	–	—	–	–	—	–
	32	–	—	–	–	—	–	50	**40**	35	–	—	–	–	—	–
	33	–	—	–	–	—	–	35	**25**	20	–	—	–	–	—	–
	34	–	—	–	–	—	–	30	**20**	15	–	—	–	–	—	–
	35	–	—	–	–	—	–	30	**20**	15	–	—	–	–	—	–
	36	–	—	–	–	—	–	80	**50**	40	–	—	–	–	—	–
	37	–	—	–	–	—	–	70	**45**	35	–	—	–	–	—	–
H	38.1	290	**240**	200	–	—	–	–	—	–	–	—	–	–	—	–
	38.2	240	**200**	160	–	—	–	–	—	–	–	—	–	–	—	–
	39.1	180	**150**	120	–	—	–	–	—	–	–	—	–	–	—	–
	39.2	120	**100**	70	–	—	–	–	—	–	–	—	–	–	—	–

*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

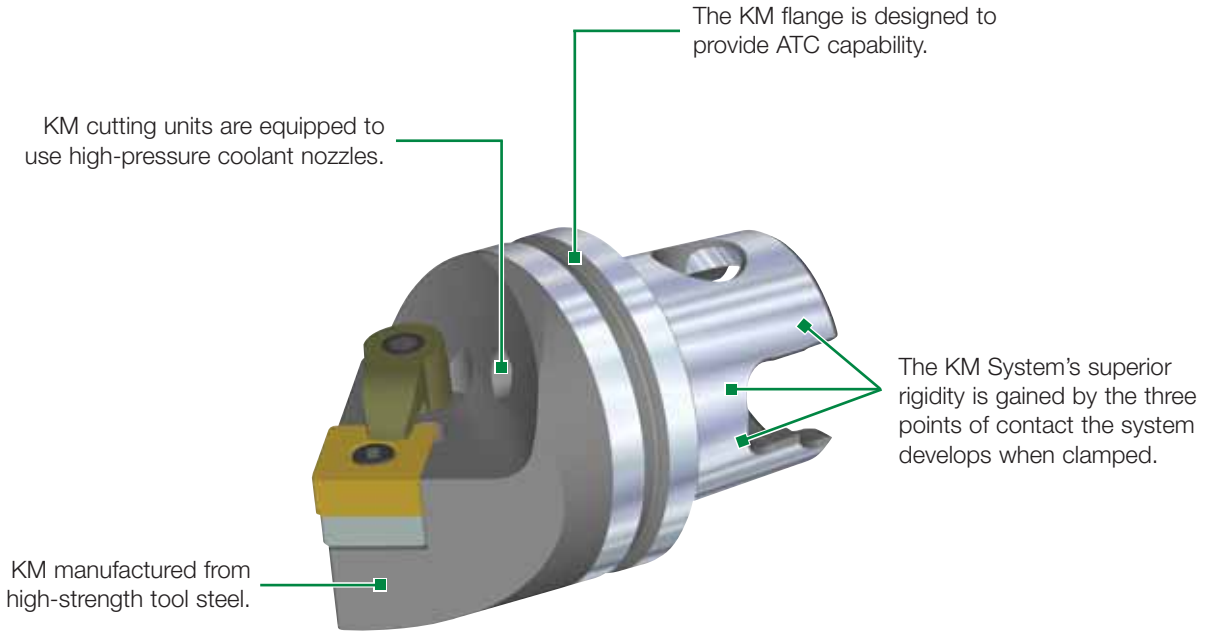


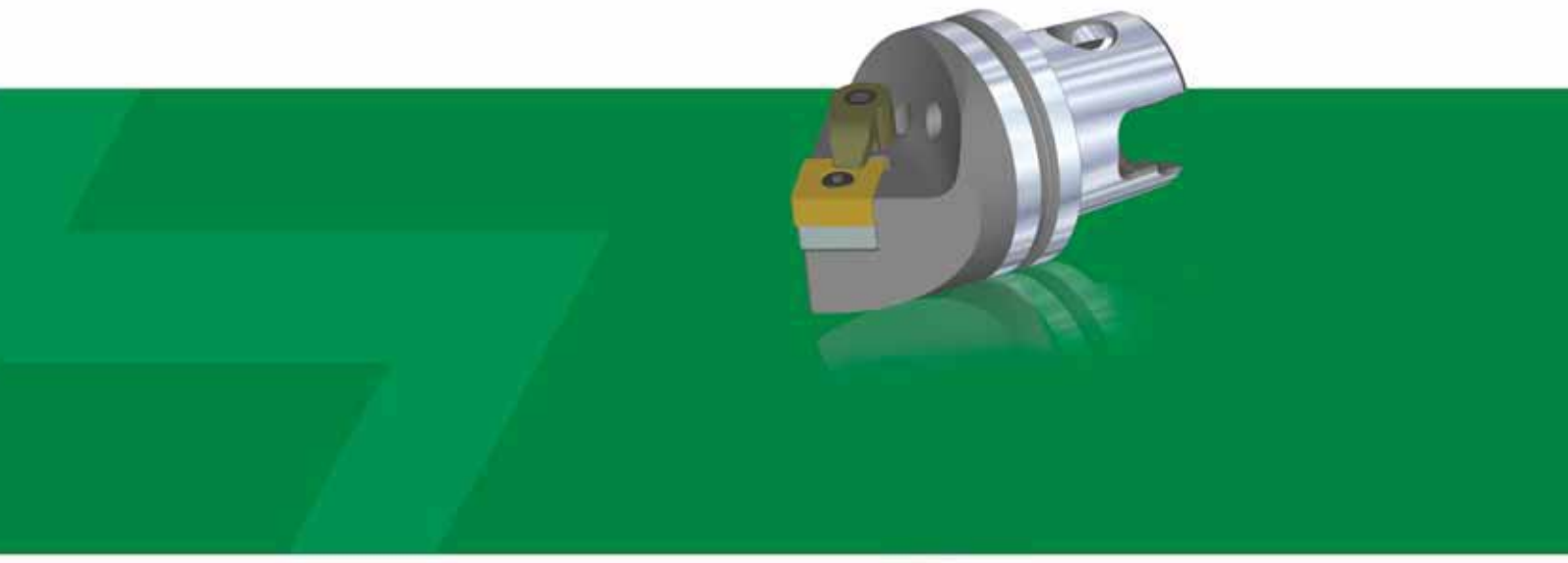
Tooling Systems

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.

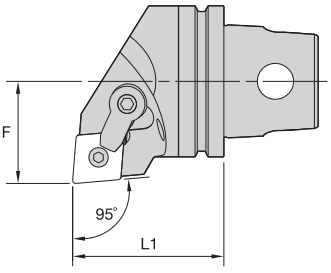
KM32TS

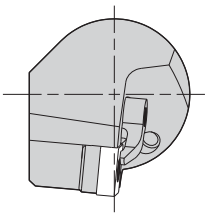


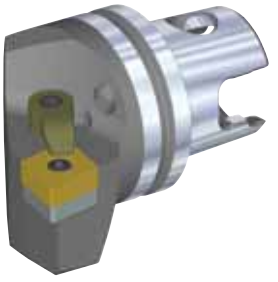


- KM™ is an ISO standard (ISO 26622).
- KM clamping units provide a 4:1 mechanical advantage.
- KM cutting units are capable of 100 bar (1,500 psi) coolant pressure.

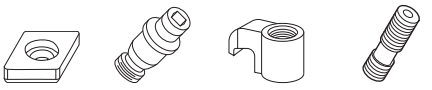
KM QUICK CHANGE





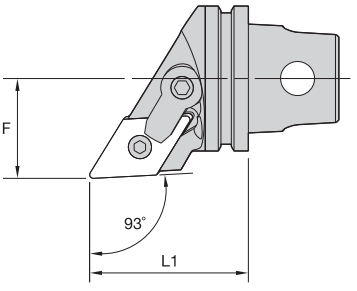


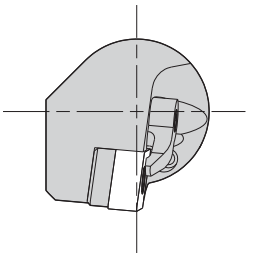
MCLN 95°



order number	catalogue 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

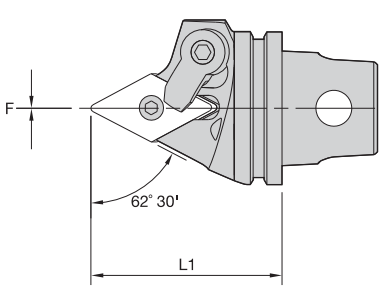
KM QUICK CHANGE

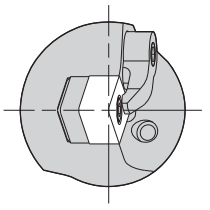


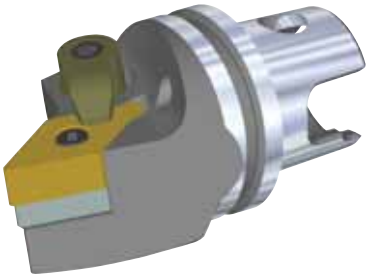


MDJN 93°

order number	catalogue 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

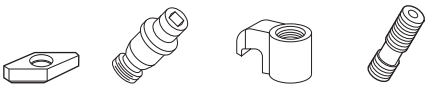




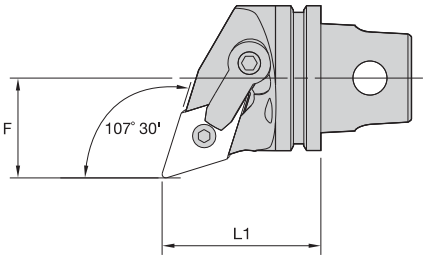


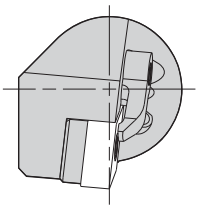
KM QUICK CHANGE

MDPN 62° 30'



order number	catalogue 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

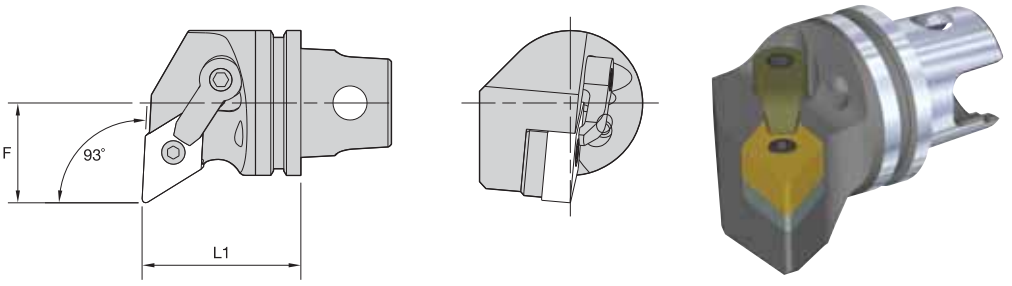




KM QUICK CHANGE

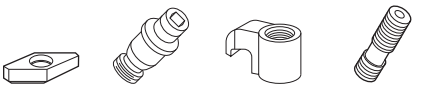
MDQN 107° 30'

order number	catalogue 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

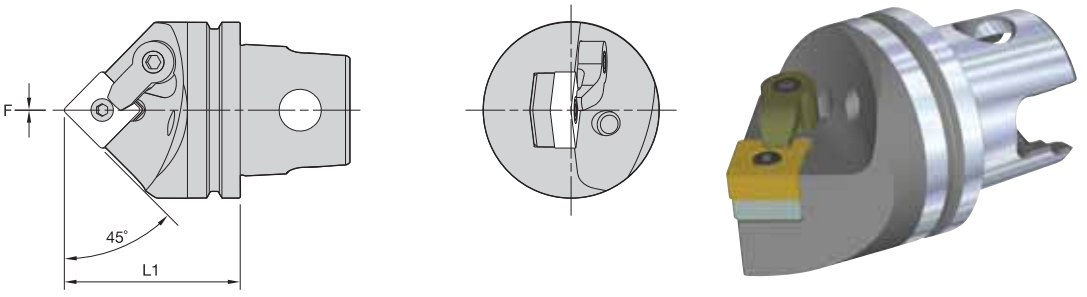


KM QUICK CHANGE

MDUN 93°

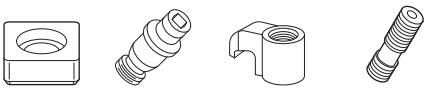


order number	catalogue number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw
	right hand									
1023274	KM32TSMDUNR1506	35	1.378	22	.866	DN..150608/DN..442	IDSN432	KLM46L	CKM23LP	STCM11
	left hand									
1023277	KM32TSMDUNL1506	35	1.378	22	.866	DN..150608/DN..442	IDSN432	KLM46L	CKM23LP	STCM11

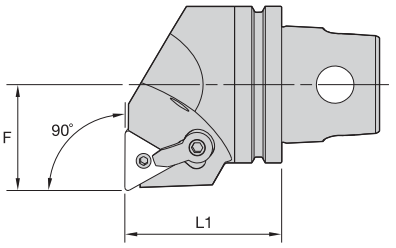


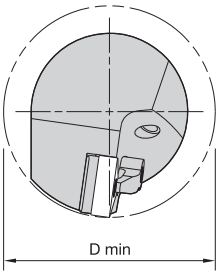
KM QUICK CHANGE

MSDN 45°



order number	catalogue 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

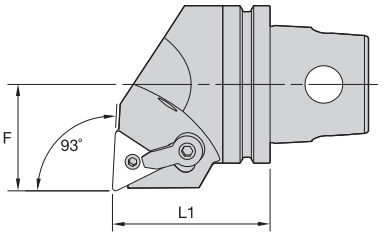


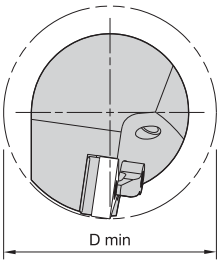


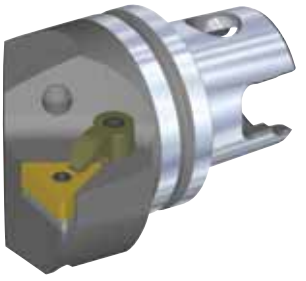
KM QUICK CHANGE

MTFN 90°

order number	catalogue 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

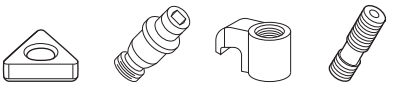






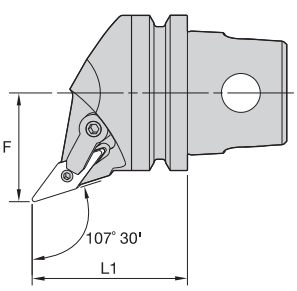
KM QUICK CHANGE

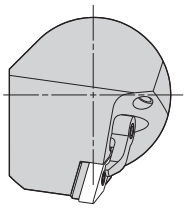
MTUN 93°



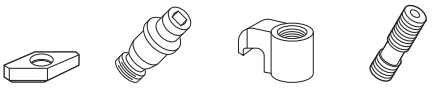
order number	catalogue number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lock pin	clamp	clamp screw
	right hand											
1144903	KM32TSMTUNR16	35	1.378	22	.866	44	1.732	TN..160408/TN..332	ITSN322	KLM34L	CKM7LP	STCM9

KM QUICK CHANGE



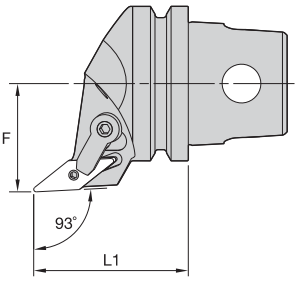


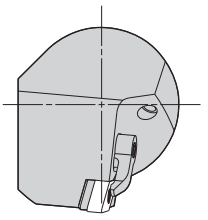
■ MVHN 107° 30'



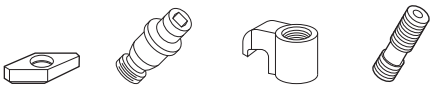
order number	catalogue number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw
	right hand									
1144909	KM32TSMVHNR16	35	1.378	22	.866	VN..160408/VN..332	IVSN322	KLM34L	CKM23LP	STCM11
	left hand									
1144910	KM32TSMVHNL16	35	1.378	22	.866	VN..160408/VN..332	IVSN322	KLM34L	CKM23LP	STCM11

KM QUICK CHANGE

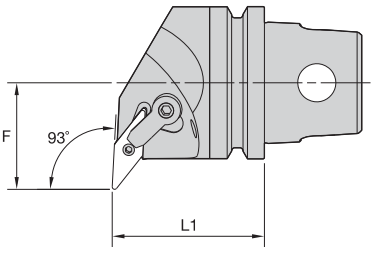


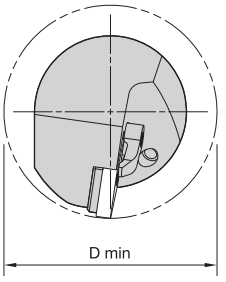


■ MVJN 93°



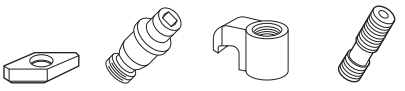
order number	catalogue number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw
	right hand									
1023280	KM32TSMVJNR16	40	1.575	22	.866	VN..160408/VN..332	IVSN322	KLM34L	CKM23LP	STCM11
	left hand									
1023283	KM32TSMVJNL16	40	1.575	22	.866	VN..160408/VN..332	IVSN322	KLM34L	CKM23LP	STCM11



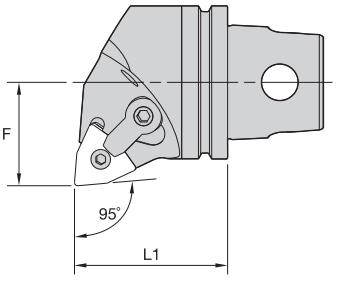


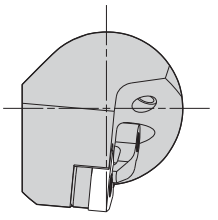
KM QUICK CHANGE

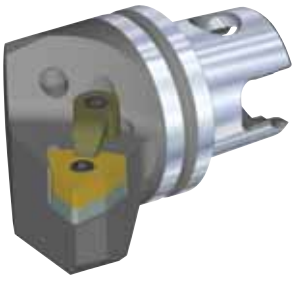
MVUN 93°



order number	catalogue 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

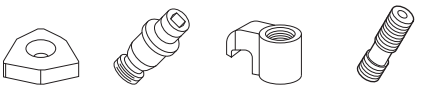






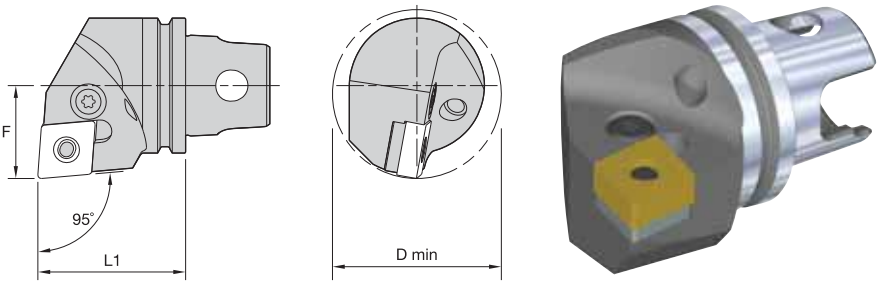
KM QUICK CHANGE

MWLN 95°

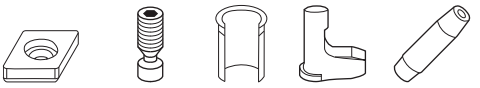


order number	catalogue number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw
	right hand									
1144914	KM32TSMWLNR08	35	1.378	22	.866	WN..080408/WN..432	IWSN433	KLM46	CKM20LP	STCM11
	left hand									
1144915	KM32TSMWLNL08	35	1.378	22	.866	WN..080408/WN..432	IWSN433	KLM46	CKM20LP	STCM11

KM QUICK CHANGE

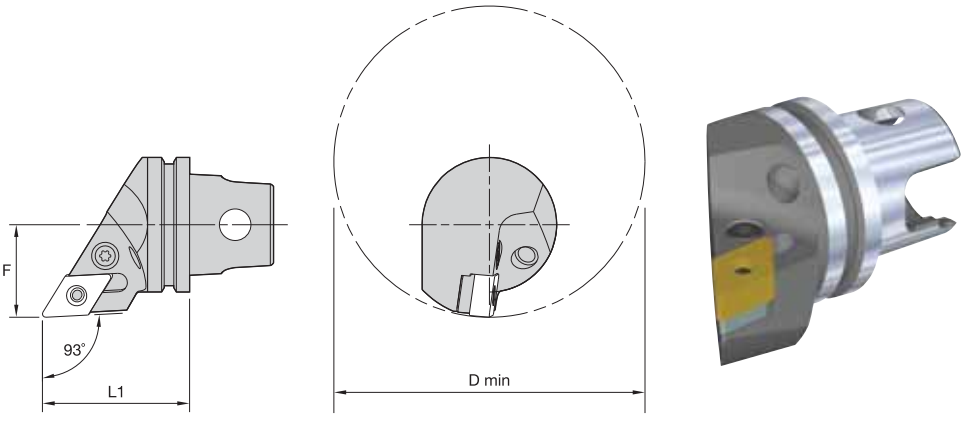


■ PCLN 95°

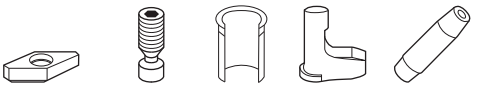


order number	catalogue number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lever screw	shim pin	toggle lever	punch
	right hand												
1624632	KM32TSPCLNR12	35	1.378	22	.866	40	1.575	CN..120408/CN..432	512.112	514.123	513.023	511.023	515.018
	left hand												
1135468	KM32TSPCLNL12	35	1.378	22	.866	40	1.575	CN..120408/CN..432	512.112	514.123	513.023	511.023	515.018

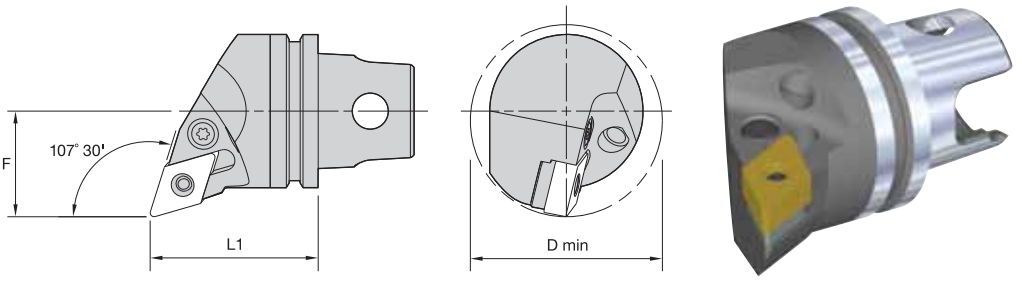
KM QUICK CHANGE



■ PDJN 93°

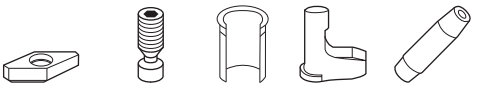


order number	catalogue number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lever screw	shim pin	toggle lever	punch
	right hand												
1232377	KM32TSPDJNR11	35	1.378	22	.866	74	2.913	DN..110408/DN..332	512.060	514.118	513.060	511.060	515.018
	left hand												
1232378	KM32TSPDJNL11	35	1.378	22	.866	74	2.913	DN..110408/DN..332	512.060	514.118	513.060	511.060	515.018

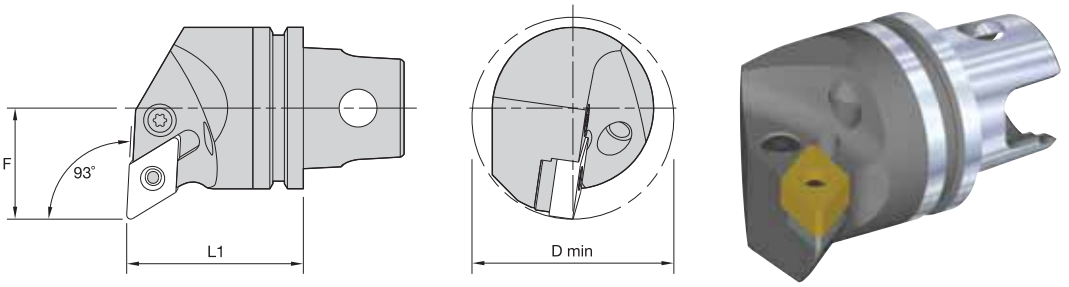


KM QUICK CHANGE

PDQN 107° 30'

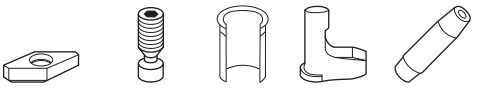


order number	catalogue number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lever screw	shim pin	toggle lever	punch
	right hand												
1671515	KM32TSPDQNR11	35	1.378	22	.866	44	1.732	DN..110408/DN..332	512.060	514.118	513.060	511.060	515.018



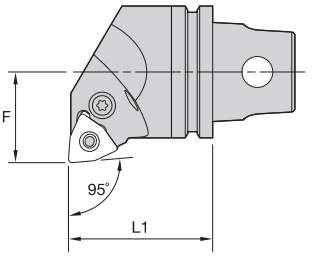
KM QUICK CHANGE

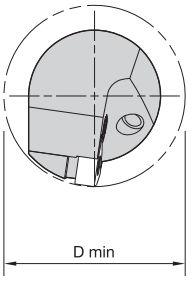
PDUN 93°



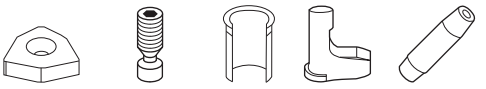
order number	catalogue number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lever screw	shim pin	toggle lever	punch
	right hand												
1232375	KM32TSPDUNR11	35	1.378	22	.866	40	1.575	DN..110408/DN..332	512.060	514.118	513.060	511.060	515.018
	left hand												
1232376	KM32TSPDUNL11	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



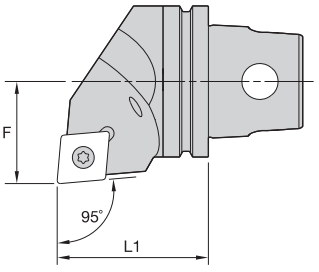


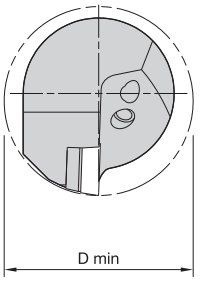
■ PWLN 95°



order number	catalogue 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

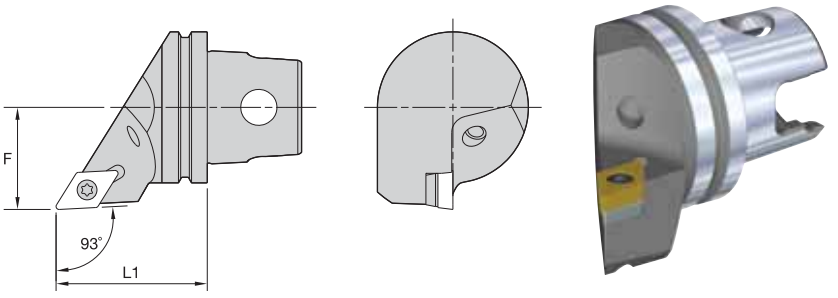
KM QUICK CHANGE





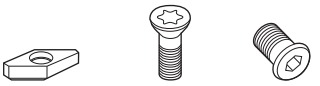
■ SCLC 95°

order number	catalogue 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

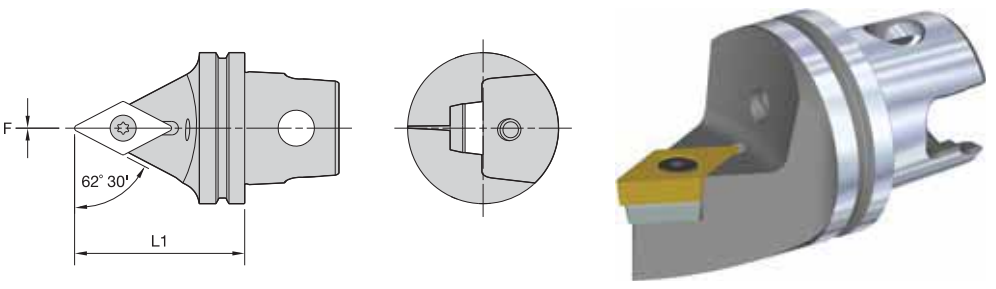


KM QUICK CHANGE

SDJC 93°

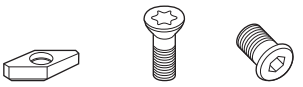


order number	catalogue number	L1 mm	L1 in	F mm	F in	gage insert	shim	insert screw	shim screw
	right hand								
1144422	**KM32TSSDJCR11**	35	1.378	22	.866	DC..11T308/DC..3252	**SKDP343**	**MS1156**	**SRS3**
	left hand								
1144427	**KM32TSSDJCL11**	35	1.378	22	.866	DC..11T308/DC..3252	**SKDP343**	**MS1156**	**SRS3**

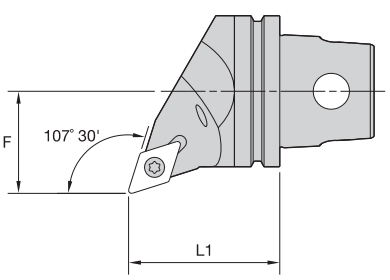


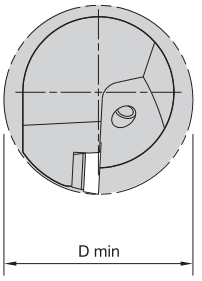
KM QUICK CHANGE

SDNC 62° 30'



order number	catalogue 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**

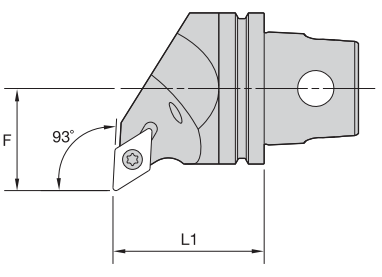


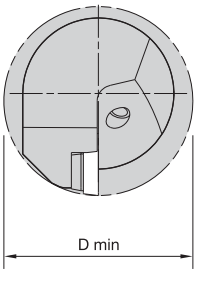


KM QUICK CHANGE

SDQC 107° 30'

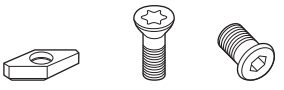
order number	catalogue number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	insert screw	shim screw
	right hand										
1144423	KM32TSSDQCR11	35	1.378	22	.866	44	1.732	DC..11T308/DC..3252	SKDP343	MS1156	SRS3
	left hand										
1144428	KM32TSSDQCL11	35	1.378	22	.866	44	1.732	DC..11T308/DC..3252	SKDP343	MS1156	SRS3



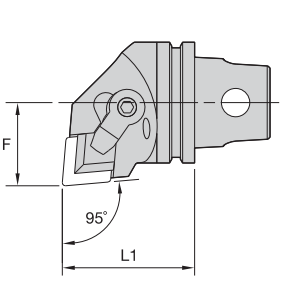


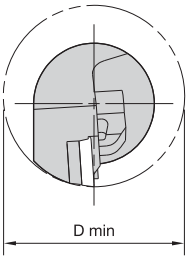
KM QUICK CHANGE

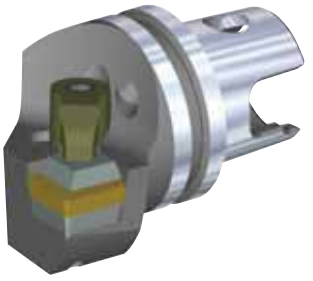
SDUC 93°



order number	catalogue 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





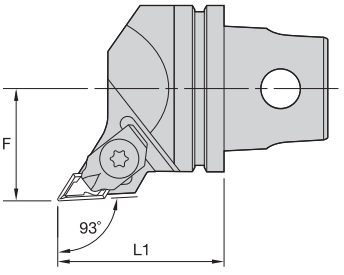


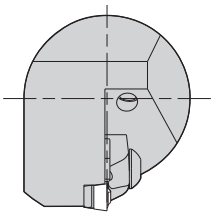
KM QUICK CHANGE

CCLP 95°

order number	catalogue 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

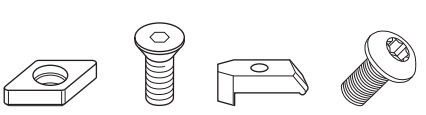
NOTE: Chipbreakers must be ordered separately. Chipbreaker catalogue number is CBD-16N.



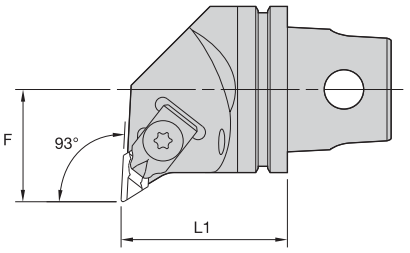


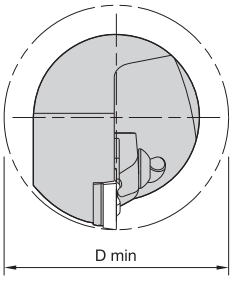
KM QUICK CHANGE

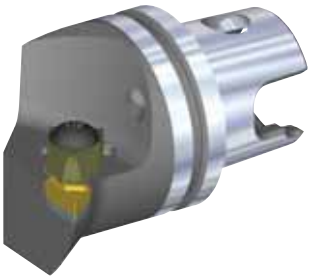
NKJC 93°



order number	catalogue 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

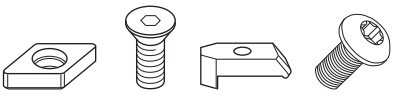




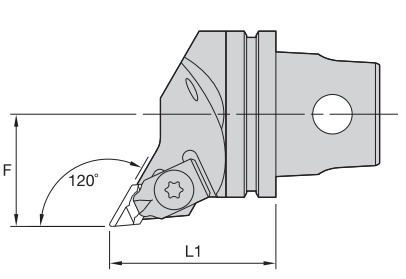


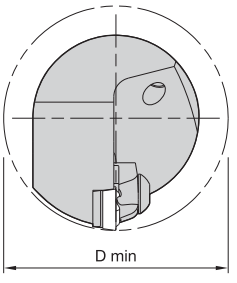
KM QUICK CHANGE

NKUC 93°



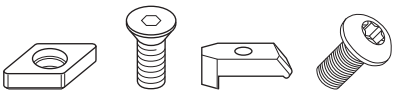
order number	catalogue number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	shim screw	clamp	clamp screw
	right hand											
1019509	KM32TSNKUCR11	35	1.378	22	.866	44	1.732	KC..110304L08/NP..51L	SM886	MS959	CM68	MS1220
	left hand											
1019566	KM32TSNKUCL11	35	1.378	22	.866	44	1.732	KC..110304R08/NP..51R	SM885	MS959	CM68	MS1220



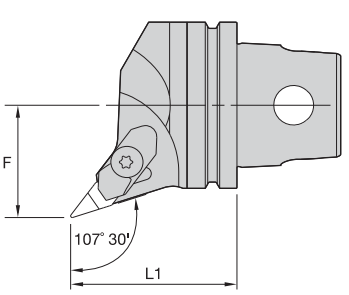


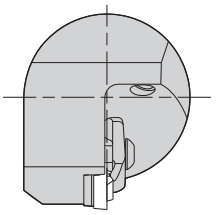
KM QUICK CHANGE

NKXC 120°



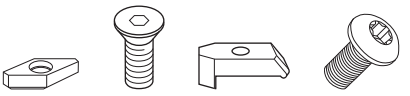
order number	catalogue number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	shim screw	clamp	clamp screw
	left hand											
1019567	KM32TSNKXCL11	35	1.378	22	.866	44	1.732	KC..110304R08/NP..51R	SM885	MS959	CM68	MS1220



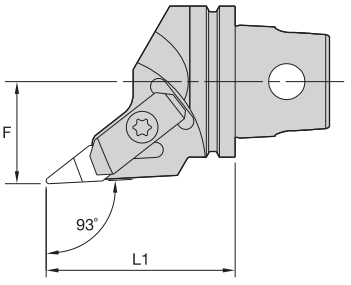


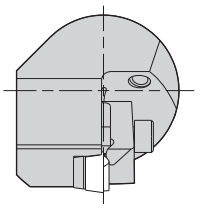
KM QUICK CHANGE

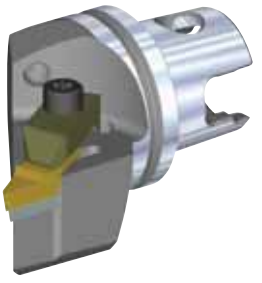
NVHB 107° 30'



order number	catalogue 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**

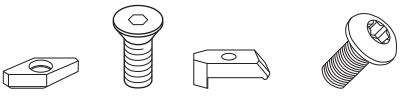




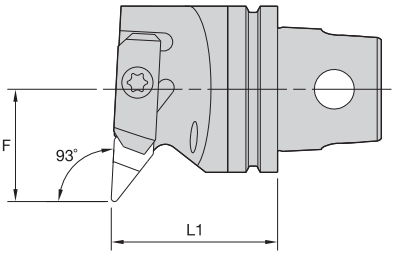


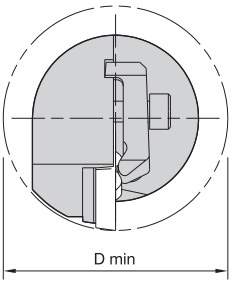
KM QUICK CHANGE

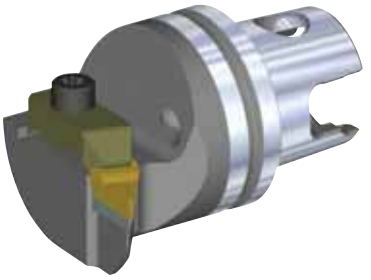
NVJC 93°



order number	catalogue 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**

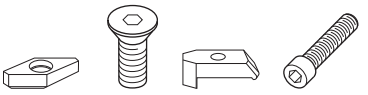




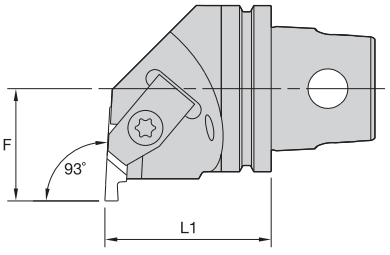


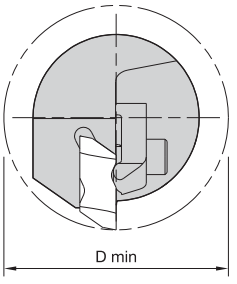
KM QUICK CHANGE

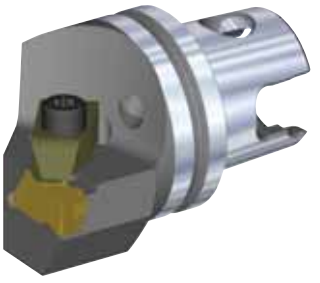
NVUC 93°



order number	catalogue 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**



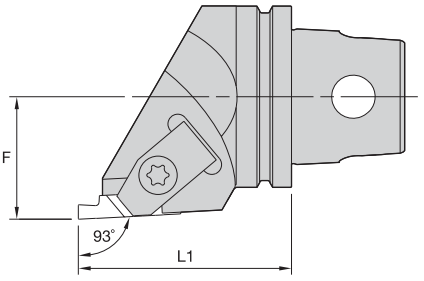


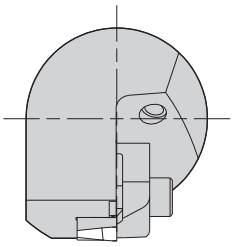


KM QUICK CHANGE

NE 93°

order number	catalogue 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**

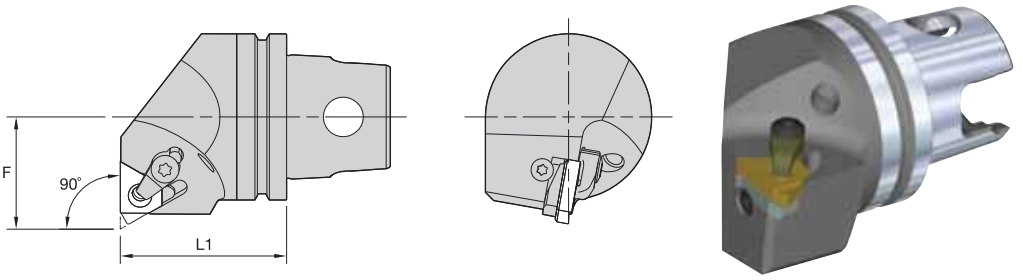




KM QUICK CHANGE

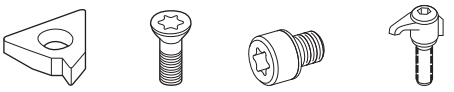
■ NS 90°

order number	catalogue 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**

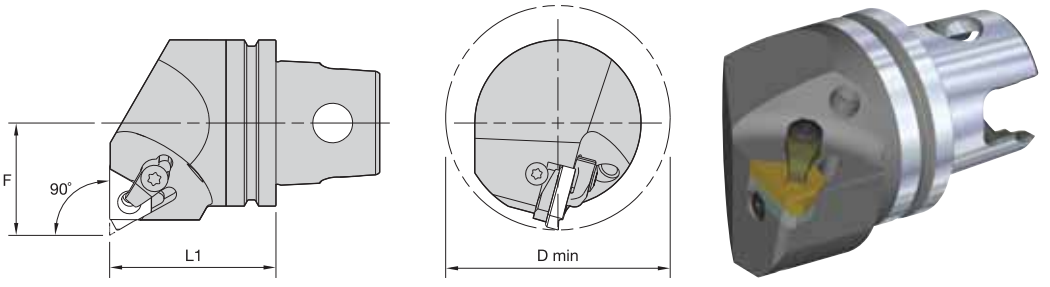


KM QUICK CHANGE

LSE-E 90° • External Only

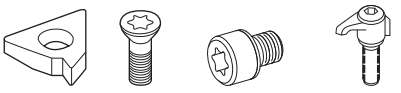


order number	catalogue number	L1 mm	L1 in	F mm	F in	gage insert	shim	insert screw	shim screw	clamp assembly
	left hand									
1144372	KM32TSLSEL16E	35	1.378	22	.866	LT16ER	SMYE3	SSA3T	SSY3T	CKC3



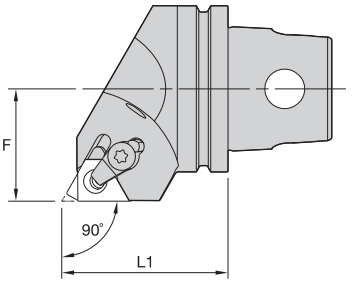
KM QUICK CHANGE

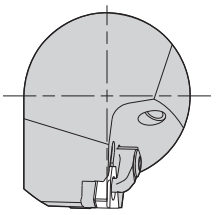
LSE-N 90° • Internal Only



order number	catalogue 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	catalogue 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**

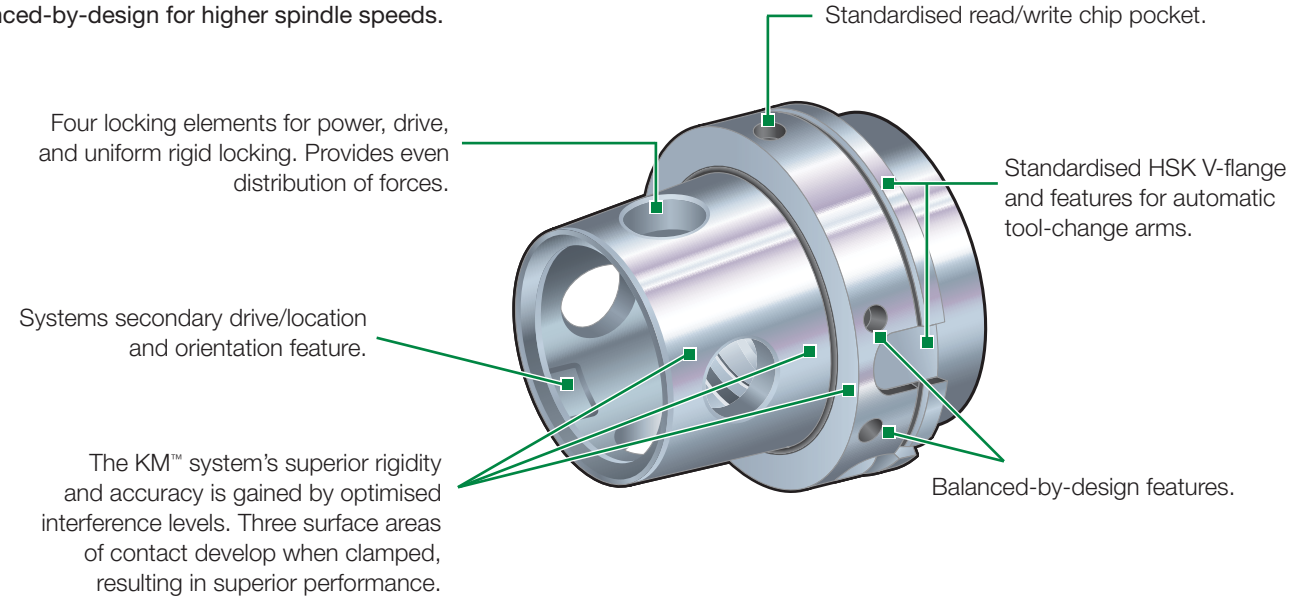
NOTE: Cutting units are supplied with insert screw and clamp assembly. However, tools are designed to use either the insert screw or the clamp assembly, not both.

KM4X™

The KM4X 4-ball spindle interface provides 3x more bending capacity than comparable systems. The greater bending capacity enables customers to fully utilise the capabilities of their machine and cutting tools when working with tough materials like titanium or during heavy machining. Increased metal removal rates optimise machine production and decrease overall manufacturing cost.

KM4X

- Heavy-duty, rigid configuration.
- 3x more bending capability.
- Increased metal removal rates.
- Full utilisation of machine tools.
- Decreased manufacturing costs.
- Balanced-by-design for higher spindle speeds.

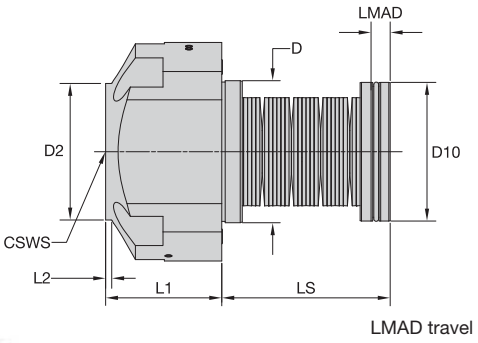


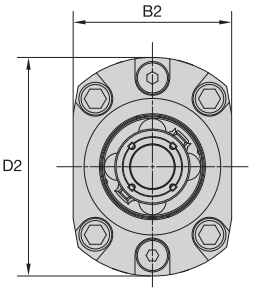
The Latest Innovation in Spindle Interface Technology

- 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 utilises face contact to create a rigid connection.





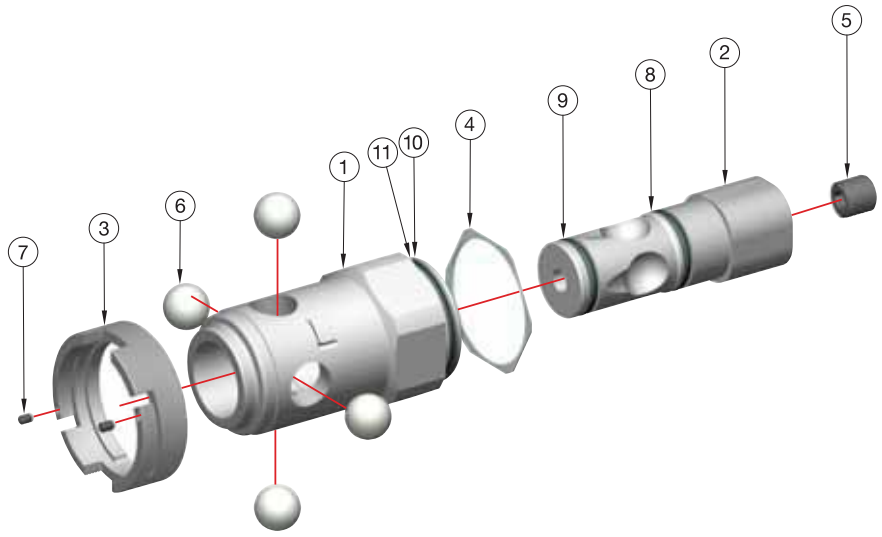
KM QUICK CHANGE

NACA

order number	catalogue number	CSWS system size	D	F	L1	LS	D2	LMAD travel
5326071	KM4X100NCADS85	KM4X100	104	0	85,0	123	100	13,00

Actuating Force

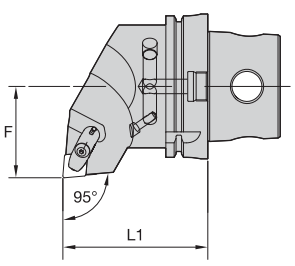
catalogue number	actuating force (kN)	actuating force (lbs)
KM4X100NCADS85	70	15700

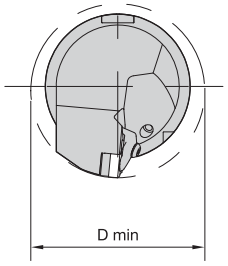


KM QUICK CHANGE

■ KIT

detail number	description	catalogue 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**

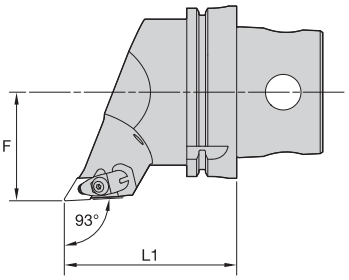


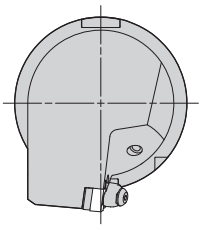


KM QUICK CHANGE

DCLN 95°

order number	catalogue 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

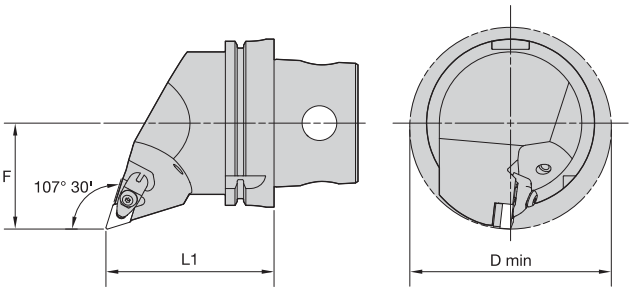




KM QUICK CHANGE

DDJN 93°

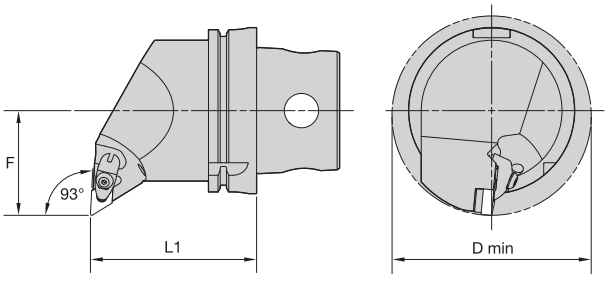
order number	catalogue number	L1 mm	L1 in	F mm	F in	gage insert	shim	shim screw	clamp assembly	pin	kg	lbs
	right hand											
5345310	**KM4X100DDJNR15KC06**	100	3.937	63	2.480	DN..150608/DN..442	**IDSN433**	**KMSP415IP**	**CM234R ASSY**	**SSP025016M**	4,19	9.24
	left hand											
5345269	**KM4X100DDJNL15KC06**	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	catalogue 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

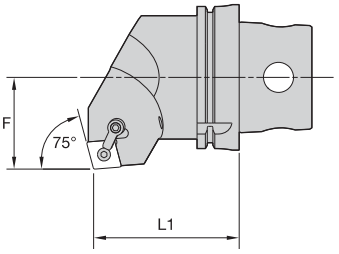


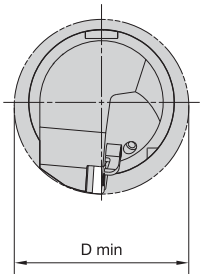
KM QUICK CHANGE

DDUN 93°

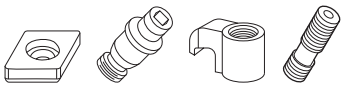
order number	catalogue number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	shim screw	clamp assembly	pin	kg	lbs
	right hand													
5345315	KM4X100DDUNR15KC06	100	3.937	63	2.480	120	4.72	DN..150608/DN..442	IDSN433	KMSP415IP	CM234R ASSY	SSP025016M	4,56	10.05
	left hand													
5345314	KM4X100DDUNL15KC06	100	3.937	63	2.480	120	4.72	DN..150608/DN..442	IDSN433	KMSP415IP	CM234R ASSY	SSP025016M	4,56	10.05

KM QUICK CHANGE



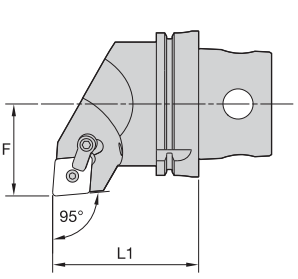


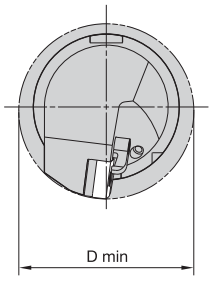
MCKN 75°



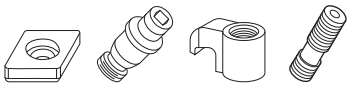
order number	catalogue number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
	right hand													
5337807	KM4X100MCKNR19	100	3.937	63	2.480	120	4.724	CN..190612/CN..643	ICSN633	KLM68	CKM12	STCM4	4,80	10.58
	left hand													
5337806	KM4X100MCKNL19	100	3.937	63	2.480	120	4.724	CN..190612/CN..643	ICSN633	KLM68	CKM12	STCM4	4,87	10.74

KM QUICK CHANGE



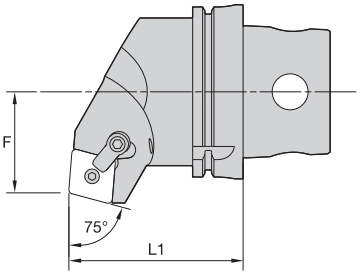


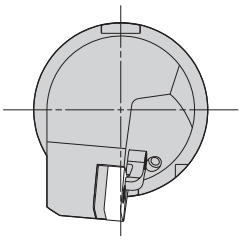
MCLN 95°



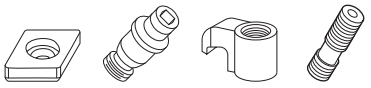
order number	catalogue number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
	right hand													
5337810	KM4X100MCLNR19	100	3.937	63	2.480	120	4.724	CN..190612/CN..643	ICSN633	KLM68	CKM12	STCM4	4,45	9.82
5337811	KM4X100MCLNR25	100	3.937	63	2.480	120	4.724	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



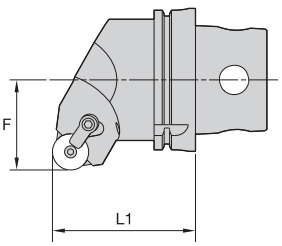


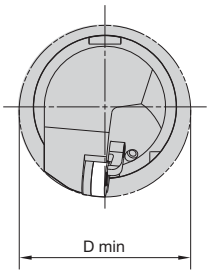
MCRN 75°



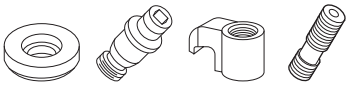
order number	catalogue number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
	right hand											
5337814	KM4X100MCRNR19	100	3.937	58	2.283	CN..190612/CN..643	ICSN633	KLM68	CKM12	STCM4	4,47	9.86
5337815	KM4X100MCRNR25	100	3.937	58	2.283	CN..250924/CN..866	ICSN846	KLM810	CKM24	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



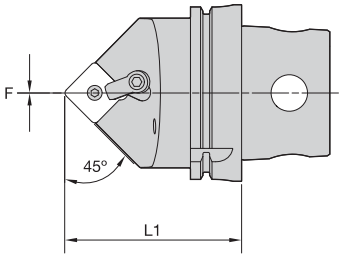


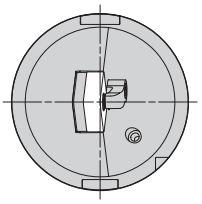
MRGN 0°



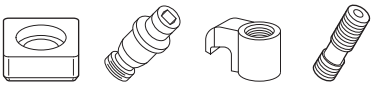
order number	catalogue number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
	right hand													
5337734	KM4X100MRGNR12	100	3.937	63	2.480	120	4.724	RN..120400/RN..43	IRSN43	KLM46	CKM9	STCM4	1,52	9.97
5337735	KM4X100MRGNR19	100	3.937	63	2.480	120	4.724	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



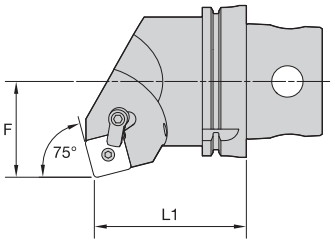


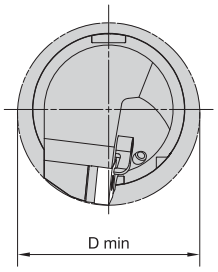
■ MSDN 45°



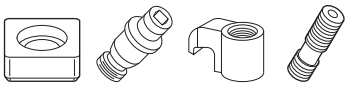
order number	catalogue number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
5337697	**KM4X100MSDNN19**	100	3.937	0	.000	SN..190612/SN..643	**ISSN633**	**KLM68**	**CKM12**	**STCM4**	3,97	8.76
5337698	**KM4X100MSDNN25**	100	3.937	0	.000	SN..250924/SN..856	**ISSN846**	**KLM810**	**CKM24**	**STCM19**	3,97	8.76

KM QUICK CHANGE

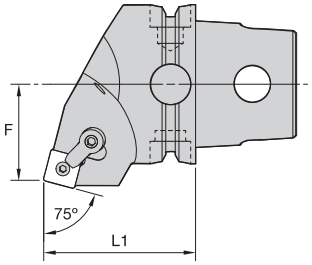


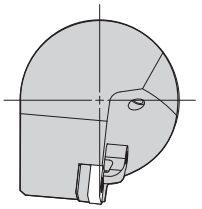


MSKN 75°



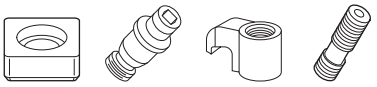
order number	catalogue number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
	right hand													
5337711	KM4X100MSKNR19	100	3.937	63	2.480	120	4.724	SN..190612/SN..643	ISSN633	KLM68	CKM12	STCM4	4,59	10.12
5337712	KM4X100MSKNR25	100	3.937	63	2.480	120	4.724	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



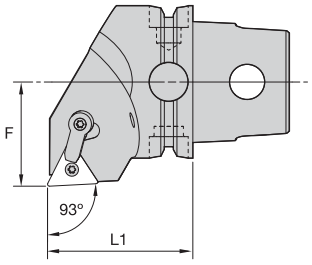


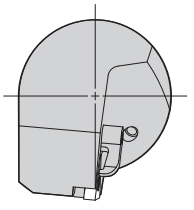
KM QUICK CHANGE

MSRN 75°



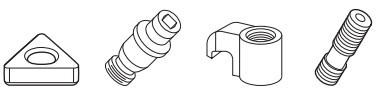
order number	catalogue number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
	right hand											
2265296	KM63TSMSRNR12	60	2.362	38	1.496	SN..120408/SN..432	ISSN432	KLM46	CKM20	STCM11	1,18	2.61
2265298	KM63TSMSRNR19	60	2.362	38	1.496	SN..190612/SN..643	ISSN633	KLM68	CKM13	STCM8	1,15	2.53
	left hand											
2265297	KM63TSMSRNL12	60	2.362	38	1.496	SN..120408/SN..432	ISSN432	KLM46	CKM20	STCM11	1,19	2.61
2265299	KM63TSMSRNL19	60	2.362	38	1.496	SN..190612/SN..643	ISSN633	KLM68	CKM13	STCM8	1,15	2.53





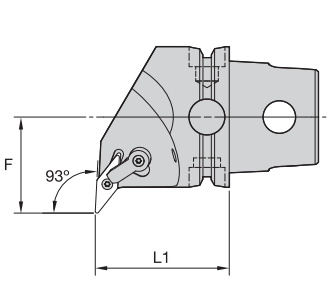
KM QUICK CHANGE

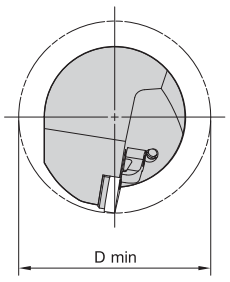
MTJN 93°

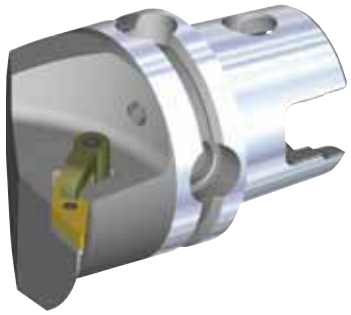


order number	catalogue number	L1 mm	L1 in	F mm	F in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
	right hand											
2265306	KM63TSMTJNR22	60	2.362	43	1.693	TN..220408/TN..432	ITSN433	KLM46	CKM23	STCM11	1,23	2.72
	left hand											
2265307	KM63TSMTJNL22	60	2.362	43	1.693	TN..220408/TN..432	ITSN433	KLM46	CKM23	STCM11	1,23	2.72

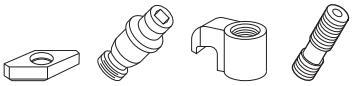
KM QUICK CHANGE





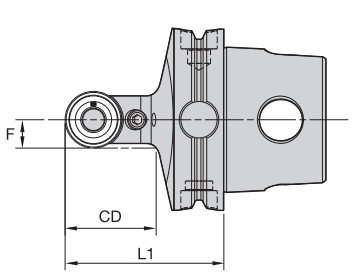


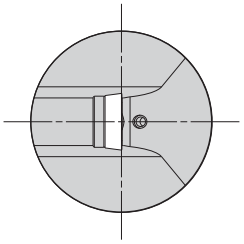
MVUN 93°

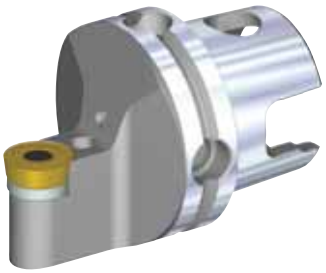


order number	catalogue number	L1 mm	L1 in	F mm	F in	D min mm	D min in	gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
	right hand													
2265314	KM63TSMVUNR16	60	2.362	43	1.693	86	3.386	VN..160408/VN..332	IVSN322	KLM34L	CKM23	STCM11	1,17	2.58
	left hand													
2265315	KM63TSMVUNL16	60	2.362	43	1.693	86	3.386	VN..160408/VN..332	IVSN322	KLM34L	CKM23	STCM11	1,17	2.59

KM QUICK CHANGE



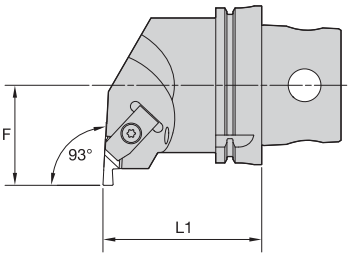


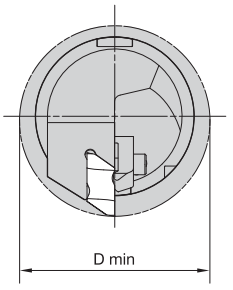


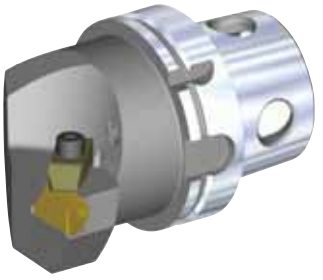
PRDCN

order number	catalogue 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	catalogue 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.

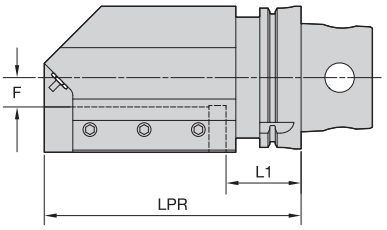
Designed for both manual and automatic tool changing, ERICKSON interfaces are ideally suited for most machine tools and feature a compact and rigid construction guaranteed to handle high torque and deliver optimal metal removal rates.

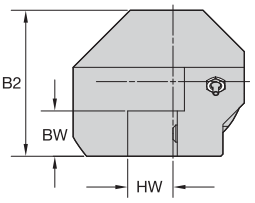
To learn more about our innovations, contact your local Authorised Distributor or visit **www.widia.com**.

ERICKSON™

KM QUICK CHANGE

STA • Metric

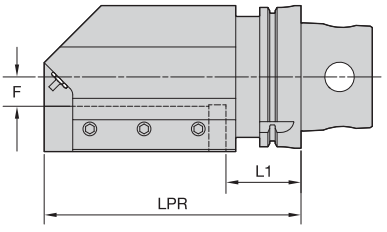


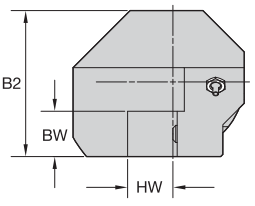


order number	catalogue number	B2	BW	F	HW	L1	LPR	nozzle	kg
	right hand								
5337782	KM4X100STAR20	102	32	21	32	53	180	PMT04526	12,09
5337783	KM4X100STAR24	102	38	14	38	53	180	PMT04526	11,61
5337784	KM4X100STAR2525M	102	25	27	25	55	180	PMT04526	12,52
5337785	KM4X100STAR3232M	102	32	20	32	55	180	PMT04526	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

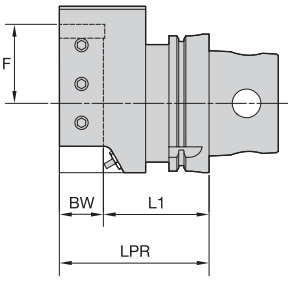
KM QUICK CHANGE

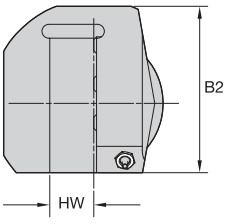
STA • Inch

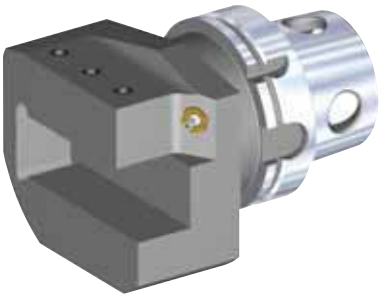




order number	catalogue number	B2	BW	F	HW	L1	LPR	nozzle	lbs
	right hand								
5337782	KM4X100STAR20	4.028	1.250	.809	1.250	2.071	7.087	PMT04526	26.66
5337783	KM4X100STAR24	4.028	1.500	.559	1.500	2.071	7.087	PMT04526	25.60
5337784	KM4X100STAR2525M	4.028	.984	1.075	.984	2.165	7.087	PMT04526	27.60
5337785	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





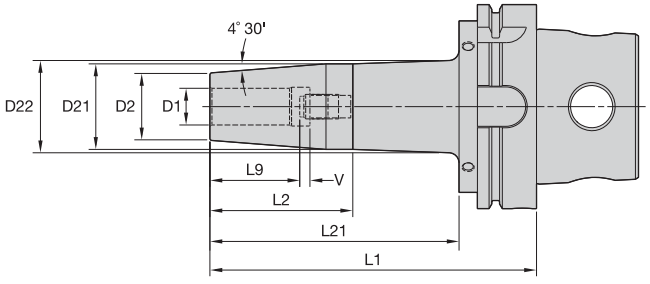


KM QUICK CHANGE

■ ETA • Inch

order number	catalogue 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)

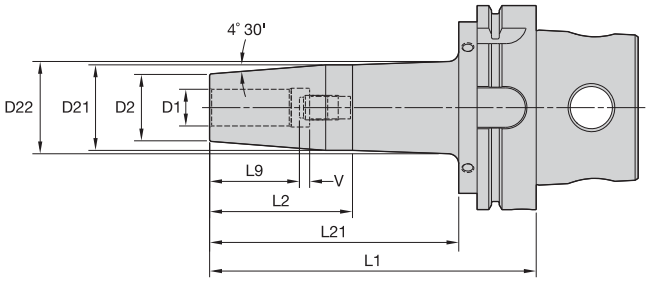
cutting tool shank diameter	tolerance	
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013
32, 40, & 50	h6	0,000/-0,016

■ TT GP HPV MM-KM4X • Metric

order number	catalogue 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)

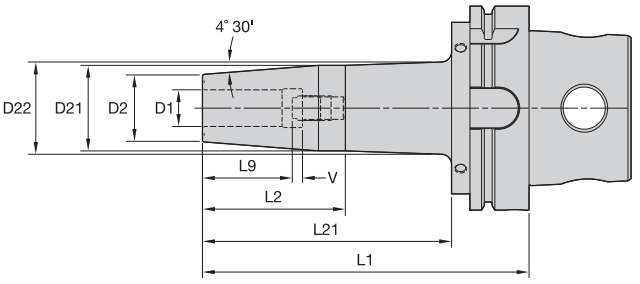
cutting tool shank diameter	tolerance
1/4, 5/16, & 3/8	-.0001/-.0004
7/16, 1/2, 9/16, 5/8, & 11/16	.0000/-.0004
3/4, 7/8, 1, 1-1/4, 1-1/2, & 2	.0000/-.0005

TT GP HPV IN-KM4X • Inch

order number	catalogue 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	catalogue 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)

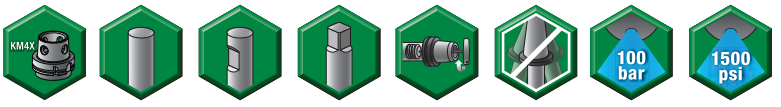
Cutting Tool Shank Requirements inch (industry standard)	
cutting tool shank diameter	tolerance
1/2 & 5/8	.0000/-.0004
3/4, 7/8, 1, 1-1/4, & 1-1/2	.0000/-.0005

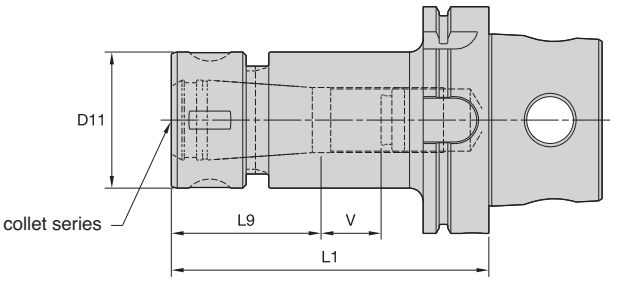
TT HT HPV IN-KM4X • Inch

order number	catalogue 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

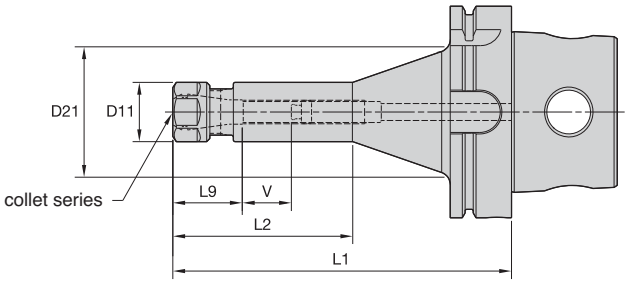
TG Round-KM4X

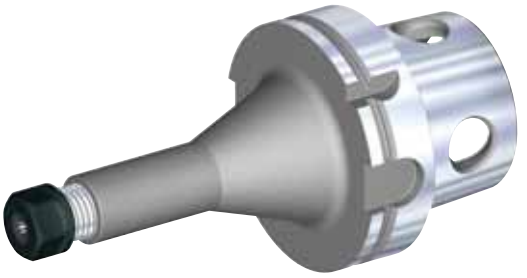


order number	catalogue number	collet series	D11	L1	L9	V	locknut	locknut wrench	Nm	stop screw	wrench size stop screw
4156445	**KM4X100TG050105M**	TG50	38	105	42	40	**LNA050M**	**HSW34M**	68	**SS056041G**	4mm & 5/32
4156446	**KM4X100TG050160M**	TG50	38	160	42	58	**LNA050M**	**HSW34M**	68	**SS056041G**	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).



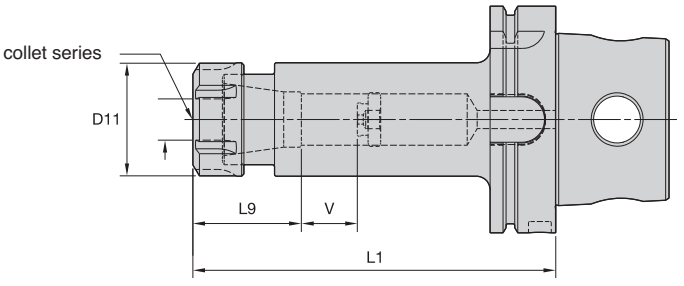


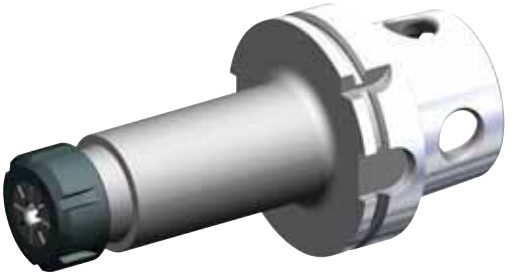
ER collet series	Collet Capacity mm min	mm max	inch min	inch max
ER16	0,5	10,0	.02	.41
ER20	0,5	13,0	.02	.50
ER25	1,0	16,0	.04	.63
ER32	2,0	20,0	.08	.81
ER40	3,0	26,0	.12	1.00

KM™

ER Hex-KM4X

order number	catalogue 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

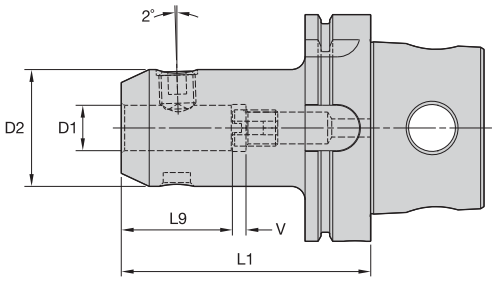


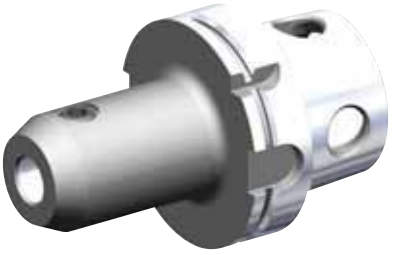


ER Round-KM4X

order number	catalogue 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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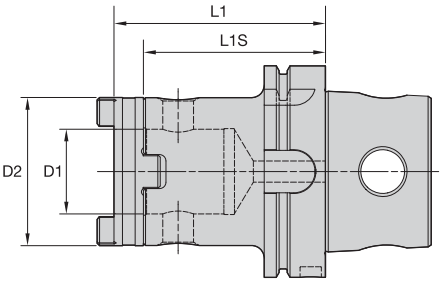
■ WN MM-KM4X • Metric

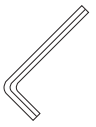
order number	catalogue number	D1	D2	L1	L9	V	clamp screw	wrench size clamp screw	Nm	stop screw	wrench size stop screw
4160047	**KM4X100WN06090M**	6	24,5	90	30	10	**SS03M012**	3mm	7	**571.060**	2,5mm
4160048	**KM4X100WN08090M**	8	27,5	90	30	10	**SS03M014**	4mm	15	**571.067**	3mm
4160049	**KM4X100WN10090M**	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.



KM

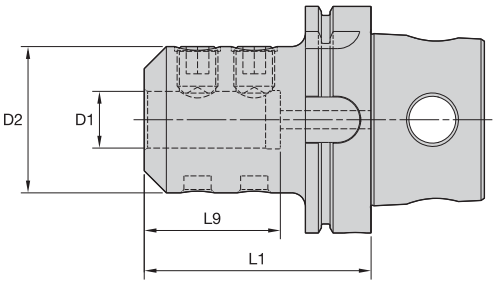
HTS-KM4X

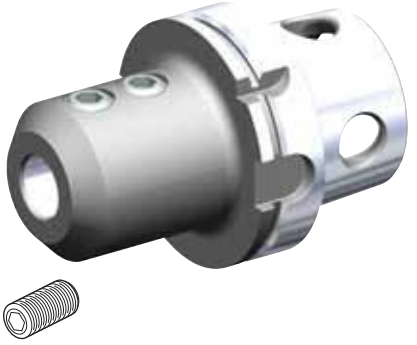


order number	catalogue number	D1	D2	L1	L1S	clamp screw	hex wrench	drive ring	ft. lbs.	kg
4159439	**KM4X100HTS40085M**	40	70	99	85	**191.728**	**170.008**	**192.424**	26	3.80
4159440	**KM4X100HTS50090M**	50	80	106	90	**191.728**	**170.008**	**192.425**	26	4.27

NOTE: Shipped with drive ring and clamping screw.
Assemble components using recommended torque values.

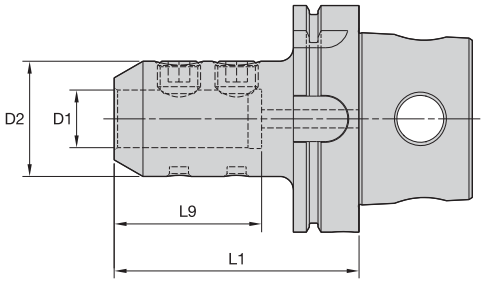
EM MM-KM4X • Metric

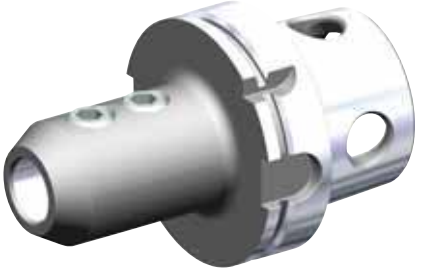




order number	catalogue number	D1	D2	L1	L9	clamp screw	wrench size clamp screw	Nm
4160510	KM4X100EM06080M	6	24,5	80	52	SS03M012	3mm	7
4160511	KM4X100EM08080M	8	27,5	80	52	SS03M014	4mm	15
4160512	KM4X100EM10080M	10	34,5	80	52	SS03M018	5mm	25
4160533	KM4X100EM12080M	12	41,5	80	49	SS03M023	6mm	35
4160534	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

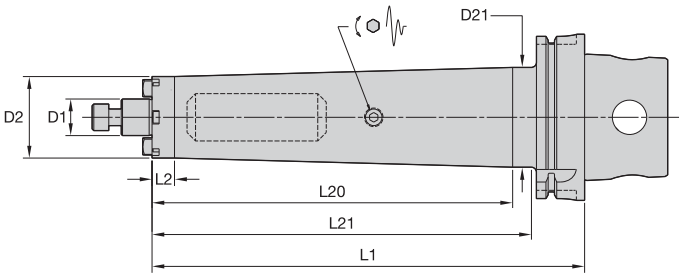
EM IN-KM4X • Inch





order number	catalogue 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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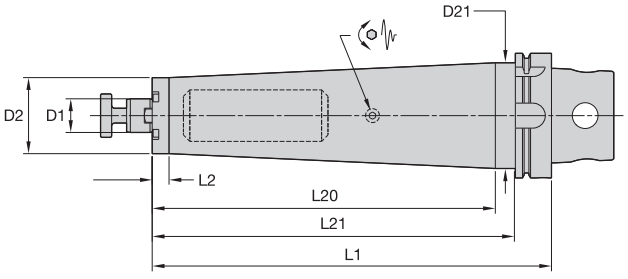
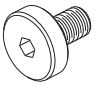
SMC TD CAP MM-KM4X • Metric

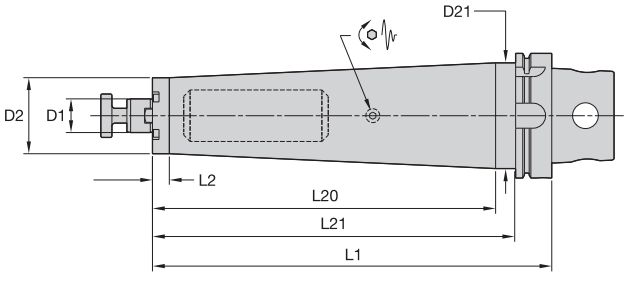
order number	catalogue number	D1	D2	D21	L1	L2	L20	L21	lock screw	wrench size lock screw
4169583	KM4X100TDSMC22260M	22	49	65	260	13,5	215	231	MS-1234	8mm



SMC TD Lock MM-KM4X • Metric



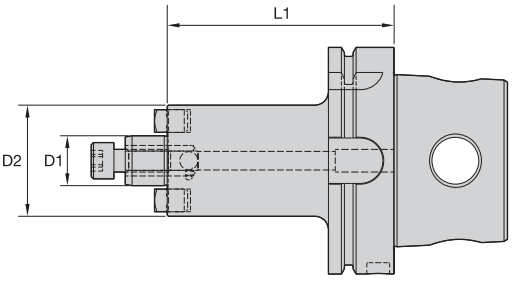
order number	catalogue number	D1	D2	D21	L1	L2	L20	L21	lock screw	wrench size lock screw
4169584	KM4X100TDSMC27320M	27	61	85	320	13,5	275	291	KLSS27M	10mm
4169585	KM4X100TDSMC32330M	32	78	—	330	299	—	—	KLSS32M	14mm



SMC TD Lock IN-KM4X • Inch

order number	catalogue 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

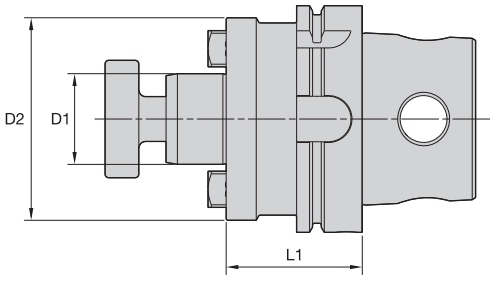
NOTE: Do not overtighten lock screw; use torque recommendations above.
Supplied with lock screw and drive keys.
Lock screw wrench not included.

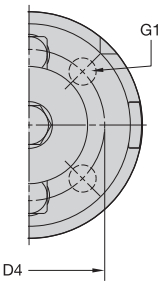


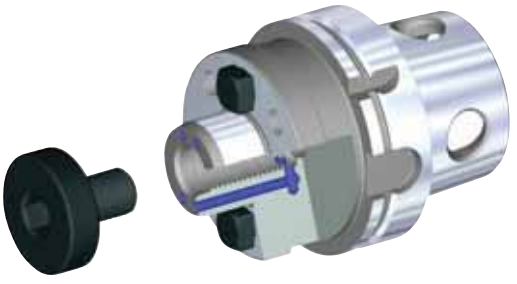
KM

SMC CAP MM-KM4X • Metric

order number	catalogue 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

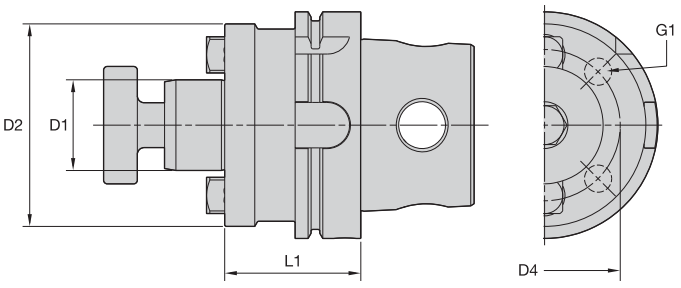


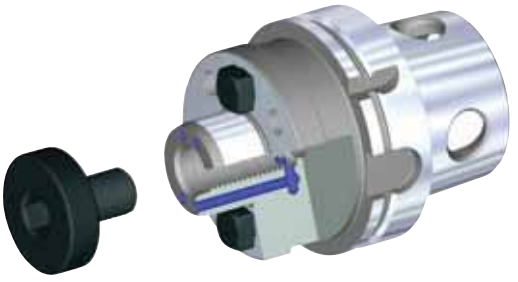


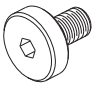


SMC Lock MM-KM4X • Metric

order number	catalogue 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	–	–



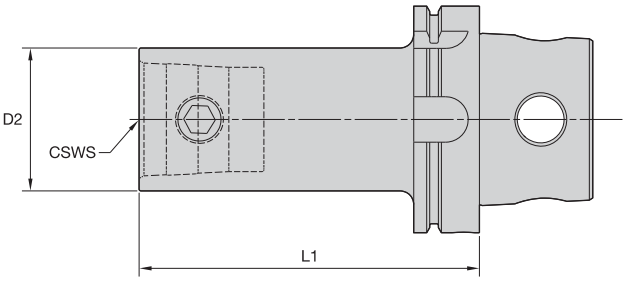




SMC Lock IN-KM4X • Inch

order number	catalogue 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.



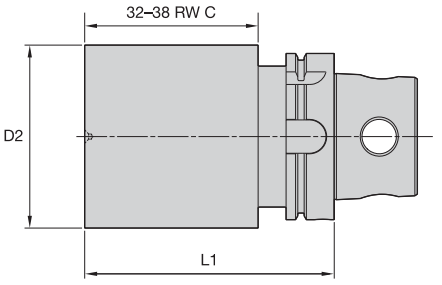
KM

KM-KM4X

order number	catalogue 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.

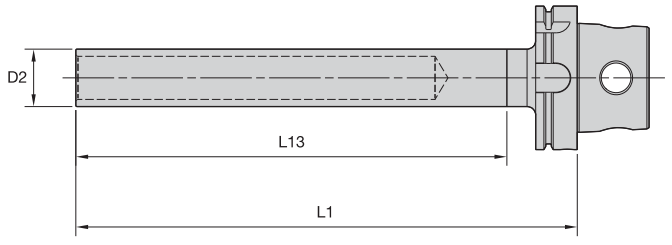


KM

BB-KM4X

order number	catalogue 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	catalogue 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, specialised network of Authorised 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 Authorised Distributor or visit **www.widia.com**.

WIDIA™

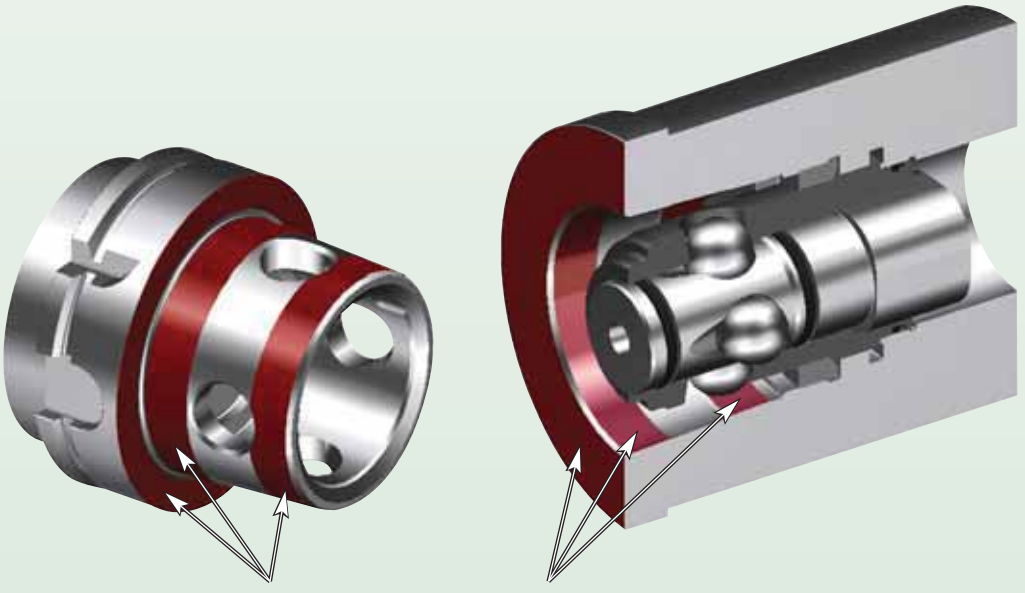
KM4X™ — The Next Generation Spindle Connection System

As a global tooling supplier and a true customer support partner, we recognise 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.



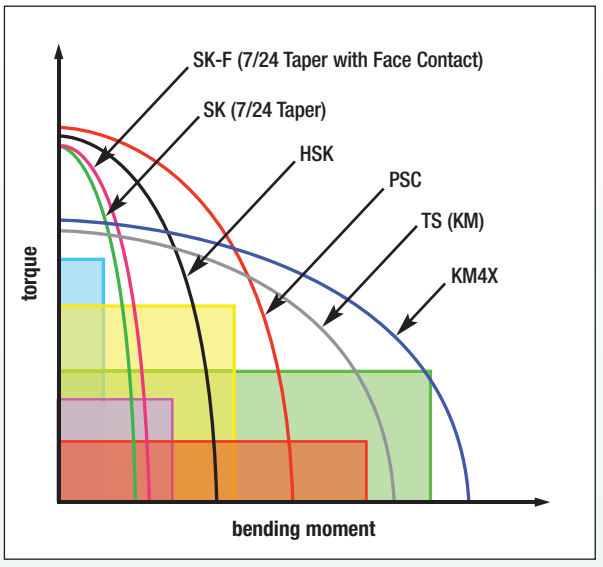
**KM4X three-surface contact for improved stability and accuracy.
Optimised clamping force distribution and interference fit provides higher stiffness.**

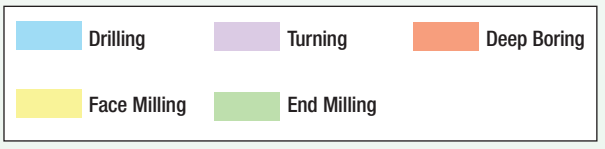
Why Bending Load Capacity Is Important

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.

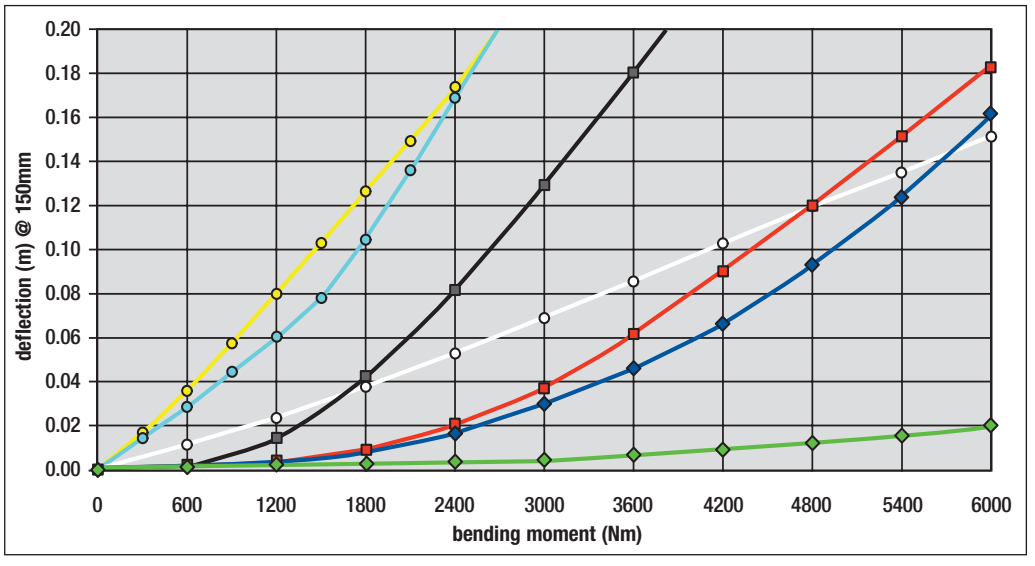
The lines on the chart to the right represent the load capacity of HSK, PSC, and KM4X. The shaded areas represent the typical requirements for heavy-duty applications in various machining processes. KM4X is the only system that can deliver the torque and bending capacity required for achieving high-performance 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.

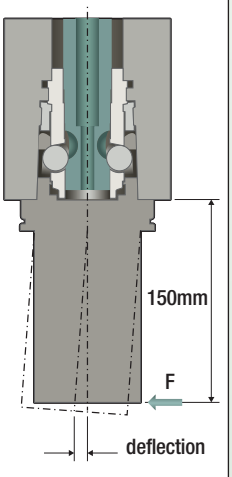


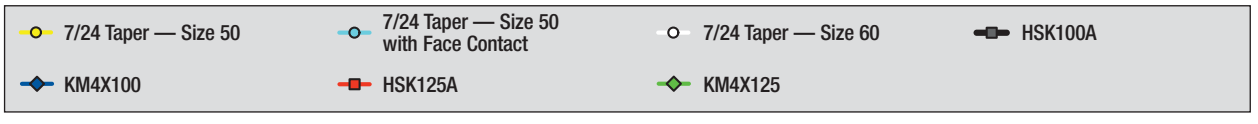


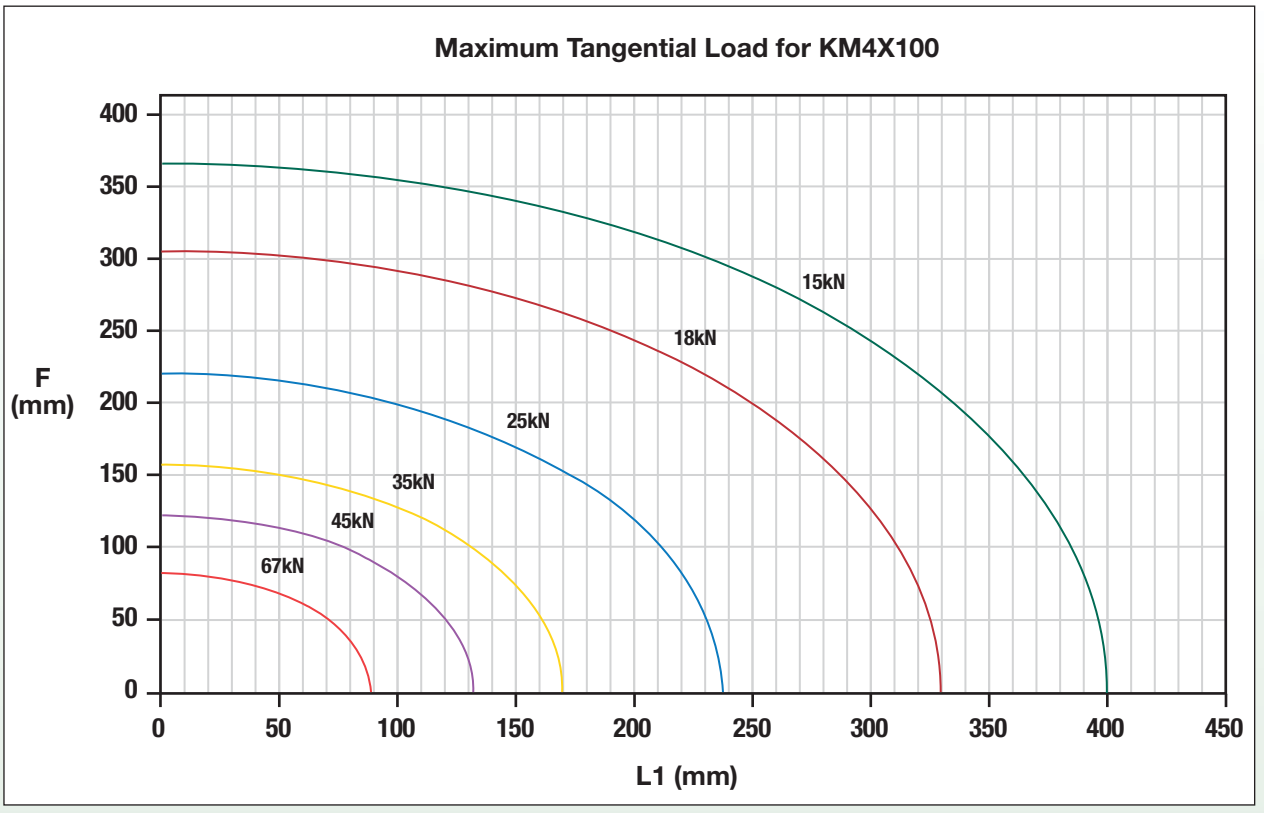
IMPORTANT
Information shown on the following charts was developed exclusively for use with KM™ tooling in static conditions. Do not use for any other tooling system because the results will not apply. To account for cutting force fluctuations in dynamic conditions, a reduction of 20–30% should be applied to the loads shown in charts.

Chart shows load-deflection comparison of steep taper with and without face contact — HSK and KM4X.









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 pullout 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 12mm (1/2") 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 programme after regrinding.

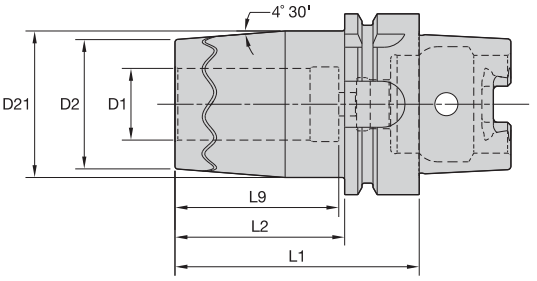
Example for Highest Metal Removal Rates

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.



ERICKSON

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

TT SF MM-HSK Form A

order number	catalogue 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)

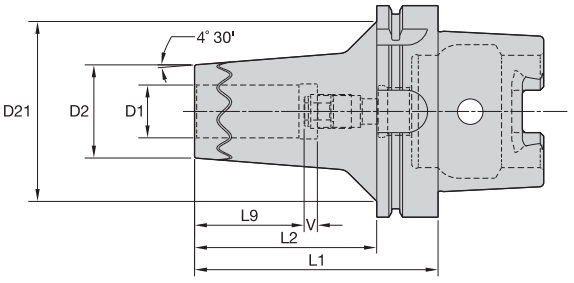
cutting tool shank diameter	tolerance
7/16, 1/2, 9/16, & 5/8	.0000/-.0004
3/4, 7/8, 1, & 1-1/4	.0000/-.0005

TT SF IN-HSK Form A

order number	catalogue 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 catalogue 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	catalogue 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)

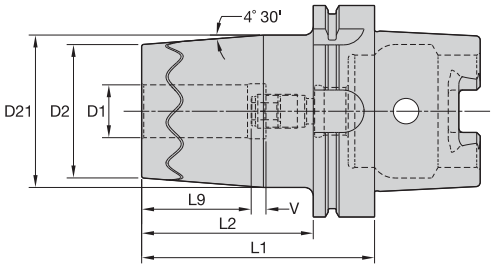
cutting tool shank diameters	tolerance
1/4, 5/16, & 3/8	.0000/-.0004
1/2 & 5/8	.0000/-.0004
3/4, 7/8, 1, 1-1/4, & 1-1/2	.0000/-.0005

TT SF IN-HSK Form A

order number	catalogue 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 catalogue 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	catalogue 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)

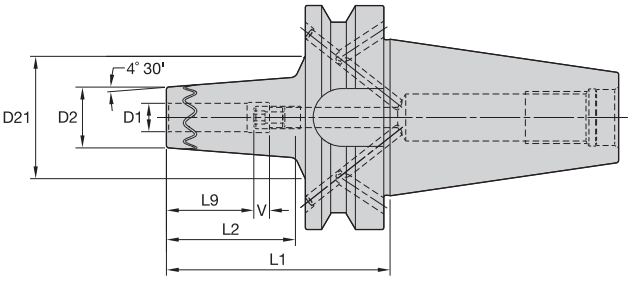
cutting tool shank diameters	tolerance
1/4, 5/16, & 3/8	.0000/-.0004
1/2 & 5/8	.0000/-.0004
3/4, 7/8, 1, 1-1/4, & 1-1/2	.0000/-.0005

TT SF HD IN-HSK Form A

order number	catalogue 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 catalogue A-09-02122.

- **SAFE-LOCK™**, innovative and unique non-slip system.
- 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	
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	catalogue 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

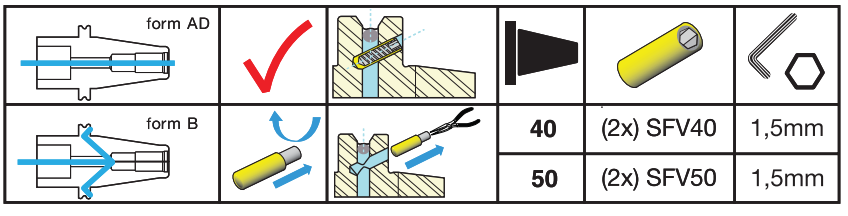
Cutting Tool Shank Requirements inch (industry standard)

cutting tool shank diameters	tolerance
1/2 & 5/8	.0000/-.0004
3/4, 1	.0000/-.0005

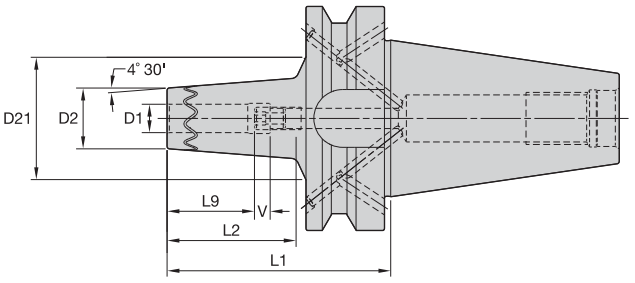
TT SF IN-BT Form B/AD

order number	catalogue 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 catalogue 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	catalogue 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

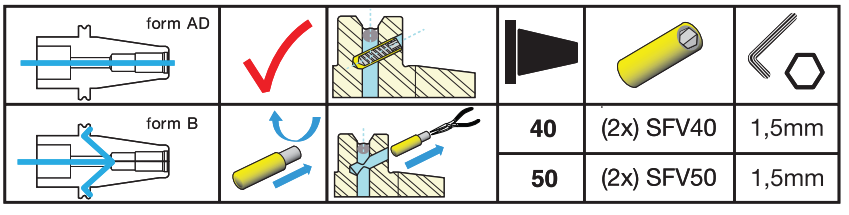
Cutting Tool Shank Requirements inch (industry standard)

cutting tool shank diameters	tolerance
1/2 & 5/8	.0000/-.0004
3/4, 1	.0000/-.0005

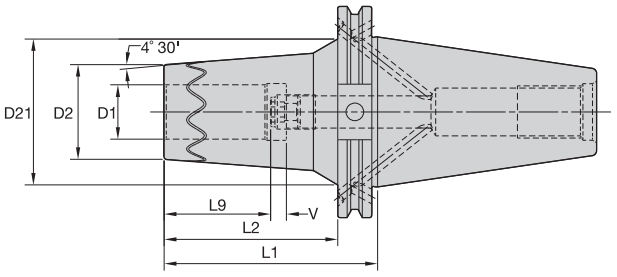
TT SF HPV IN-BT Form B/AD

order number	catalogue 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 catalogue 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	catalogue 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)

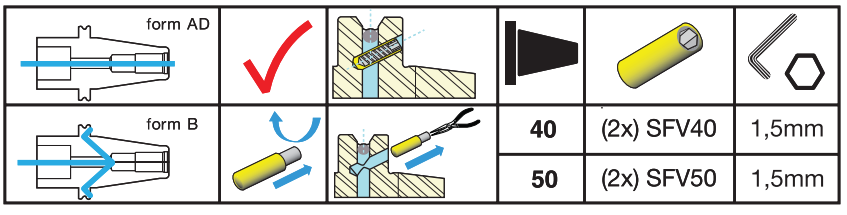
cutting tool shank diameters	tolerance
1/2 & 5/8	.0000/-.0004
3/4, 1	.0000/-.0005

TT SF IN-CV Z Form B/AD

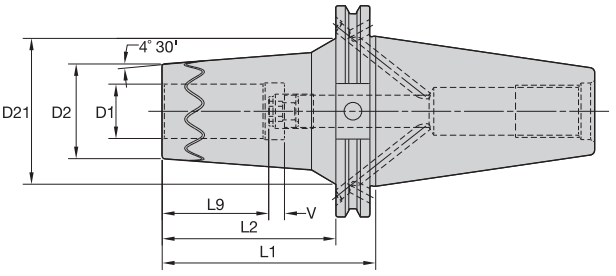
order number	catalogue number	D1	D2	D21	L1	L2	L9	V	lbs
5089586	**CV40ZBSFTT050256**	1/2	1.04	1.33	2.56	1.81	1.46	.39	2.20
5089587	**CV40ZBSFTT062256**	5/8	1.16	1.45	2.56	1.81	1.58	.39	2.22
5089588	**CV40ZBSFTT075256**	3/4	1.40	1.68	2.56	1.81	1.65	.39	2.37
5089589	**CV40ZBSFTT100295**	1	1.79	2.03	2.95	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 catalogue 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	catalogue 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)

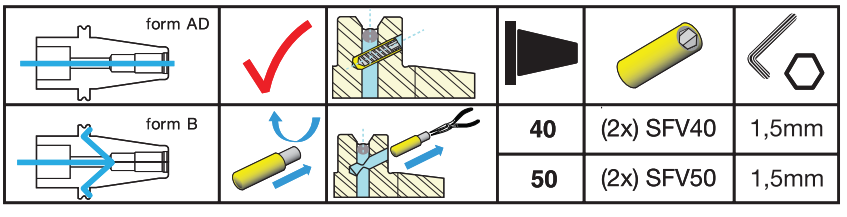
cutting tool shank diameters	tolerance
1/2 & 5/8	.0000/-.0004
3/4, 7/8, 1	.0000/-.0005

TT SF IN-CV Z Form B/AD

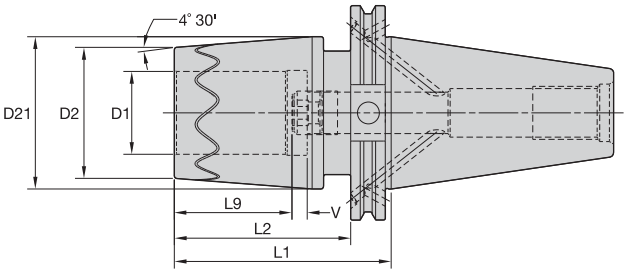
order number	catalogue number	D1	D2	D21	L1	L2	L9	V	lbs
5089656	**CV50ZBSFTT050315**	1/2	1.06	2.17	3.15	2.40	1.46	.39	6.49
5089657	**CV50ZBSFTT062315**	5/8	1.31	1.69	3.15	2.40	1.46	.39	6.71
5089658	**CV50ZBSFTT075315**	3/4	1.76	2.14	3.15	2.40	1.65	.39	7.41
5089659	**CV50ZBSFTT100394**	1	1.73	2.68	3.94	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 catalogue 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.



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	catalogue 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)

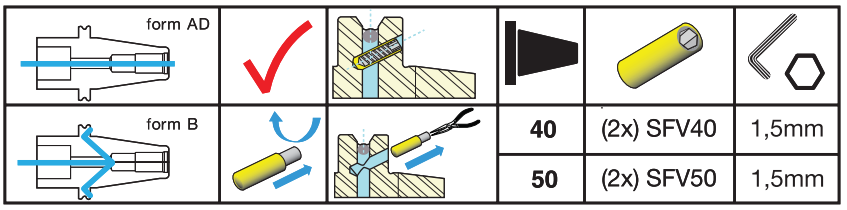
cutting tool shank diameters	tolerance
1, 1-1/4, 1-1/2, & 2	.0000/-.0005

TT SF HD IN-CV Z Form B/AD

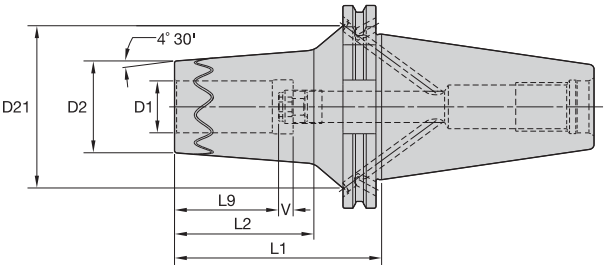
order number	catalogue number	D1	D2	D21	L1	L2	L9	V	lbs
5089664	CV50ZBSFHDTT100354	1	2.48	2.81	3.54	2.79	1.89	.39	9.44
5089665	CV50ZBSFHDTT125354	1 1/4	2.76	3.07	3.54	2.79	2.01	.39	9.81
5089666	CV50ZBSFHDTT150394	1 1/2	3.23	3.54	3.94	3.19	3.07	.39	11.35
5089667	CV50ZBSFHDTT200551	2	3.23	3.70	5.51	4.76	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 catalogue 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)

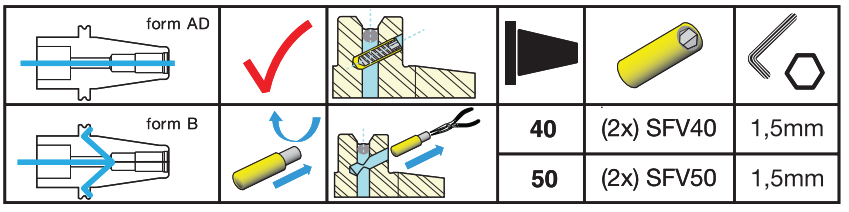
cutting tool shank diameter	tolerance	
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013
32	h6	0,000/-0,016

ERICKSON™

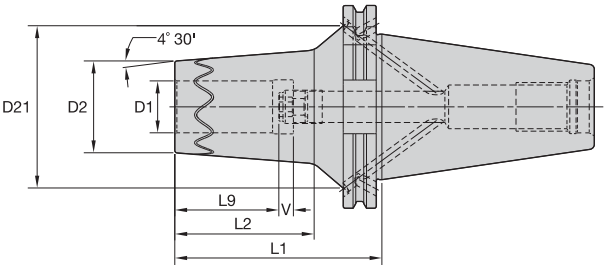
■ TT SF HPV MM-DV Form B/AD

order number	catalogue 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 catalogue 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)

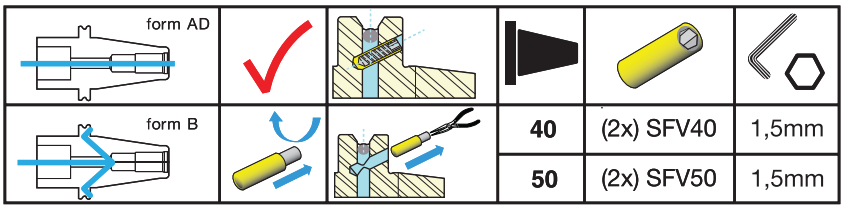
cutting tool shank diameter	tolerance	
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013

ERICKSON™

TT SF HPV MM-DV Form B/AD

order number	catalogue 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 catalogue 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 pull-out 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™

WIDIA

Best-in-Class Service and Support

With WIDIA™, you get it all — superior products, reliable performance, and unsurpassed support and programme services.

- Highly qualified Customer Service and Customer Application Support (CAS) teams support clients through strong product and market knowledge.
- Advanced engineering teams specialise in specific product groups to help customers optimise 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 Authorised Distributor or visit **www.widia.com**.

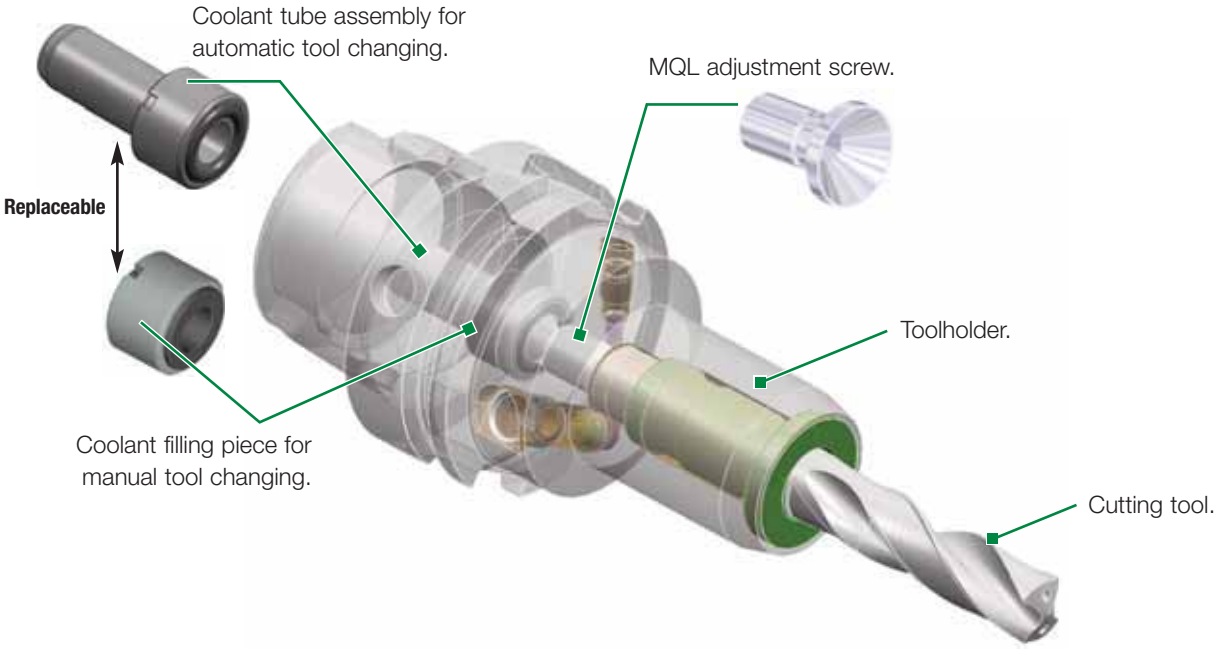
WIDIA™

ERICKSON™ HSK Shank Tooling System • **HSK63A Series**

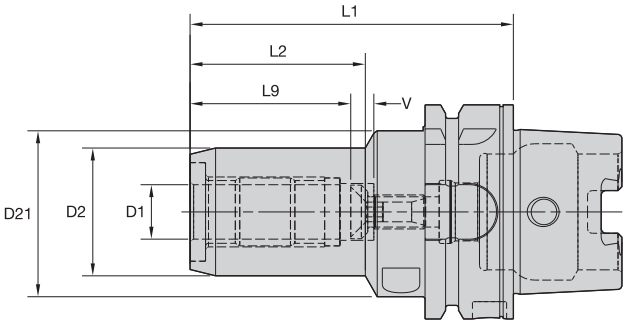
WIDIA™ has further developed their successful products, hydraulic chucks, and Shrink Fit toolholders, by replacing the individual components for use in wet, dry, and MQL (Minimum Quantity Lubrication) machining applications.

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

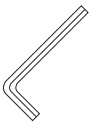


- DIN 69090 1–3 standard.
- Open-source solution.
- Universal for wet, MQL, or dry machining.
- Designed for all straight shanks.
- Equal dimensions for wet and MQL tools.



ERICKSON

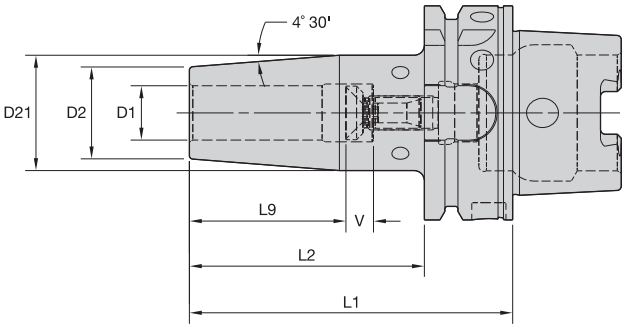
■ HCT • MQL • Metric



order number	catalogue 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)

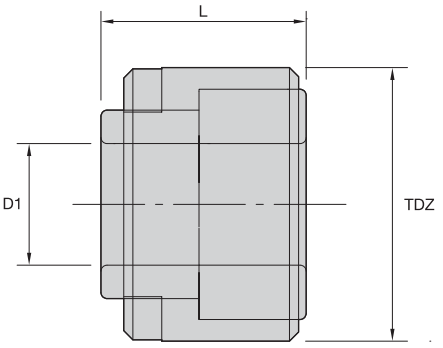
cutting tool shank diameter	tolerance	
3	h4	0,000/-0,003
4	h4	0,000/-0,004
5	h5	0,000/-0,005
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013
32	h6	0,000/-0,016

ERICKSON

■ HPVTT • MQL • Metric

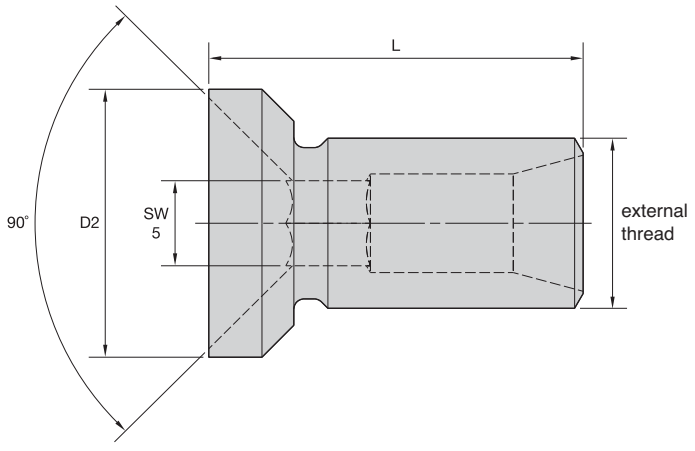
order number	catalogue number	D1	D2	D21	L1	L2	L9	V	screw	wrench size stop screw	kg
5008181	HSK63AHPVTTMQL1C06080M	6	21	27	80	54	26	10,0	06ASMQL1C05170M	2.5 mm	0,82
5008182	HSK63AHPVTTMQL1C08080M	8	21	27	80	54	26	10,0	08ASMQL1C06180M	3 mm	0,82
5008183	HSK63AHPVTTMQL1C10085M	10	24	32	85	59	31	10,0	10ASMQL1C08180M	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	catalogue 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	catalogue 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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2103160	2IL14W TN6025	A173
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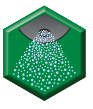
Solid End Milling Icons

 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	 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**™	 Helix Angle: 20°	 Helix Angle: 38°
 Helix Angle: 45°	 Helix Angle: 43°	 Tool Dimensions: Flute Configuration: X (variable)	 Tool Dimensions: Flute Configuration: 4
 Tool Dimensions: Flute Configuration: 5			

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: 1500psi	 Through Adaptor Face
 ISO 26622	 Tunable Bar/Milling		

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Metalcutting Safety

IMPORTANT SAFETY INSTRUCTIONS

Read before using the tools in this catalogue!

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	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	Grey 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 aluminium alloys		NAG		60	Al 99,5, AlMg 1
	22			AG		100	AlCuMg 1, AlMgSiPb, AlMgSi 1
	23	Cast aluminuim 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, Fibre 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 Condition

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 — Grey cast iron
GGG — Nodular cast iron
GO — Cast
H — Hardened
MA — Martensitic
N — Normalised
NAG — Non-aged (non-aging)
PH — Precipitation hardened
S-AU — Superaustenitic
U — Untreated
V — Heat treated
var1 — Variable

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