



ADVANCES 2014

TURNING | SOLID END MILLING | INDEXABLE MILLING | TOOLING SYSTEMS

INCH

WIDIA ™

A close-up, high-angle photograph of industrial machinery, likely a lathe or mill. The image shows various metal components, including a cutting tool and a workpiece, with bright blue sparks emanating from the cutting point. The lighting is dramatic, highlighting the metallic surfaces and the intensity of the cutting process.

WIDIA™ Means Complete Quality

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

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

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

ADVANCES

Introduction **.ii-v**

Service and Support **.vi-xvii**

Turning **.A1-A212**

Solid End Milling **.B1-B51**

Indexable Milling **.C1-C39**

Tooling Systems **.D1-D74**

Index by Order Number **.E2-E19**

Index by Catalog Number **.E20-E37**

Global Contacts **.F2-F3**

Icon Legend **.F4-F5**

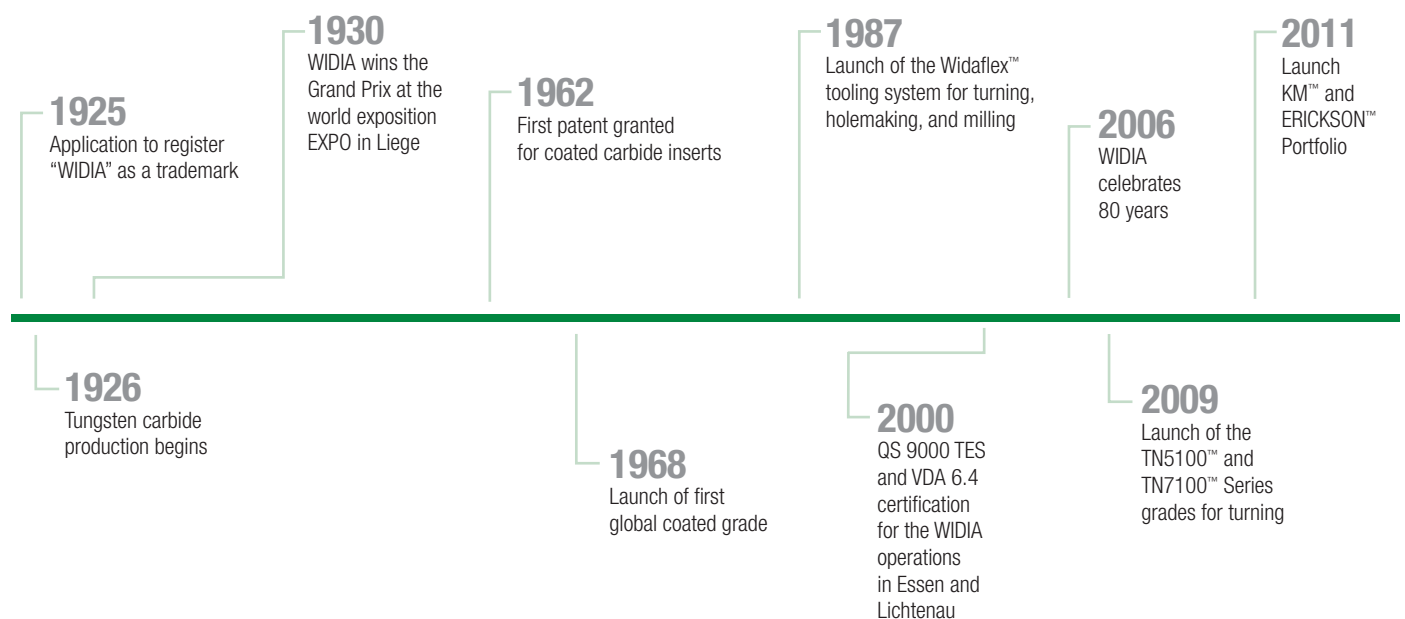
WIDIA™

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, holmaking, and tooling systems products available through a skilled network of Authorized Distributor partners, you'll find everything you need from one single source.



80+ Years of Quality



Technical expertise you can count on

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

They will show you how to:

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



The most powerful family of brands in the industry

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

Turning, Holemaking, Indexable Milling, and Tooling Systems

WIDIA 

WIDIA 
MANCHESTER

WIDIA 
CLAPDICO

WIDIA 
CIRCLE

WIDIA 
METCUT

Solid Carbide End Milling and Solid Carbide Drilling and Reaming

WIDIA 
HANITA

WIDIA 
RÜBIG

WIDIA 
METAL REMOVAL

Tapping Operations

WIDIA 
GTD

New Products

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

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



Turning

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

Solid End Milling

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

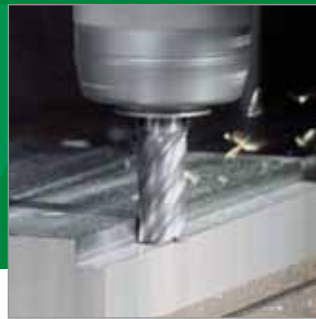


Indexable Milling

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

Tooling Systems

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



ToolBOSS™

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

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

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



Drawer Options

19 different drawer sizes available.

Compatibility

Fully compatible with existing ToolBOSS units.

Diagnostics

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

Efficiency

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

Future-Port

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

High-Speed Access

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

Traceability

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

Expandability

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

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

ATMS

Reduce tool spend and productivity costs — quickly and easily.

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

Increase Productivity

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

Improve Your Bottom Line

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



ADVANCED TOOL MANAGEMENT SOFTWARE

Standard and Custom Reporting

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

Requesting and Purchasing

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

Rework Control

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

Inspection Management

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

Unlimited Points of Issue

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

Vending Machine Consolidation and Order Control

Streamlines data entry process consolidation for an unlimited amount of linked vending machines.

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

Recondition

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

Why recondition?

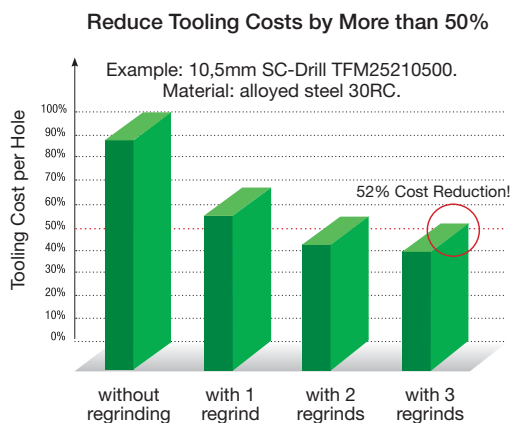
Our Reconditioning Services help optimise the total value of your metalcutting tools throughout their entire life cycle by giving them “like-new” performance characteristics — with rapid turnaround time — so the tools you need are always on-hand and perform just like new.

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

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

Most tooling can be reconditioned up to five times.

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



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

Why Recycle?

It's the right thing to do!

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

It's profitable!

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

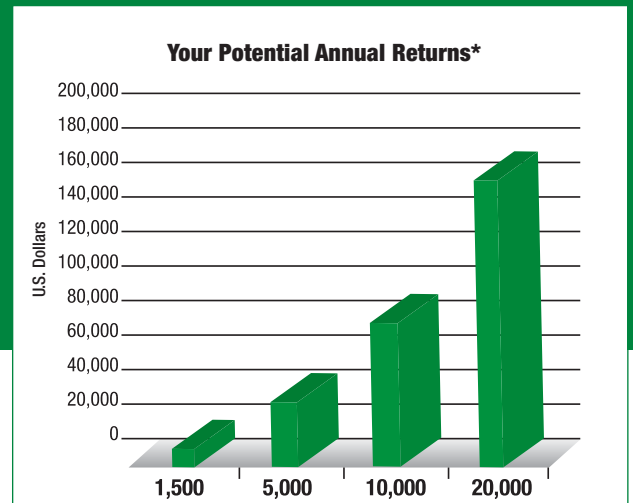
It's EASY!

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

Green Boxes for green companies

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

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



Carbide Scrap Pounds per Year*

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



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

Sustainable Engineering

Environmental Responsibility

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



Sustainable Engineering

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

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

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

On the Web

Fast, free, and easy registration.

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



Find a Local Authorized WIDIA™ Distributor in Your Area

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

Contact Us

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

WIDIA Products

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

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

Customer Application Support

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



Easy access to proven metalworking expertise!

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

Service Level Excellence:

- Fast telephone response.
- Quick technical solutions.
- Efficient case management.

Best-in-Class Support Tools and Technology:

- Tooling performance experts.
- Materials database.
- Application calculators.

Services Provided:

- Tooling selection.
- Operating parameters.
- Troubleshooting.
- Process optimization.
- Hardware support.

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

CAS

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

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

Convenient Access Options:

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

*Noted phone and fax numbers are not toll free.

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

WIDIA™ Branded Merchandise

SHOP. BUY. PROMOTE.

New WIDIA Branded Merchandise Available! Place Your Order Today!

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



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

Global Online Ordering Made Simple.

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



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

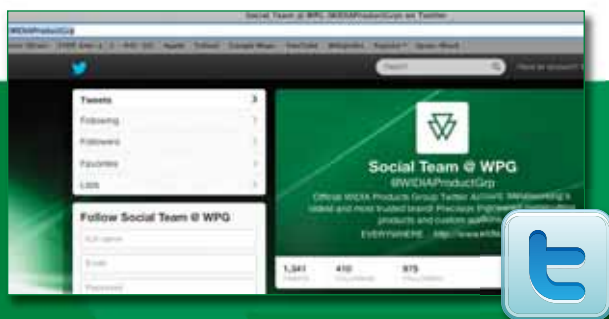
To learn more, contact your local Authorized Distributor or visit www.widia.com.

WIDIA™ Social Media

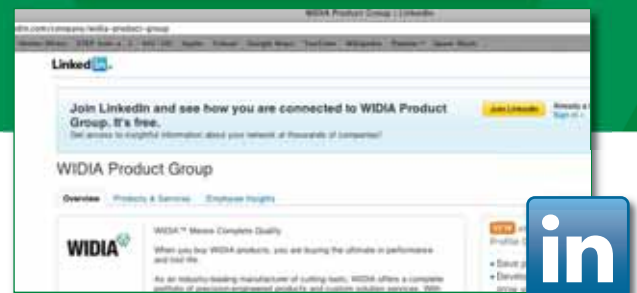
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Connect with us to get the latest information on our new products and promotions, read success stories, and view product videos.

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<https://www.facebook.com/WIDIAProductGrp>



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



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

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



WIDIA™ QR Codes

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

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



Helpful Information to Get You Scanning

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

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



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

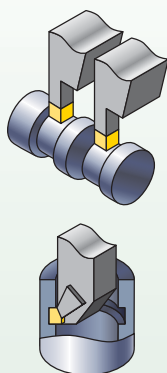
Scan the code at the top of the page to visit our website and online product catalog.

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WIDIA Grooving	A2–A123
WMT Turning, Grooving, Cut-Off, and Profiling	A4–A30
TopGroove	A32–A73
ProGroove	A74–A86
Separator	A88–A109
Ranger	A110–A117
S-LOC	A118–A123
WIDIA Threading	A124–A212
TopThread	A128–A159
Laydown	A160–A188
Technical Information	A189–A212

Grooving



WMT™

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

Pages:
A4–A30



TopGroove™

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

Pages:
A32–A73



ProGroove™

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

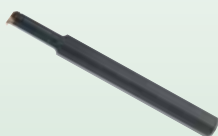
Pages:
A74–A86



S-LOC™

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

Pages:
A118–A123



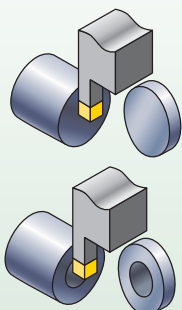
LG

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

Pages:
A74–A86



Cut-Off



WMT™

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

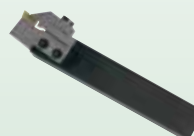
Pages:
A4–A30



Separator™

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

Pages:
A88–A109



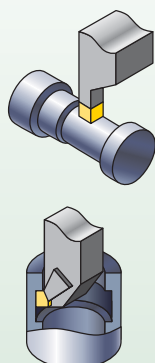
ProGroove™

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

Pages:
A74–A86



Plunge and Turn



WMT™

Heavy Stock Removal in Turning Applications

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

Pages:
A4–A30



ProGroove™

For Light-Cutting Inserts

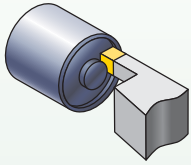
- Cutting widths: .079–.315" (2–8mm).
- O.D. cutting depths: .394–1.58" (10–40mm).
- Single-edge inserts for maximum depth capacity.
- Screw-clamping integral shank toolholders available.

Pages:
A74–A86





Face Grooving



WMT™

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

Pages:
A4–A30



Ranger™

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

Pages:
A110–A117



S-LOC™

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

Pages:
A118–A123



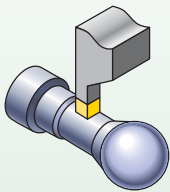
TopGroove™

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

Pages:
A32–A73



Profiling



WMT™

For Heavy Stock Removal

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

Pages:
A4–A30



TopGroove™

Moderate/Heavy Stock Removal at Shallow Profile Depths

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

Pages:
A32–A73



ProGroove™

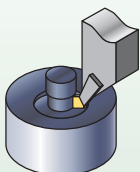
For Light Cutting

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

Pages:
A74–A86



Undercutting



TopGroove™

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

Pages:
A32–A73



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

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

WMT

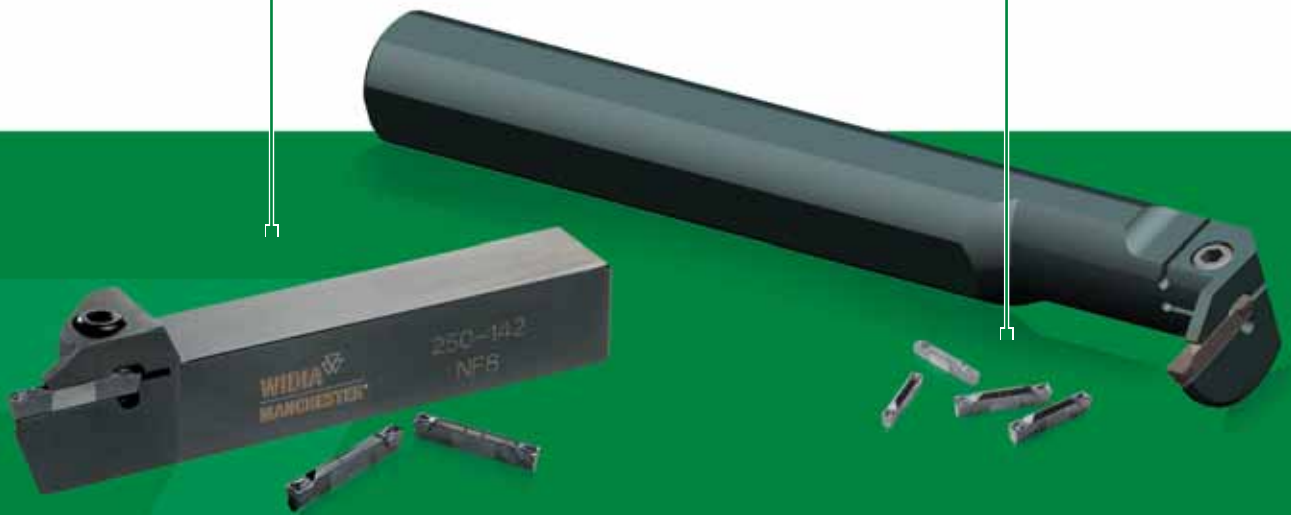
Versatile and Well Constructed

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



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

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



WMT™ Toolholders

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



The Most Advanced Turning Solutions in the Industry

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

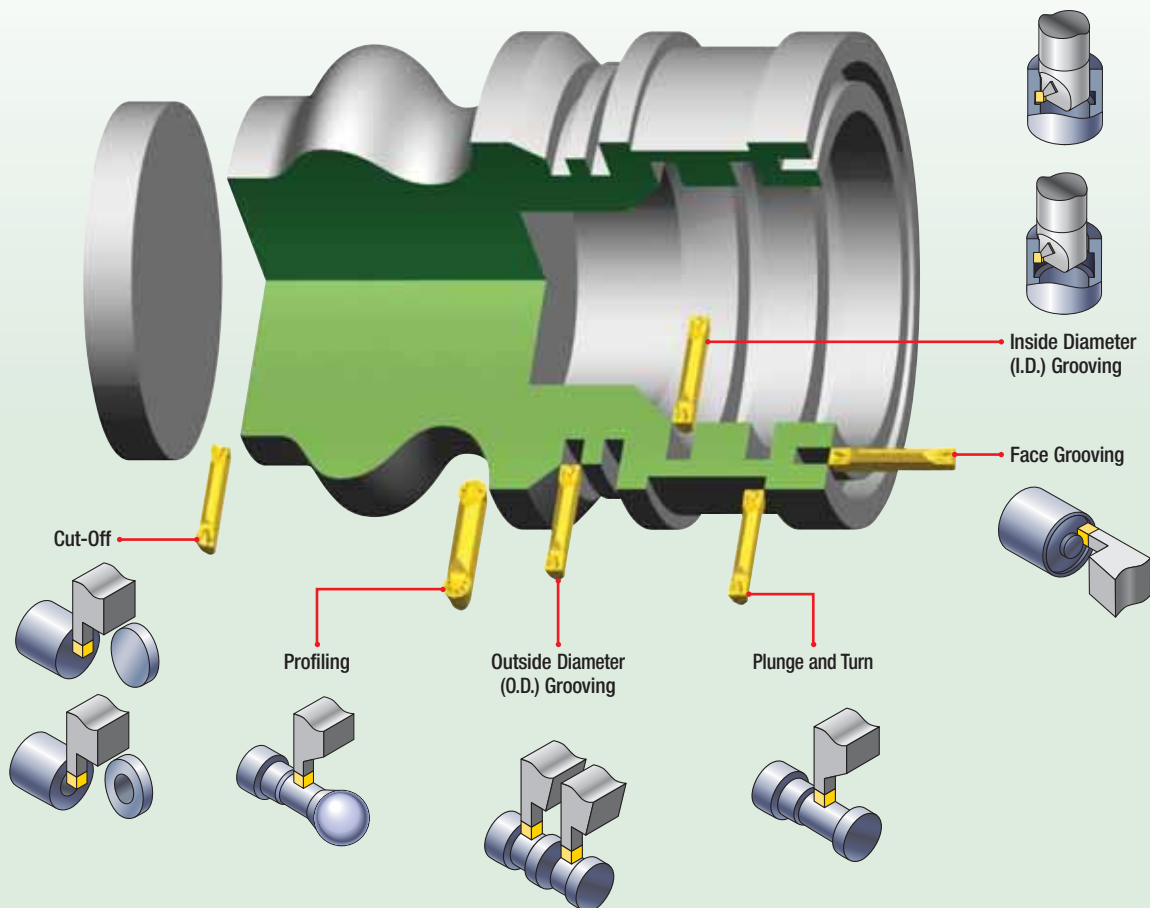
The WMT system, with its extra-long clamping area and precise insert positioning, ensures exceptionally fast and accurate machining, all-in-one tool, for your most demanding grooving, cut-off, turning, and profiling applications.

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

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

1 Choose the application to be performed:

Groove depth, width, and profile.



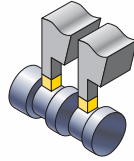
2 Identify the material to be machined:

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

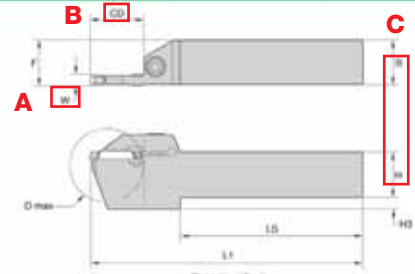
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

3 Select your toolholder based on the application:

- A Choose the appropriate width “W” required for the application.
- B Choose the shortest cutting depth “CD” dimension for increased tool rigidity.
- C Select the largest toolholder shank “H” and “B” dimensions for maximum rigidity.



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



■ O.D. Grooving and Cut-Off

order number	new catalog number	old catalog number	C		A	B	D max	F	C				clamp screw
			H	W	CD	B			H3	L1	L2		
3655936	WMTCR82053	250301	.375	.078	—	1.062	.375	.368	.125	4.500	3.410	—	606249
3655888	WMTCR828033	250108	.375	.094	—	1.062	.375	.368	.125	4.500	3.410	—	606249
3655840	WMTCR82062	250303	.500	.079	—	1.125	.500	.494	.188	4.500	3.410	—	606249
3655892	WMTCR82062	250-111	.500	.094	—	1.250	.500	.490	.190	4.500	3.290	—	606249
3655942	WMTSR102065	250308	.625	.079	—	.850	—	.625	.600	2.500	3.680	—	606249
3655894	WMTSR1028075	250-112	.625	.094	.750	—	.625	.600	.250	5.000	3.480	—	619205
3655896	WMTSR103044	250117	.625	.125	.440	—	.625	.600	—	5.000	3.695	—	619205
3655900	WMTSR100087	250119	.625	.125	.875	—	.625	.600	.250	5.000	3.355	—	619205
3655930	WMTSR104044	250181	.625	.156	.440	—	.625	.600	—	5.000	3.695	—	619205
3655902	WMTSR100056	250123	.625	.188	.560	—	.629	.600	—	5.000	3.562	—	619168
3655904	WMTSR100100	250125	.625	.188	1.000	—	.629	.600	.250	5.500	3.655	—	619168
3655944	WMTSR122065	250307	.750	.079	.650	—	.750	.719	—	5.000	3.680	—	606249
3655896	WMTSR1228075	250-115	.750	.094	.750	—	.750	.719	.250	5.000	3.480	—	619205
3655934	WMTSR1228042	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	.069	.650	—	.991	1.000	—	6.000	4.679	—	606266
3655846	WMTSR162065	250308	1.000	.078	.650	—	1.000	.969	—	6.000	4.680	—	606249
3655938	WMTSR1628075	250193	1.000	.094	.750	—	1.000	.969	—	6.000	4.500	—	619205
3655918	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	WMTSR208096	250175	1.250	.312	.560	—	1.250	1.207	—	6.000	4.935	—	619168

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

4 Select chipbreaker style for the application:

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

NOTE: Chart shows recommended starting feed rates.

WMT™ Inserts

Feed Values for Grooving

CM

- Double-ended, V bottom, and top, mechanically stamped.
- Neutral, right-, and left-hand lead angles up to 17°.
- Designed to increase speed and feed.
- Chip geometry designed for excellent chip control and minimized cutting pressure on various materials.

CM-W

- Wiper flats where surface finish is critical.
- Double-ended, V bottom, and top, mechanically stamped.
- Neutral, right-, and left-hand lead angles up to 17°.
- Designed to increase speed and feed.
- Chip geometry designed for excellent chip control and minimized cutting pressure on various materials.
- Ideal for 300 Series stainless steel, tool steel, titanium, Inconel®, and other nickel-based alloys at moderate speeds and feeds.

PT Grooving Inserts

- High positive rake geometry for low cutting force, especially in soft materials.
- Deep grooving tool for plunge and turn (0.1) 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 (0.1) and face grooving operations.
- Delivers chip control over full range of DOC when turning.
- Delivers superior chip control in interrupted cuts.

A14

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

B Select the required corner radius value "RR".

WMT™ Turning, Grooving, and Cut-Off

Cut-Off Inserts





RR = RL on neutral inserts

● first choice

○ alternate choice

WMT-CM	catalog number	seat size	A W		B RR		LJ		flank
			mm	in	mm	in	mm	in	
	WMTCD15N00CM06	1	1.50	0.09	0.08	0.03	19.30	760	N - Neutral
	WMTCD20N00CM09	2	2.00	0.079	0.08	0.03	19.21	756	N - Neutral
	WMTCD30N00CM13	3	2.39	0.094	0.13	0.03	22.32	875	N - Neutral
	WMTCD30N00CM17	3	3.00	0.118	0.17	0.03	25.58	999	N - Neutral
	WMTCD40N00CM17	4	3.17	0.125	0.17	0.03	25.41	1,000	N - Neutral
	WMTCD40N00CM17	4	4.00	0.157	0.17	0.03	25.40	1,000	N - Neutral

5 Select grade:

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


NOTE: See page A10 for Grades and Grade Descriptions.

6 Determine cutting data:

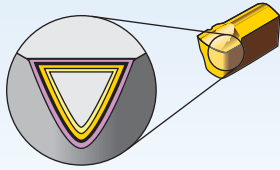
- A Based on material group and grade, identify starting speed (vc).
- B First choice starting speed is in **bold**.

NOTE: See pages A12–A13 for cutting data.

WMT™ Turning, Grooving, and Cut-Off
Speed and Feed Chart • Metric

WIDIA 

ANSI ISO S13	VDI 3323	Material Group	Cutting Speed • vc m/min														
			WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
			min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	1		100	100	110	150	200	210	170	175	180	210	225	240	170	175	180
	2		100	100	110	150	200	210	170	175	180	240	250	260	215	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	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	125	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	
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	—	—	—	—	—	—
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
	21		70	75	80	140	150	160	110	120	130	—	—	—	—	—	—
N	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	—	—	—	—	—	—
	S	31		20	25	30	70	75	80	50	50	50	—	—	—	—	—
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		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																		
	HC-P15		M																		
WU25PT		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																		
	HC-P30		M																		
WU10HT		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.																			
	HW-K15		M																		
WP10CT		A specially engineered, proprietary, cobalt-enriched carbide grade with thick K-MTCVD-TiCN coating layer, an Al ₂ O 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																		
	HC-P10		K																		
WP25CT		A tough cobalt-enriched carbide grade with a newly designed multilayer K-MTCVD TiCN-Al ₂ O ₃ -TiCN-TiN coating with superior interlayer adhesion. This is the industry's best general-purpose turning grade for most steels and ferritic and martensitic stainless steels. The substrate design, with cobalt-enrichment, ensures adequate deformation resistance along with excellent bulk toughness and insert edge strength. The coating layers offer good wear resistance over a wide range of machining conditions. The smoothness of the coating leads to reduced frictional heat, minimizes microchipping, and improves workpiece surface finishes. The WP25CT grade performs well in moderately heavy roughing to semi-finishing cuts. Use the WP25CT grade for finishing cuts.	P																		
	HC-P25		K																		



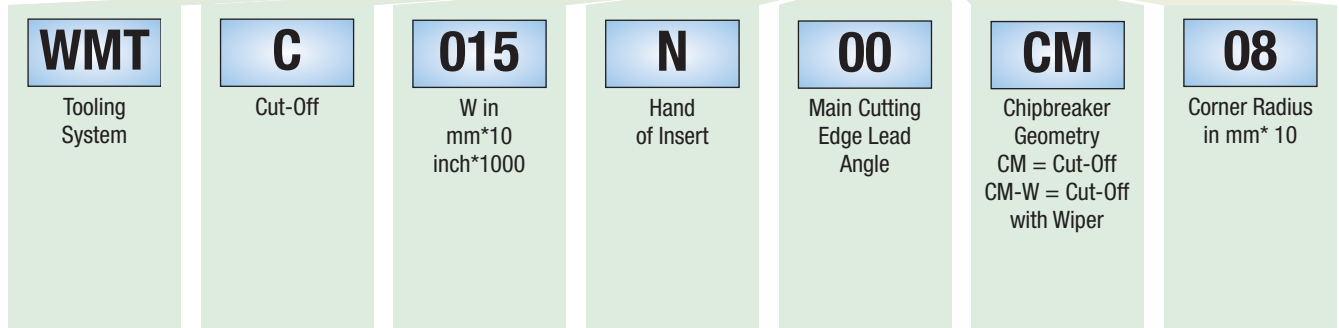
Turning

WMT Identification System

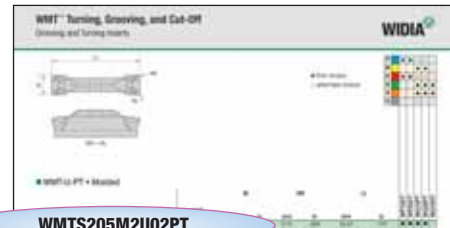
Cut-Off



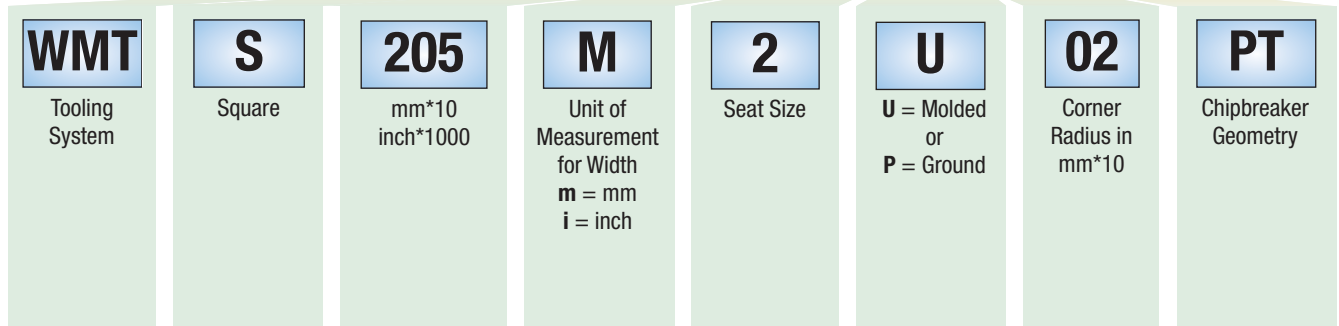
WMTC015N00CM08



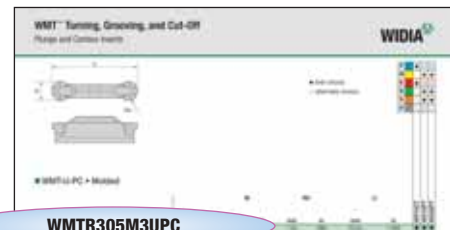
Grooving



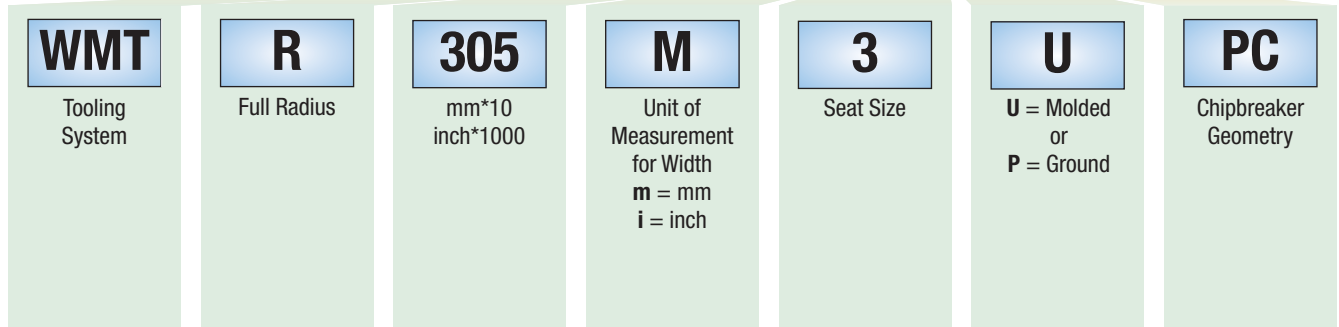
WMTS205M2U02PT



Plunge • Contour



WMTR305M3UPC



Turning

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



Turning

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

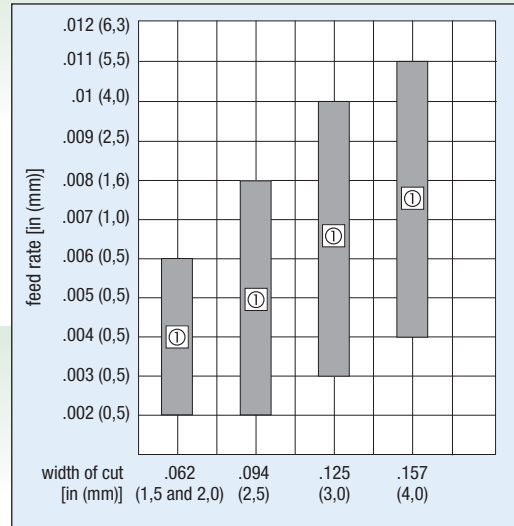
CM

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



CM-W

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



① Recommended feed

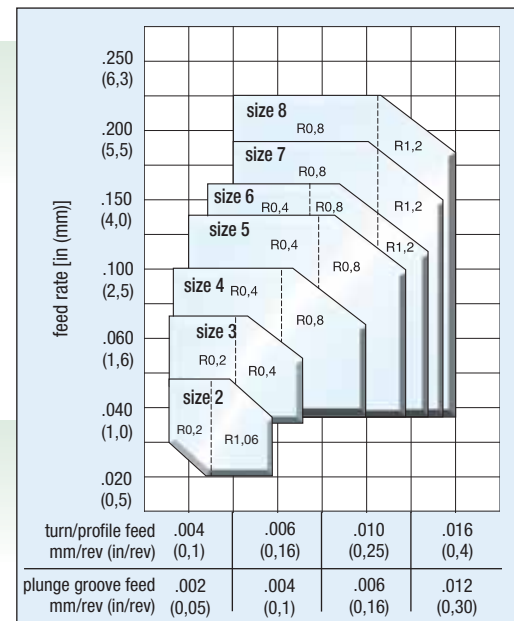
PT Grooving Inserts

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



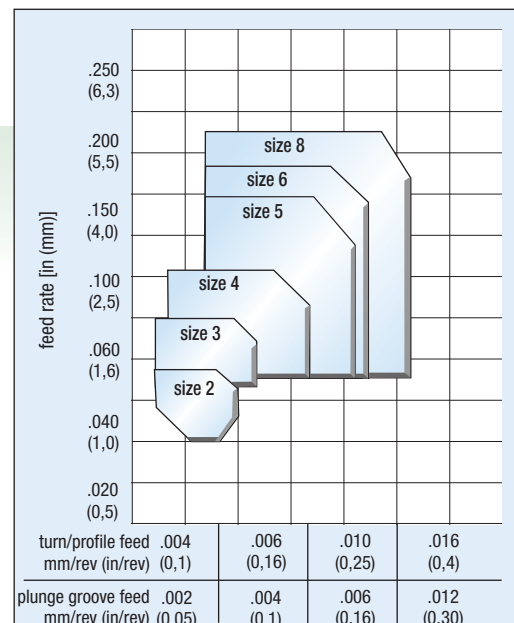
PC Grooving and Profiling Inserts

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



PH Plunging and Turning Inserts

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



WIN WITH WIDIA™



WMT™ System

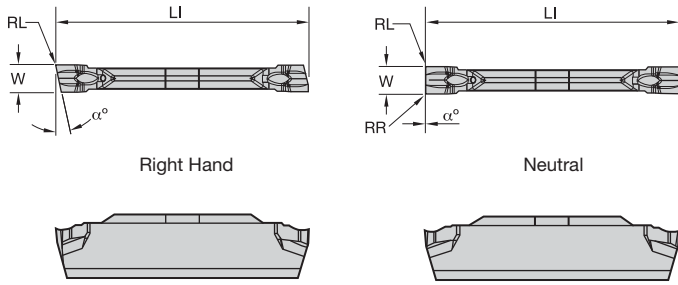
The WIDIA™ WMT System is the economical and reliable option for all of your grooving, cut-off, turning, and profiling applications. Trust the WMT system to ensure precise insert positioning and provide only the most accurate machining with exceptionally fast cycle times and superior performance.

WMT Toolholders

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

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

Turning



RR = RL on neutral inserts

- first choice
- alternate choice

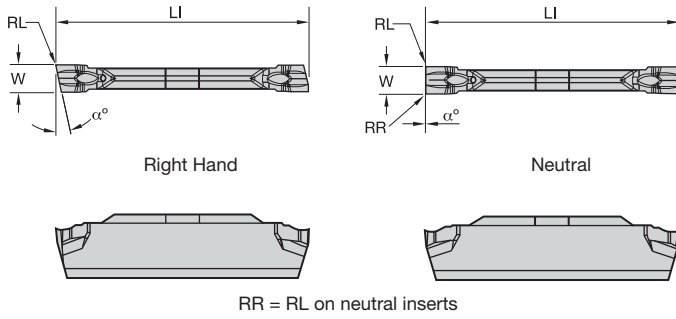
P	●
M	●
K	○
N	●
S	●
H	●

■ WMT-CM

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

catalog number	seat size	W		RR		LI		α°	hand	WU25PT
		mm	in	mm	in	mm	in			
WMTC015L05CM08	1	1,50	.059	0,08	.003	19,31	.760	5	L - Left	●
WMTC020L05CM08	2	1,99	.079	0,08	.003	19,21	.756	5	L - Left	●
WMTC020L12CM08	2	2,00	.079	0,08	.003	19,25	.758	12	L - Left	●
WMTC030L05CM17	3	3,00	.118	0,17	.007	25,34	.998	5	L - Left	●
WMTC030L12CM17	3	3,00	.118	0,17	.007	25,40	1.000	12	L - Left	●
WMTC040L12CM17	4	4,00	.157	0,17	.007	25,40	1.000	12	L - Left	●
WMTC040L05CM17	4	4,00	.157	0,17	.007	25,40	1.000	5	L - Left	●

catalog number	seat size	W		RL		LI		α°	hand	WU25PT
		mm	in	mm	in	mm	in			
WMTC015R12CM08	1	1,50	.059	0,08	.003	19,28	.759	12	R - Right	●
WMTC015R05CM08	1	1,50	.059	0,08	.003	19,31	.760	5	R - Right	●
WMTC020R05CM08	2	2,00	.079	0,08	.003	19,26	.758	5	R - Right	●
WMTC020R12CM08	2	2,00	.079	0,08	.003	19,26	.758	12	R - Right	●
WMTC094R12CM13	2B	2,39	.094	0,13	.005	22,28	.877	12	R - Right	●
WMTC094R05CM13	2B	2,39	.094	0,13	.005	22,32	.879	5	R - Right	●
WMTC030R05CM17	3	3,00	.118	0,17	.007	25,34	.998	5	R - Right	●
WMTC030R12CM17	3	3,00	.118	0,17	.007	25,40	1.000	12	R - Right	●
WMTC125R05CM17	3	3,17	.125	0,17	.007	25,40	1.000	5	R - Right	●
WMTC125R12CM17	3	3,18	.125	0,17	.007	25,40	1.000	12	R - Right	●
WMTC040R05CM17	4	4,00	.157	0,17	.007	25,40	1.000	5	R - Right	●
WMTC040R12CM17	4	4,00	.157	0,17	.007	25,40	1.000	12	R - Right	●



- first choice
- alternate choice

P	●
M	●
K	○
N	●
S	●
H	●

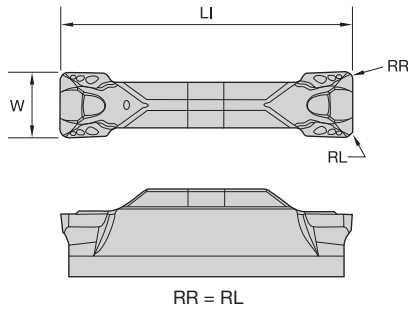
Turning
■ WMT-CM-W

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

catalog number	seat size	W		RR		LI		α°	hand	WU25PT
		mm	in	mm	in	mm	in			
WMTC020L12CMW08	2	2,00	.079	0,08	.003	19,27	.758	12	L - Left	●
WMTC030L05CMW17	3	3,00	.118	0,17	.007	25,35	.998	5	L - Left	●
WMTC030L12CMW17	3	3,00	.118	0,17	.007	25,40	1.000	12	L - Left	●

catalog number	seat size	W		RL		LI		α°	hand	WU25PT
		mm	in	mm	in	mm	in			
WMTC020R05CMW08	2	2,00	.079	0,08	.003	19,20	.756	5	R - Right	●
WMTC020R12CMW08	2	2,00	.079	0,08	.003	19,27	.758	12	R - Right	●
WMTC094R12CMW13	2B	2,39	.094	0,13	.005	22,29	.877	12	R - Right	●
WMTC094R05CMW13	2B	2,39	.094	0,13	.005	22,32	.879	5	R - Right	●
WMTC030R05CMW17	3	2,00	.118	0,17	.007	25,35	.998	5	R - Right	●
WMTC030R12CMW17	3	2,00	.118	0,17	.007	25,40	1.000	12	R - Right	●
WMTC125R05CMW17	3	3,17	.125	0,17	.007	25,41	1.000	5	R - Right	●
WMTC125R12CMW17	3	3,17	.125	0,17	.007	25,41	1.000	12	R - Right	●

Turning



● first choice
○ alternate choice

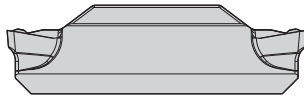
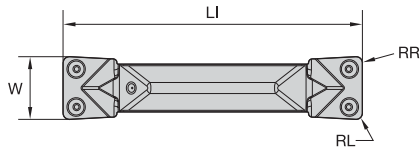
P	●	●	○	○	○	○	○
M	●	●	○	○	○	○	○
K	●	●	○	○	○	○	○
N	●	●	○	○	○	○	○
S	●	●	○	○	○	○	○
H	○	○	○	○	○	○	○

■ WMT-U-PT • Molded

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

■ WMT-P-PT • Precision

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



RR = RL

● first choice
○ alternate choice

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

■ **WMT-U-PH • Molded**

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

■ **WMT-P-PH • Precision**

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



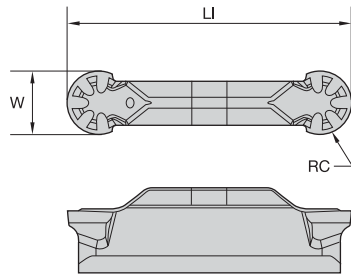
Turning

WMT™ Turning, Grooving, and Cut-Off

Plunge and Contour Inserts



Turning



● first choice
○ alternate choice

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

■ WMT-U-PC • Molded

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

■ WMT-P-PC • Precision

catalog number	seat size	W		RC		L1		WP10CT	WU10PT	WU25PT
		mm	in	mm	in	mm	in			
WMTR300M3PPC	3	3,00	.118	1,50	.059	25,40	1.000	●	●	●
WMTR400M4PPC	4	4,00	.158	2,00	.079	25,45	1.002	●	●	●
WMTR188I5PPC	5	4,78	.188	2,39	.094	28,65	1.128	●	●	●
WMTR500M5PPC	5	5,00	.197	2,50	.098	28,88	1.137	●	●	●
WMTR600M6PPC	6	6,00	.236	3,00	.118	28,65	1.128	●	●	●
WMTR250I6PPC	6	6,36	.250	3,18	.125	29,01	1.142	●	●	●
WMTR312I8PPC	8	7,94	.312	3,96	.156	29,00	1.142	●	●	●
WMTR800M8PPC	8	8,00	.315	4,00	.158	29,08	1.145	●	●	●

WMT™ System

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

Integral Toolholders

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

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

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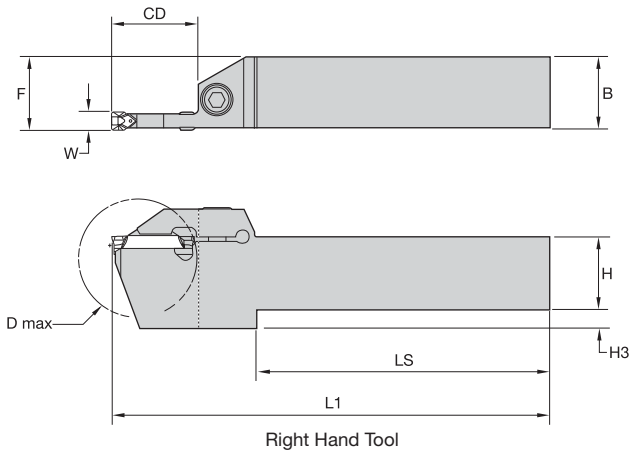


Integral Boring Bars

A Bar Type 	16 Bar Diameter 	R Bar Length 	WMT Tooling System	E Tool Style 	R Hand R = Right hand L = Left hand	6 Seat Size	12 Max Grooving Depth	M Tool Units
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For more detailed information about our new nomenclature system, visit us at www.widia.com.

Turning



■ O.D. Grooving and Cut-Off

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

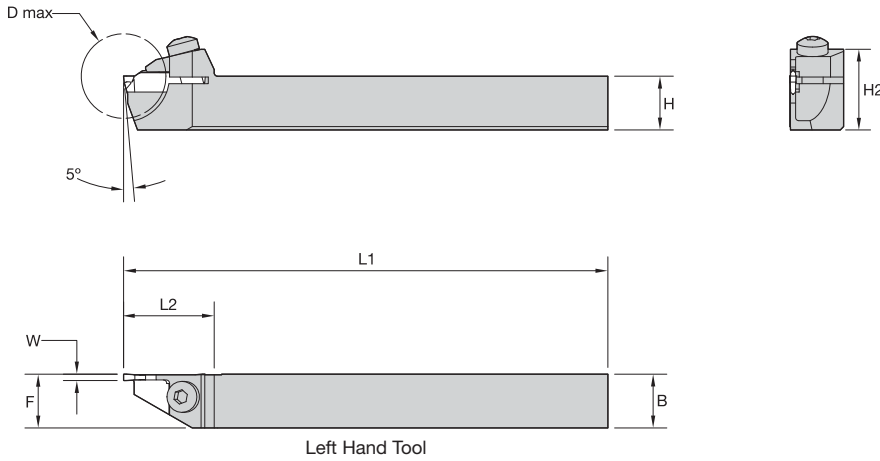
(continued)

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

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

Turning

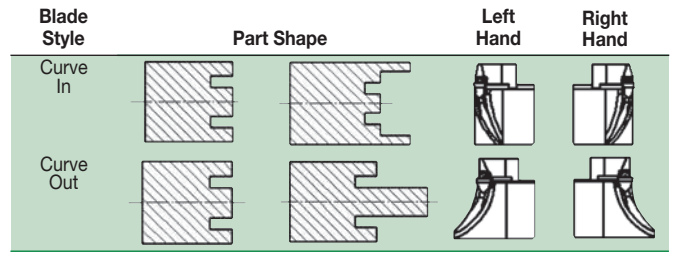
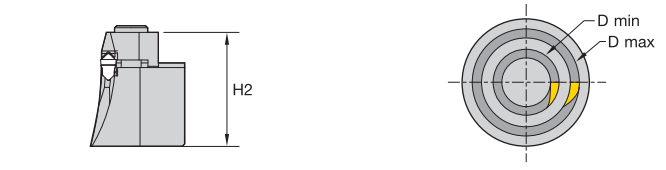
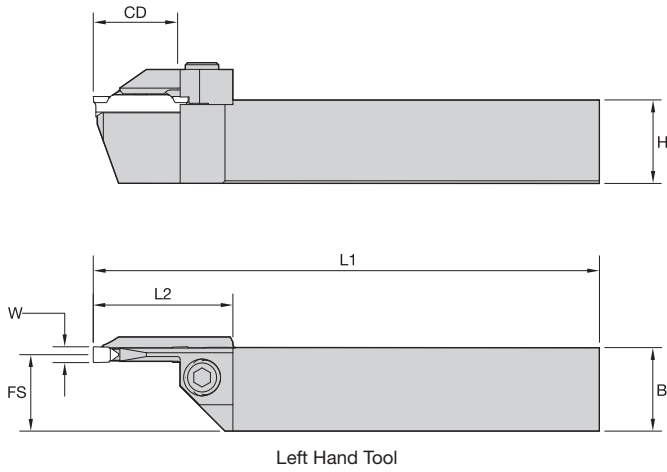
Turning



Swiss Grooving and Cut-Off

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

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

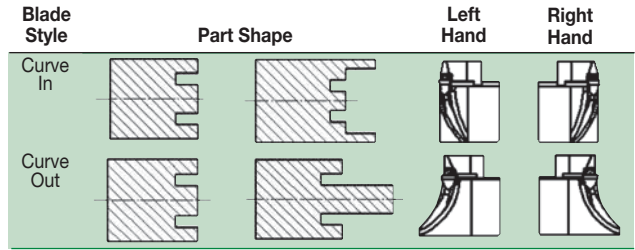
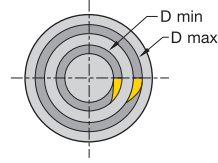
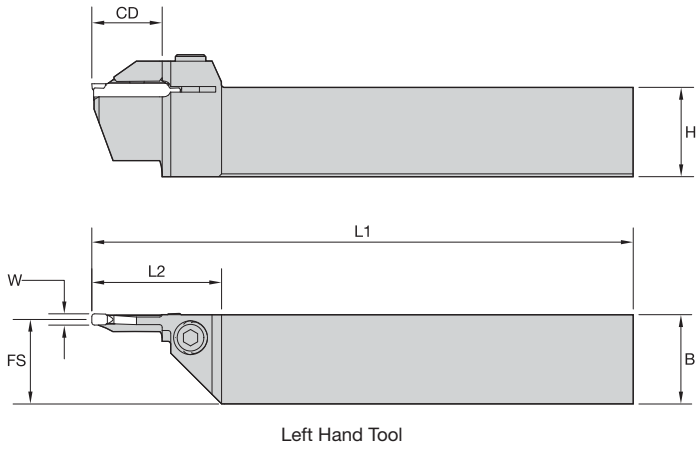


Curve Out

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

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

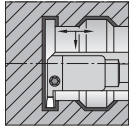
Turning



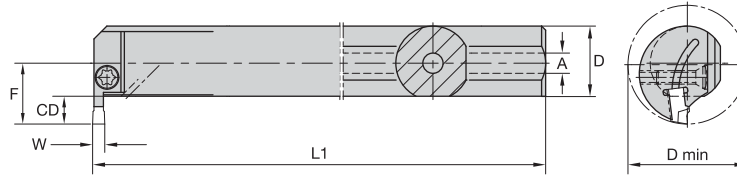
Curve In

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

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



Steel shank with through coolant.



Right Hand Tool

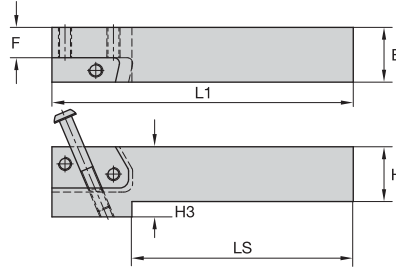
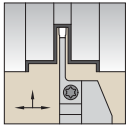


■ I.D. Boring Bars



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

Turning



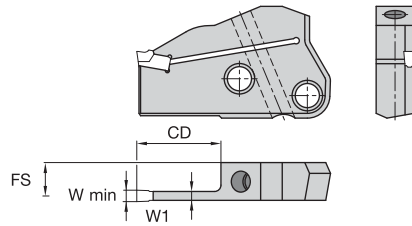
M50
2 blade screws required
Right Hand Tool

■ Grooving, Cut-Off, and Face Grooving



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

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

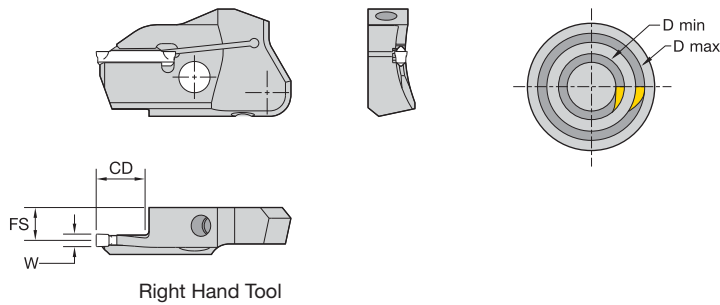


Right Hand Tool

■ Grooving and Cut-Off

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

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



■ Face Grooving

order number	catalog number	seat size	CD	W	FS
right hand					
5359150	WMTWGMR313B038-052	3	.500	.118	.433
5359151	WMTWGMR316B052-070	3	.625	.118	.433
5359152	WMTWGMR316B070-100	3	.625	.118	.433
5359153	WMTWGMR319B100-205	3	.750	.118	.433
5359154	WMTWGMR416B052-070	4	.625	.157	.413
5359155	WMTWGMR416B070-100	4	.625	.157	.413
5359156	WMTWGMR419B100-205	4	.750	.157	.413
5359157	WMTWGMR522B100-205	5	.8661	.197	.394
5359158	WMTWGMR622B100-205	6	.8661	.236	.394
left hand					
5359134	WMTWGML313B038-052	3	.500	.118	.433
5359135	WMTWGML316B052-070	3	.625	.118	.433
5359136	WMTWGML316B070-100	3	.625	.118	.433
5359137	WMTWGML319B100-205	3	.750	.118	.433
5359138	WMTWGML413B038-052	4	.500	.157	.413
5359139	WMTWGML416B052-070	4	.625	.157	.413
5359140	WMTWGML416B070-100	4	.625	.157	.413
5359141	WMTWGML419B100-205	4	.750	.157	.413
5359142	WMTWGML516B038-052	5	.625	.197	.394
5359143	WMTWGML519B052-070	5	.750	.197	.394
5359144	WMTWGML519B070-100	5	.750	.197	.394
5359145	WMTWGML522B100-205	5	.8661	.197	.394
5359146	WMTWGML616B038-052	6	.625	.236	.394
5359147	WMTWGML619B052-070	6	.750	.236	.394
5359148	WMTWGML619B070-100	6	.750	.236	.394
5359149	WMTWGML622B100-205	6	.8661	.236	.394

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

WIN WITH WIDIA™

WIDIA 



ProGroove™

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

ProGroove Grooving and Cut-Off

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

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

WIDIA 

WIDIA™ TopGroove™

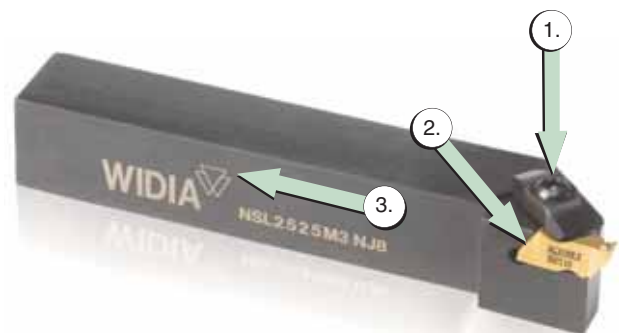
WIDIA has set the industry standard for threading and grooving productivity with the TopGroove clamping design. The TopGroove design provides consistent tool performance, accurate indexing, and superior clamping to provide excellent surface finish and outstanding tool life.

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

TopGroove

Rigidity, Versatility, and Chip Control

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



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

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

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



Carbide Grades and Proven Solutions for High Productivity

- The TopGroove system has a carbide grade to match your application needs that includes uncoated grades, PVD-coated grades, CVD-coated grades, and advanced material grades, including cermets, ceramics, PCBNs, and PCDs.
- PVD 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.

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

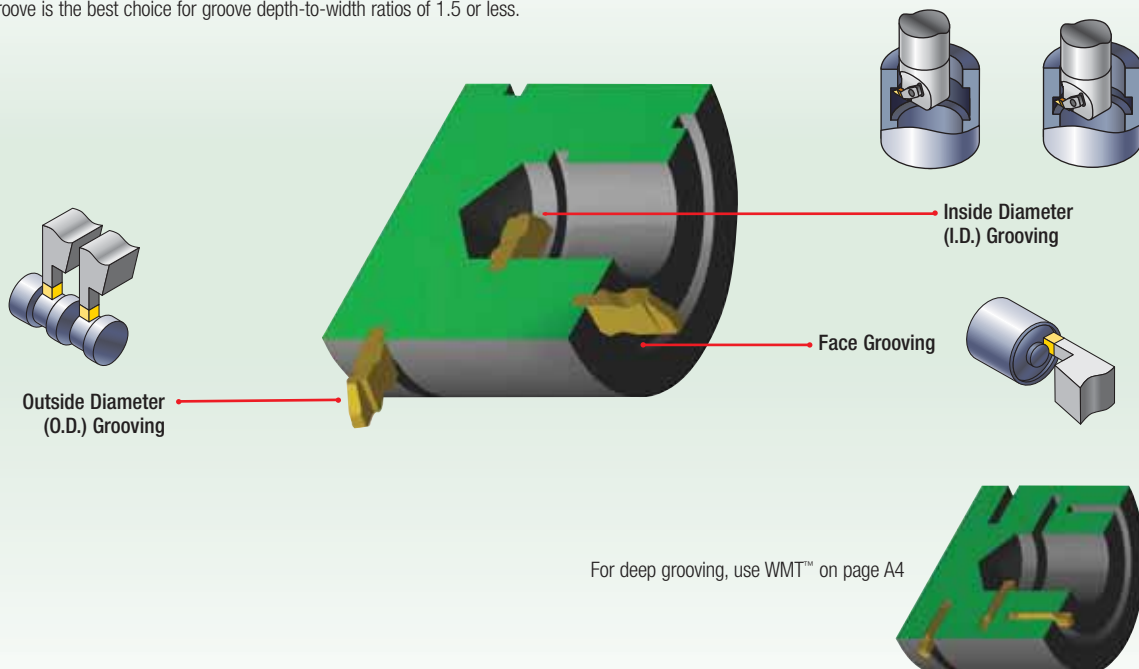
What you need to know:

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

1 Choose the application to be performed:

Groove depth, width, and profile.

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



TopGroove™ for Internal, External, and Face Grooving Applications

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

2 Identify the material to be machined:

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

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

3 Select your toolholder based on the application:

- A Choose the appropriate gage insert (width) required for the application.
- B Choose the shortest cutting depth "CD" dimension for increased tool rigidity.
- C Select the largest toolholder shank "H" and "B" dimensions for maximum rigidity.

TopGroove™
Toolholders

WIDIA

■ NS

order number	catalog number	C		F	L1	L2	B4	CD	gage insert	clamp	clamp screw	heat Treat Plus	
		H	B										
3632147	NSR062	.375	.375	.562	2.50	.75	.35	.138	N.2H	CM74	S310	—	7/64
3639035	NSR082V	.500	.500	.750	3.50	.75	.35	.138	N.2H	CM74	S310	—	7/64
3639044	NSR102B	.625	.625	.875	4.50	.75	.35	.138	N.2H	CM74	S310	—	7/64
3639026	NSR122B	.750	.750	1.000	4.50	.75	.35	.138	N.2H	CM74	S310	—	7/64
3639025	NSR162C	1.000	1.000	1.250	5.00	.75	.35	.138	N.2H	CM74	S310	—	7/64
3639027	NSR123A	.750	.750	1.000	4.00	1.25	.50	.210	N.3R	CM73LP	—	S2112	25 IP
3639023	NSR123B	.750	.750	1.000	4.50	1.25	.50	.210	N.3R	CM73LP	—	S2112	25 IP
3638892	NSR163C	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3R	CM73LP	—	S2112	25 IP
3638891	NSR163D	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3R	CM73LP	—	S2112	25 IP
3639028	NSR203D	1.250	1.250	1.500	6.00	1.25	.50	.210	N.3R	CM73LP	—	S2112	25 IP
3637508	NSR243D	1.500	1.500	2.000	6.00	1.38	.50	.210	N.3R	CM73LP	—	S2112	25 IP
3637535	NSR243E	1.500	1.500	2.000	7.00	1.38	.50	.210	N.3R	CM73LP	—	S2112	25 IP
3637496	NSR853D	1.250	1.000	1.250	6.00	1.25	.50	.210	N.3R	CM73LP	—	S2112	25 IP
3637509	NSR205D	1.250	1.250	1.500	6.00	2.00	.61	.415	N.5R	CM80	S352	—	1/8
3637540	NSR245D	1.500	1.500	2.000	6.00	2.00	.61	.415	N.5R	CM80	S352	—	1/8
3632161	NSL062	.375	.375	.562	2.50	.75	.35	.138	N.2L	CM75	S310	—	7/64
3637485	NSL082V	.500	.500	.750	3.50	.75	.35	.138	N.2L	CM75	S310	—	7/64
3637510	NSL102B	.625	.625	.875	4.50	.75	.35	.138	N.2L	CM75	S310	—	7/64
3632145	NSL122B	.750	.750	1.000	4.50	.75	.35	.138	N.2L	CM75	S310	—	7/64
3632138	NSL162C	1.000	1.000	1.250	5.00	.75	.35	.138	N.2L	CM75	S310	—	7/64
3632152	NSL123A	.750	.750	1.000	4.00	1.25	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3639032	NSL123B	.750	.750	1.000	4.50	1.25	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3639029	NSL163C	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3639024	NSL163D	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3L	CM73LP	—	S2112	25 IP

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

4 Select chipbreaker style for the application:

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

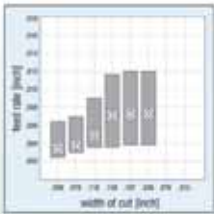
NOTE: Chart shows recommended starting feed rates.

See page A47.

TopGroove™ Inserts
 Feed Values for Grooving

TopGroove • NG-K, NG-1L, and NG

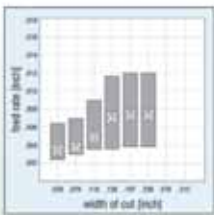
- Chip control enables true optimization and productivity.
- For general purpose, O-ring, and circlip grooving applications.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.



① Recommended feed

TopGroove • NGP and NGD-K

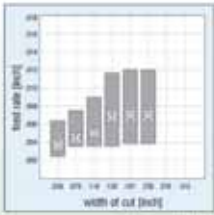
- Positive rake angles.
- For deep, O-ring, circlip, and general purpose grooving applications.
- Chip geometry for excellent chip control.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.



① Recommended feed

TopGroove • NR and NR-K

- 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

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

B Select the required corner radius value “RR”.

TopGroove™
 Grooving Inserts






■ NG

● first choice
□ alternate choice

catalog number	A W		Ap max		B RR		T		Insert size	TN6010	TN6025	TN7110	TNM
	mm	in	mm	in	mm	in	mm	in					
right hand NG2001R	0,79	.031	—	—	0,09	.0035	1,27	.050	2	●	●	●	●
NG2041R	1,04	.041	—	—	0,09	.0035	1,27	.050	2	●	●	●	●
NG2056R	1,47	.058	—	—	0,19	.0075	1,27	.050	2	●	●	●	●
NG2062R	1,58	.062	—	—	0,19	.0075	2,79	.110	2	●	●	●	●
NG3047R	1,19	.047	—	—	0,19	.0075	1,91	.075	3	●	●	●	●
NG3062R	1,58	.062	—	—	0,19	.0075	2,09	.084	3	●	●	●	●
NG3094R	2,30	.094	—	—	0,19	.0075	3,81	.150	3	●	●	●	●
NG3125R	3,18	.125	—	—	0,19	.0075	3,81	.150	3	●	●	●	●
NG4250R	6,35	.250	—	—	0,57	.0225	6,35	.250	4	●	●	●	●
left hand NG2031L	0,79	.031	—	—	0,09	.0035	1,27	.050	2	●	●	●	●



5 Select grade:

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

See page A48 for Grades and Grade Descriptions.

6 Determine cutting data:

- A Based on material group and grade, identify starting speed (vc).
- B First choice starting speed is in **bold**.

See page A50 for cutting data.

ANSI ISO 513		VDI 3323		Cutting Speed + vc SFM											
Material Group		TN6010			TN6025			TN7110			THM				
		min	Start	max	min	Start	max	min	Start	max	min	Start	max		
P	1	455	570	685	425	455	490	655	705	750	295	310	325		
	2	425	620	620	390	520	655	620	800	980	295	340	455		
	3	360	455	555	325	425	520	520	670	820	225	295	360		
	4	390	490	590	390	490	590	590	750	915	260	340	425		
	5	325	425	520	325	425	520	480	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	330	365	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			
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		
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	300	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		
	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	960	1210	750	960	1210	---	---	---	750	960	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		
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	290	135	195	235	---	---	---	135	195	235		

TopGroove
Holder Identification System

Turning

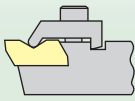


NSR163D

N

Insert
Holding
Method

N —
TopGroove*



*Proprietary
standard only.

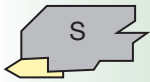
S

Insert
Mounting
Location

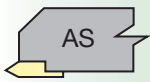
End mount



Side mount
Offset



Side mount
No offset
for swiss
machining



NRR undercut

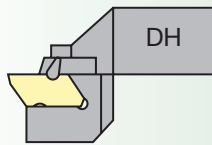


R

Hand
of Tool

**Drop
Head**

Drop
Head



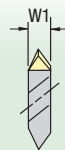
16

Shank
Size

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

3

Insert
Size

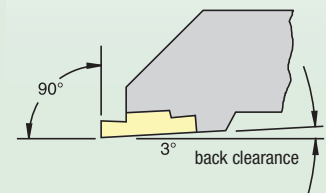


insert size	W1
2	.150"
3	.195"
4	.255"
5	.380"
6	.383"
8	.438"

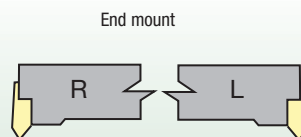
D

Qualified
Surface
and
Length

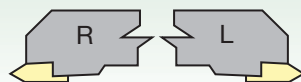
- A — qualified back and end, 4" long
- B — qualified back and end, 4.5" long
- C — qualified back and end, 5" long
- D — qualified back and end, 6" long
- E — qualified back and end, 7" long



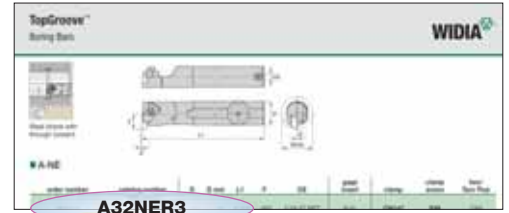
NOTE: Holders are designed to locate
insert inclined to 3° to provide back
clearance down open side.



Side mount



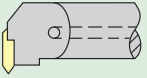
**TopGroove
Boring Bar Identification System**



Turning


A
Bar Type

Steel with coolant



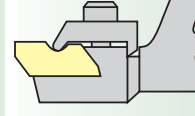
32
Bar Diameter

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



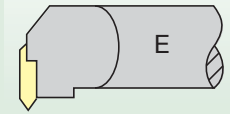
N
Insert Holding Method

N — TopGroove

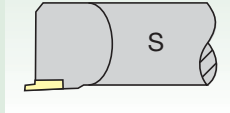


E
Insert Location

End mount




Side mount

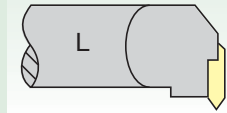


R
Hand of Tool

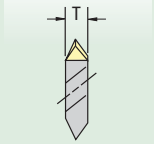
Right hand



Left hand

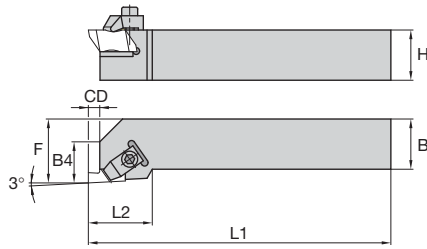
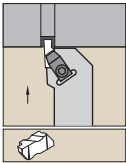


3
Insert Size



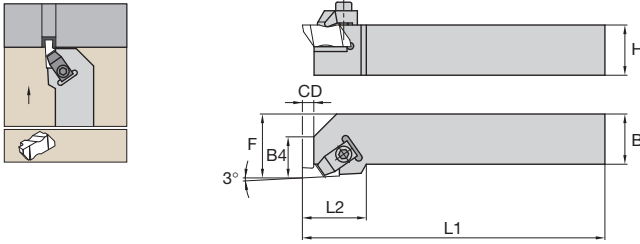
insert size	T
1	.100"
2	.150"
3	.195"
4	.255"
5	.380"
6	.383"
8	.438"

Turning



■ NS

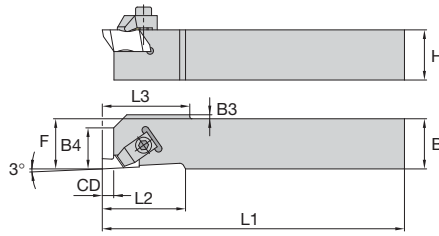
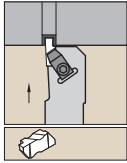
order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus
	right hand											
3632147	NSR062	.375	.375	.562	2.50	.75	.35	.138	N.2R	CM74	S310	7/64
3639035	NSR082V	.500	.500	.750	3.50	.75	.35	.138	N.2R	CM74	S310	7/64
3639044	NSR102B	.625	.625	.875	4.50	.75	.35	.138	N.2R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



■ NS (with Shim)

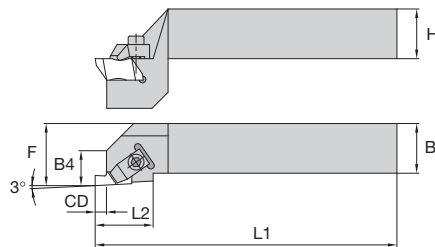
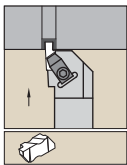
order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/Torx Plus	shim	shim screw	shim screw I.D. drive size
	right hand														
3639031	NSR164C	1.000	1.000	1.250	5.00	1.38	.54	.294	N.4R	CM72LP	S2112	25 IP	SM420	SL344	—
3639033	NSR164D	1.000	1.000	1.250	6.00	1.38	.54	.294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

Turning



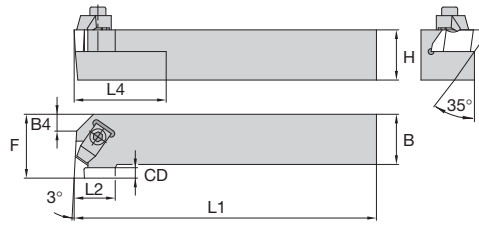
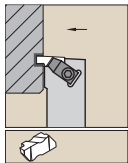
■ NAS (for Swiss Machines)

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



■ NS-DH

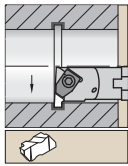
order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/Torx plus	jack screw	wrench size jack screw
right hand														
3637547	NSRDH122B	.750	.750	1.000	4.50	.75	.40	.138	N.2R	CM74	S310	7/64	—	—
3637528	NSRDH163D	1.000	1.000	1.250	6.00	1.25	.58	.210	N.3R	CM72LP	S2112	25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



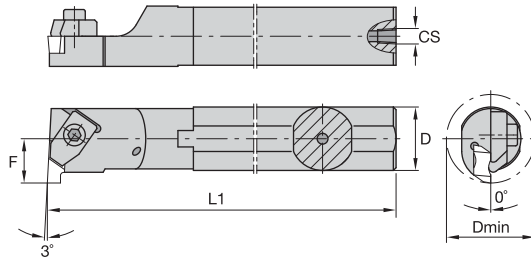
■ NE

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

Turning



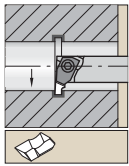
Steel shank with through coolant.



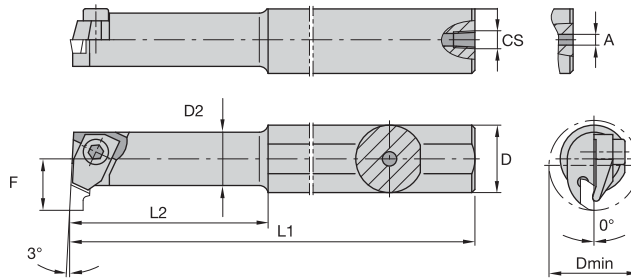
■ A-NE

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

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



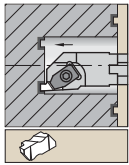
Necked steel shank with through coolant.



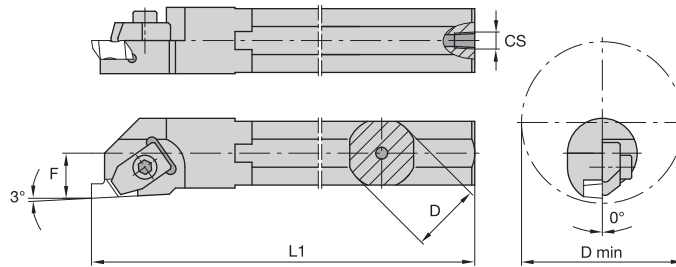
■ **A-NE-1**

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

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



Steel shank with through coolant.



■ **A-NS**

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

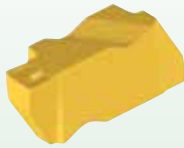
NOTE: Minimum bore capability varies with depth of groove. See pages A68–A69 for details.

insert style	application	rake angle	page(s)	insert style	application	rake angle	page(s)
NG 	<ul style="list-style-type: none"> • General-purpose grooving. • O-ring grooving. • Circlip grooving. 	neutral	A51	NFD-KI* 	<ul style="list-style-type: none"> • Internal deep face grooving with chip control. • For use in boring bars for internal face grooves. 	10° positive	—
NG-K 	<ul style="list-style-type: none"> • Chip control geometry. • General-purpose grooving. • O-ring grooving. • Circlip grooving. • Light turning. 	10° positive	A52	NP-K 	<ul style="list-style-type: none"> • Turning. • Back turning positive. • Profiling with chip control. 	10° positive	A58
NGC-K* 	<ul style="list-style-type: none"> • Combined groove and chamfered edge break in one positive plunge with chip control. • Designed for DIN 471/472 standard circlip grooves. 	10° positive	—	NR 	<ul style="list-style-type: none"> • Full radius grooving. • Turning and profiling. 	neutral	A58
NGD* 	<ul style="list-style-type: none"> • Deep grooving. 	neutral	—	NR-K 	<ul style="list-style-type: none"> • Chip control geometry. • Full radius grooving, turning, and profiling. 	10° positive	A60
NGD-K 	<ul style="list-style-type: none"> • Chip control geometry. • Deep grooving. • Light turning. 	10° positive	A55	NRD 	<ul style="list-style-type: none"> • Deep grooving. • Full radius end-form. 	neutral	A60
NGP 	<ul style="list-style-type: none"> • General-purpose grooving. • O-ring grooving. • Circlip grooving. 	5° positive	A56	NRP* 	<ul style="list-style-type: none"> • Full radius grooving. • Light-turning profiling. 	5° positive	—
NF* 	<ul style="list-style-type: none"> • Face grooving. • Additional side clearance. 	neutral	—	NU* 	<ul style="list-style-type: none"> • Undercutting. 	neutral	—
NF-K 	<ul style="list-style-type: none"> • Face grooving with chip control. • Additional side clearance. 	10° positive	A57	NV* 	<ul style="list-style-type: none"> • Poly-Vee grooving. 	neutral	—
NFD-K 	<ul style="list-style-type: none"> • Deep face grooving with chip control. • Additional side clearance. 	10° positive	A57	NB/NBD 	<ul style="list-style-type: none"> • Blanks. • Blanks for deep grooving. • Available in uncoated grades only. 	—	A61

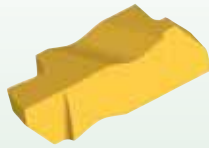
*Inserts are available as custom solutions.



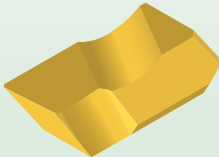
TopGroove • NG-K, NG-1L, and NG



NG-K

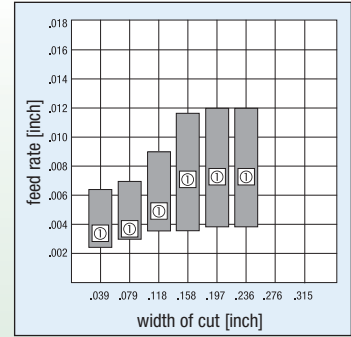


NG

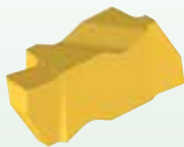


NG-1L

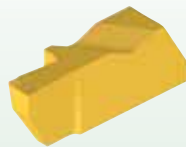
- Chip control enables true optimization and productivity.
- For general-purpose, O-ring, and circlip grooving applications.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.



TopGroove • NGP and NGD-K

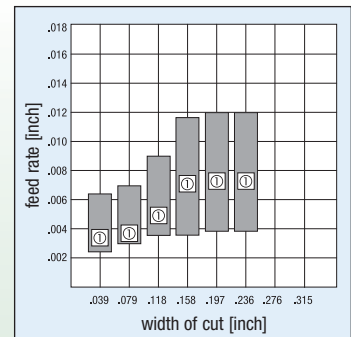


NGP

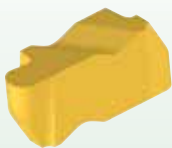


NGD-K

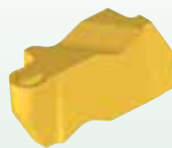
- Positive rake angles.
- For deep, O-ring, circlip, and general-purpose grooving applications.
- Chip geometry for excellent chip control.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.



TopGroove • NR and NR-K

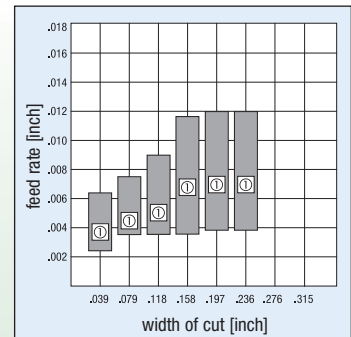


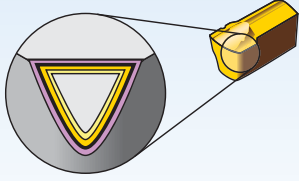
NR



NR-K

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





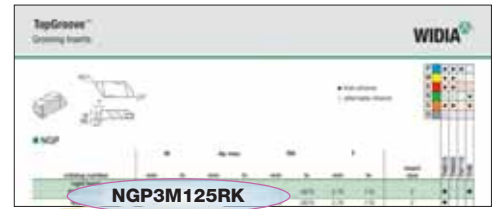
Coatings provide high-speed capability and are engineered for finishing to light roughing.

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

Grade	Coating	Grade Description	Speed (m/min)																					
			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																					
			M																					
			K																					
			N																					
			S																					
			H																					
TN6025 HC-S25		Coated carbide. PVD — TiAlN Nano-multilayer. Light and medium machining. For difficult-to-machine alloys.	P																					
			M																					
			K																					
			N																					
			S																					
			H																					
TN710 HC-P10		Coated carbide. MTCVD/CVD — TiN-TiCN-Al ₂ O ₃ -TiN. Very wear resistant. Light and medium machining. For steels and nodular cast iron.	P																					
			M																					
			K																					
			N																					
			S																					
			H																					
THM HW-K15		Uncoated carbide. Extraordinarily good balance of hardness, wear resistance, edge stability, and toughness. Light and medium machining. For cast iron and all non-ferrous metals and non-metals. Useful in unfavorable conditions.	P																					
			M																					
			K																					
			N																					
			S																					
			H																					



**TopGroove
Insert Identification System**

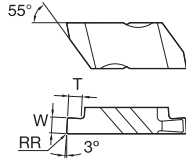
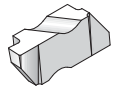


Turning

N	G	P	3	M	125	R		K																																								
Type of Insert	Insert Style	Additional Information	Insert Size	Size Identification	Groove Size**	Hand of Insert	Cutting Depth	Chipbreaker Design	Definition of Inserts																																							
N — Top-Groove		D — Deep grooving P — Positive C — Groove and chamfer		M — Metric insert groove width C — Circlip groove insert width is nominal circlip size Blank — indicates inch width insert		L — Left hand R — Right hand																																										
						Shown for groove and chamfer inserts in .0004" increments.																																										
B — Blank (for special forms) F — Face grooving G — Grooving P — Back turning R — Full radius U — Undercutting (or relieving) V — Poly-Vee					Groove width for F-, G-, and U-style inserts; radii for R-style grooving inserts; and circlip size for groove and chamfer inserts. Dimension in .001". inch example 1/32 = .031" Width Tolerance: ±.001" unless otherwise specified			K — Standard chip control E — Hone only																																								
			<table border="1"> <thead> <tr> <th rowspan="2">insert size</th> <th colspan="2">S</th> <th colspan="2">W1</th> </tr> <tr> <th>inch</th> <th>mm</th> <th>inch</th> <th>mm</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>.100</td> <td>2,54</td> <td>.100</td> <td>2,54</td> </tr> <tr> <td>2</td> <td>.219</td> <td>5,56</td> <td>.150</td> <td>3,81</td> </tr> <tr> <td>3</td> <td>.344</td> <td>8,74</td> <td>.195</td> <td>4,95</td> </tr> <tr> <td>4</td> <td>.453</td> <td>11,51</td> <td>.255</td> <td>6,98</td> </tr> <tr> <td>5</td> <td>.688</td> <td>17,48</td> <td>.380</td> <td>9,65</td> </tr> <tr> <td>6</td> <td>.453</td> <td>11,51</td> <td>.383</td> <td>9,73</td> </tr> </tbody> </table>	insert size	S		W1		inch	mm	inch	mm	1	.100	2,54	.100	2,54	2	.219	5,56	.150	3,81	3	.344	8,74	.195	4,95	4	.453	11,51	.255	6,98	5	.688	17,48	.380	9,65	6	.453	11,51	.383	9,73						
insert size	S		W1																																													
	inch	mm	inch	mm																																												
1	.100	2,54	.100	2,54																																												
2	.219	5,56	.150	3,81																																												
3	.344	8,74	.195	4,95																																												
4	.453	11,51	.255	6,98																																												
5	.688	17,48	.380	9,65																																												
6	.453	11,51	.383	9,73																																												
								Groove size J or L — Poly-Vee inserts I — Internal face grooving																																								
				**Omit position for TopGroove NB-style blanks.																																												

Turning

ANSI ISO 513	VDI 3323	Cutting Speed • vc SFM											
Material Group		Cutting Speed • vc SFM											
		min	Start	max	min	Start	max	min	Start	max	min	Start	max
P		TN6010			TN6025			TN7110			THM		
	1	455	570	685	425	455	490	655	705	750	295	310	325
	2	425	520	620	390	520	655	620	800	980	295	340	455
	3	360	455	555	325	425	520	520	670	820	225	295	360
	4	390	490	590	390	490	590	590	750	915	260	340	425
	5	325	425	520	325	425	520	490	635	785	225	295	360
	6	390	490	590	390	490	590	590	750	915	260	340	425
	7	325	425	520	295	410	520	455	620	785	195	275	360
	8	295	390	490	260	360	455	390	555	720	160	245	325
	9	195	295	390	195	260	325	295	410	520	130	160	225
	10	295	340	390	260	310	360	425	490	555	195	225	260
	11	160	210	260	160	210	260	260	340	425	130	160	195
	12	390	505	620	390	455	520	590	685	785	260	310	360
13.1	295	390	490	260	340	425	425	540	655	195	245	295	
13.2	145	195	245	130	180	210	210	275	325	95	130	145	
M		TN6010			TN6025			TN7110			THM		
	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	
K		TN6010			TN6025			TN7110			THM		
	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	
N		TN6010			TN6025			TN7110			THM		
	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	
S		TN6010			TN6025			TN7110			THM		
	31	120	145	180	85	120	145	—	—	—	85	120	145
	32	95	115	145	65	95	115	—	—	—	65	95	115
	33	75	90	115	55	75	90	—	—	—	55	75	90
	34	45	55	80	35	45	55	—	—	—	35	45	55
	35	50	55	80	35	50	55	—	—	—	35	50	55
	36	195	235	260	135	195	235	—	—	—	135	195	235
37	95	115	145	65	95	115	—	—	—	65	95	115	



■ **NG**

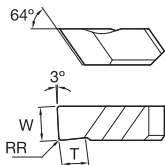
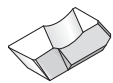
● first choice
○ alternate choice

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



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

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

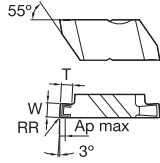
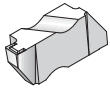


■ **NG-1L**

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

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

Turning



● first choice
○ alternate choice

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

■ NG-K

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

(continued)

(NG-K continued)

- first choice
- alternate choice

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



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

(continued)

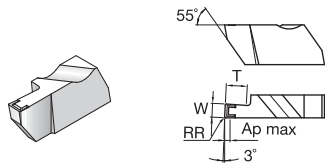
(NG-K continued)

Turning

● first choice
○ alternate choice

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

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



● first choice
○ alternate choice

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

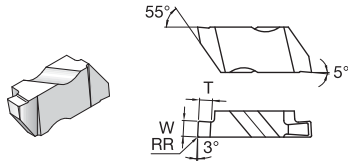


■ **NGD-K**

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

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

Turning



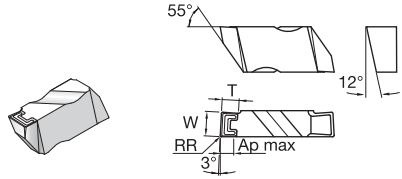
● first choice
○ alternate choice

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

■ NGP

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

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



● first choice
○ alternate choice

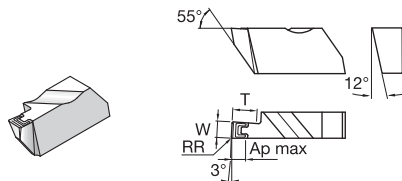
P	●	●	●	●
M	●	●	○	○
K	●	●	○	○
N	○	○	○	○
S	○	○	○	○
H	○	○	○	○



■ **NF-K**

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

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

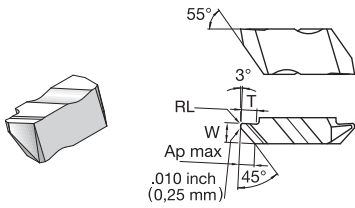


■ **NFD-K**

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

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

Turning



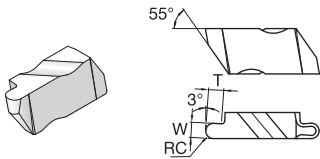
● first choice
○ alternate choice

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

■ NP-K

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

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



■ NR

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

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

(continued)

(NR continued)

- first choice
- alternate choice

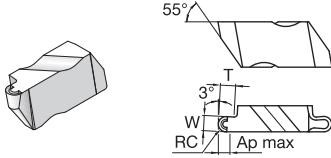
P	●	●	●	●
M	●	●	○	●
K	●	●	○	●
N	○	○	●	●
S	●	●	●	●
H	○	○	○	○



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

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

Turning



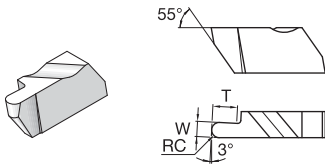
● first choice
○ alternate choice

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

■ NR-K

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

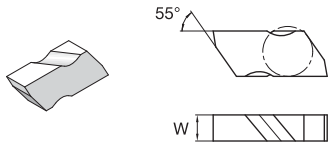
NOTE: Right-hand insert shown; left-hand insert is mirror image.



■ NRD

catalog number	W		Ap max		RC		T		insert size	cutting edges	TN6010	TN6025	TN7110	THM
	mm	in	mm	in	mm	in	mm	in						
right hand														
NRD3031R	1,58	.062	—	—	0,79	.0310	3,18	.125	3	2	●	●		
NRD3062R	3,18	.125	—	—	1,59	.0625	6,35	.250	3	1	●	●		
NRD4062R	3,18	.125	—	—	1,59	.0625	6,35	.250	4	2	●	●		
left hand														
NRD4125R	6,35	.250	—	—	3,18	.1250	12,70	.500	4	1	●	●		
right hand														
NRD3031L	1,58	.062	—	—	0,79	.0310	3,18	.125	3	2	●	●		
NRD3062L	3,18	.125	—	—	1,59	.0625	6,35	.250	3	1	●	●		
left hand														
NRD4062L	3,18	.125	—	—	1,59	.0625	6,35	.250	4	2	●	●		
NRD4125L	6,35	.250	—	—	3,18	.1250	12,70	.500	4	1	●	●		

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



● first choice
○ alternate choice

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



■ NB

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

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

TopGroove Inserts: The Best Platform for Customization

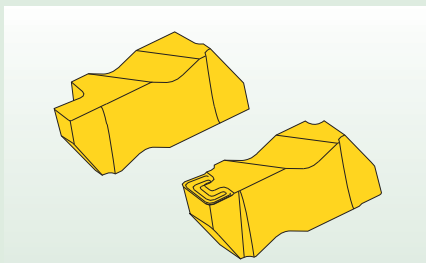
All TopGroove custom order inserts benefit from the superior rigidity of our TopGroove toolholder and clamping system. For added productivity, most custom orders can be incorporated into the double-ended inserts.

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

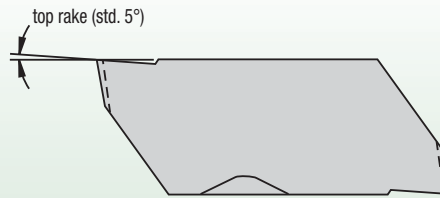
State-of-the-art CAD enables rapid development of your custom insert design. For convenience, a concept drawing is always available to facilitate engineering development of an insert.

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

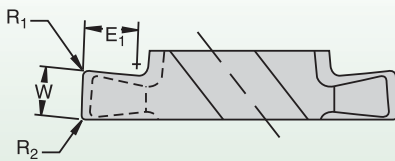
Whatever your special grooving requirements may be, WIDIA can provide an effective solution. We have the technical expertise, resources, and commitment to help you develop insert designs that satisfy your metalcutting application demands.



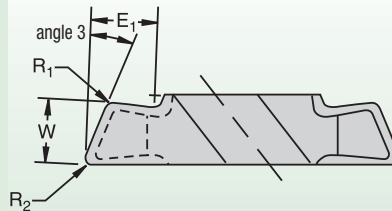
top rake



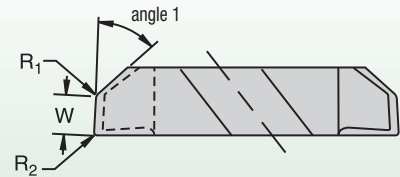
style A



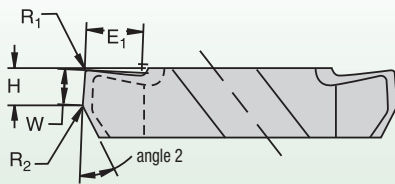
style B1



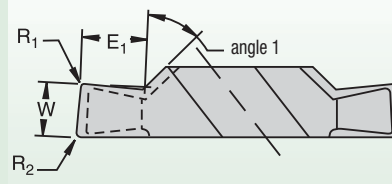
style B2



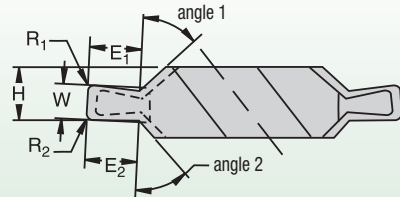
style B3



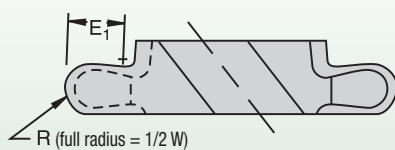
style B4



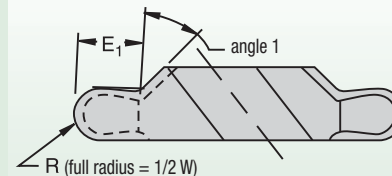
style C1



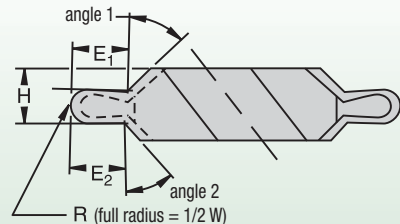
style D



style F



style G



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



TopGroove™ Grooving Systems

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

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

Date

Customer-Specified Dimensions

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

Orientation (circle one) left hand right hand

Top Rake **Total Width (T)**

Cutting Width (W) **Angle 1**

Corner Radius 1 (R₁) **Angle 2**

Corner Radius 2 (R₂) **Offset (H)**

Cutting Depth (E₁) **Other** (please specify)

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

Closest Catalog Standard

Customer

Distributor

Shipping Requirements

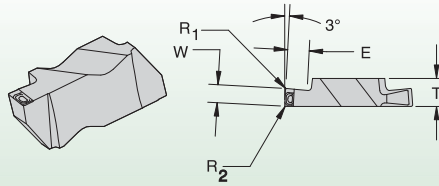
Attention Distributors: Use this worksheet to collect information for your customer.

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

A-SK Specials

10° positive cutting action

- Grooving
- Face grooving



insert catalog number		width range W	corner radii range R ₁ and R ₂	E	T	grades
right hand	left hand					
NG2-R-SK or NF2-R-SK	NG2-L-SK or NF2-L-SK	.026-.056	.000-.007	.050	.150	Carbide grades quoted upon request. See page A48.
		.057-.135	.003-.013	.110		
NG3-R-SK or NF3-R-SK	NG3-L-SK or NF3-L-SK	.042-.067	.003-.013	.094	.195	
		.068-.076	.005-.020	.094		
		.077-.094	.005-.030	.150		
		.095-.105	.005-.020	.150		
		.106-.125	.005-.030	.150		
		.126-.134	.005-.020	.150		
		.135-.156	.005-.030	.150		
		.157-.174	.008-.018	.150		
NG4-R-SK or NF4-R-SK	NG4-L-SK or NF4-L-SK	.184-.196	.018-.028	.150		
		.100-.110	.005-.020	.150	.255	
		.111-.125	.005-.030	.150		
		.126-.131	.005-.020	.150		
		.132-.156	.005-.030	.150		
		.157-.162	.005-.020	.150		
		.163-.189	.005-.030	.250		
		.190-.191	.018-.028	.250		
.192-.204	.008-.018	.250				
		.245-.257	.018-.025	.250		

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

Order example: NF3R-SK W=.090, R₁=.010, R₂=.010, grade TN6010.

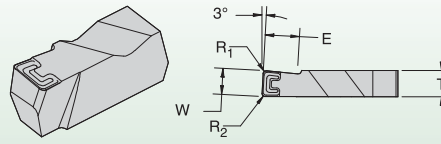
Unless otherwise specified, a standard tolerance of ±.001" on width (W) will be applied, and a standard tolerance of ±.0025" on radii (R₁ and R₂) will be applied.

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

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

A-SK Specials

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



insert catalog number		width range W	corner radii range R ₁ and R ₂	E	T	grades
right hand	left hand					
NGD3-R-SK or NFD3-R-SK	NGD3-L-SK or NFD3-L-SK	.057-.069 .089-.101* .120-.132* .184-.196*	.003-.013 .003-.013 .003-.013 .018-.028	.125 .250 .250 .250	.195	Carbide grades quoted upon request. See page A48.
NGD4-R-SK or NFD4-R-SK	NG4-L-SK or NF4-L-SK	.120-.132* .180-.196* .245-.257*	.003-.013 .018-.028 .018-.028	.250 .375 .500	.255	

*One cutting edge.

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

Order example: NF3R-SK W=.090, R₁=.010, R₂=.010, grade TN6010.

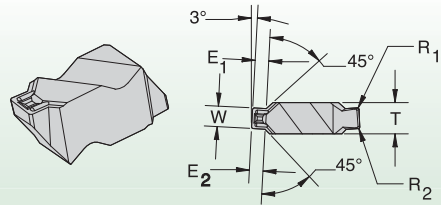
Unless otherwise specified, a standard tolerance of ±.001" on width (W) will be applied, and a standard tolerance of ±.0025" on radii (R₁ and R₂) will be applied.

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

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

C1-SK Specials

- Groove and chamfer

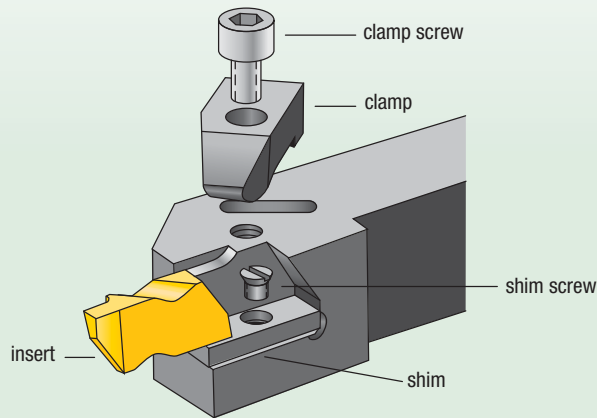


insert catalog number		width range W	corner radii range R ₁ and R ₂	E	T	grades
right hand	left hand					
NB2-R-K	NB2-L-K	.047-.125	.005-.015	.100	.150	Carbide grades quoted upon request. See page A48.
NB3-R-K	NB3-L-K	.094-.170	.005-.025	.150	.195	

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

TopGroove Toolholders and Boring Bars

Turning



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

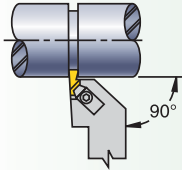
*1" diameter boring head.

**Boring head.

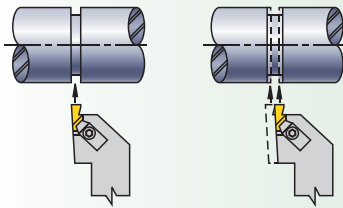
Grooving Tool Failure and Solution Guide

Practical Solutions to Common Grooving Problems

Holder Position for Grooving Operation

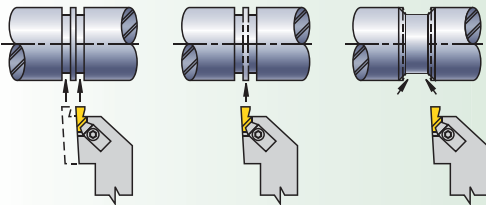


How to Cut a Groove Slightly Wider than the Groove Tool



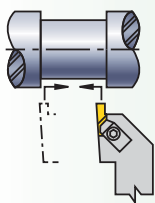
1. Plunge the center of the groove.
2. Plunge each side of the groove to get the specified width. Use a slower feed rate when cutting groove sides.

How to Cut Wider Grooves



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

Finish Turning the Groove



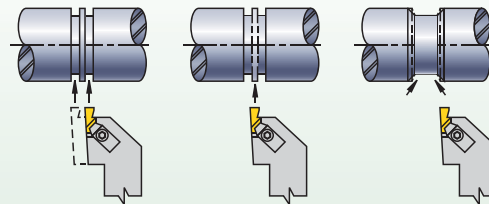
1. Follow recommendations explained above.
2. To avoid insert chipping and to achieve groove wall perpendicularity, follow the tool path outlined here.
3. Use the lightest depth of cut that still enables good chip surface finishing.

problem	solution
burr	<ol style="list-style-type: none"> 1. Ensure tool center height. 2. Use sharp tool (index more often). 3. Use positive rake PVD-coated insert. 4. Use correct grade for workpiece material. 5. Use correct geometry (e.g., positive rake for work-hardening material). 6. Chamfer before grooving. 7. Change tool path.
poor surface finish	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Use sharp tool (index more often). 2. Dwell tool in bottom 1–3 revolutions (max). 3. Reduce tool overhang (increase rigidity). 4. Ensure correct tool alignment. 5. Reduce feed rate at groove bottom. 6. Use a wider insert. 7. Ensure tool center height.
poor chip control	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Reduce tool and workpiece overhang. 2. Adjust speed and feed (usually increase first). 3. Ensure center height.
insert chipping	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Check tool alignment for square. 2. Use correct insert hand. 3. Reduce workpiece and tool overhang. 4. Use sharp insert (index more often).

Machining Guidelines for Chip Control • Grooving

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

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

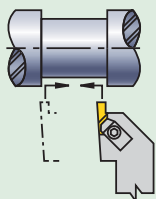


Machining Guidelines for Chip Control • Turning/Profiling

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

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

Finish Turning the Groove



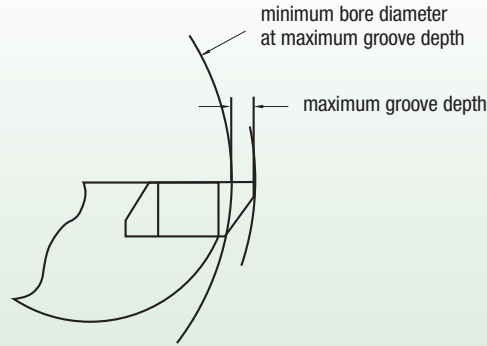
1. Plunge both sides of groove width.
2. Plunge center area to remove web of material remaining.
3. To avoid insert chipping and to achieve groove wall perpendicularity, follow the tool path outlined.
4. Use the lightest depth of cut that still allows good chipbreaking, tool life, and surface finish.

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

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

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

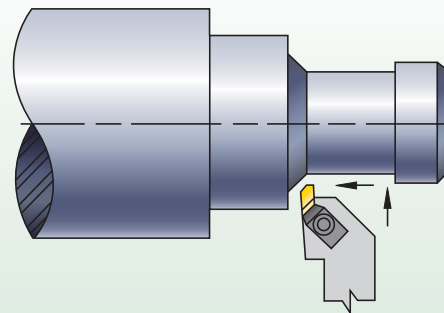
Internal Groove Depth versus Bar Interference



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

Machining Guidelines for Back Turning/Turning/Profiling

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



Machining Guidelines for Using TopGroove Deep Grooving Inserts (NGD)

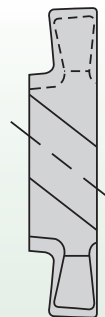
Typically, those NGD- and NRD-style inserts with two cutting edges require no machine offset changes. However, those inserts with only one cutting edge do require offset changes. Refer to the chart here to ensure proper offset adjustments.

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

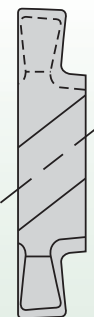
TopGroove Insert Selection Guide

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

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



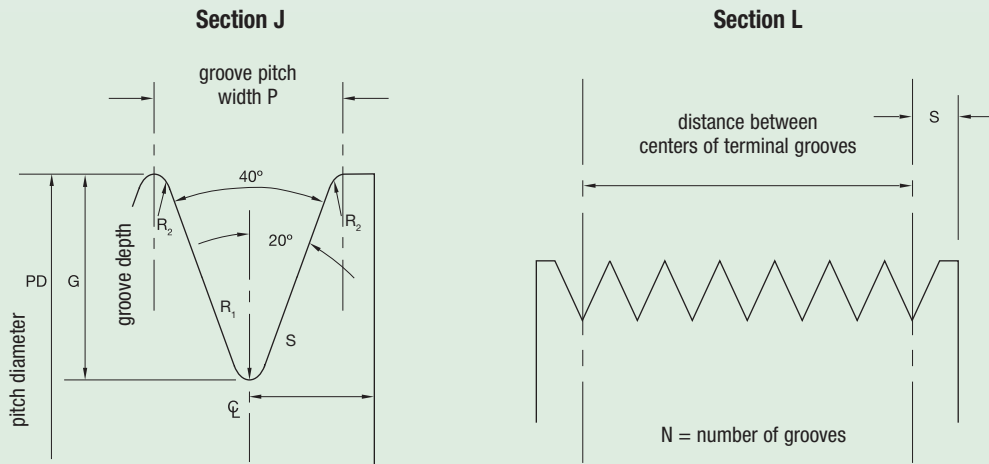
left-hand insert



right-hand insert

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

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

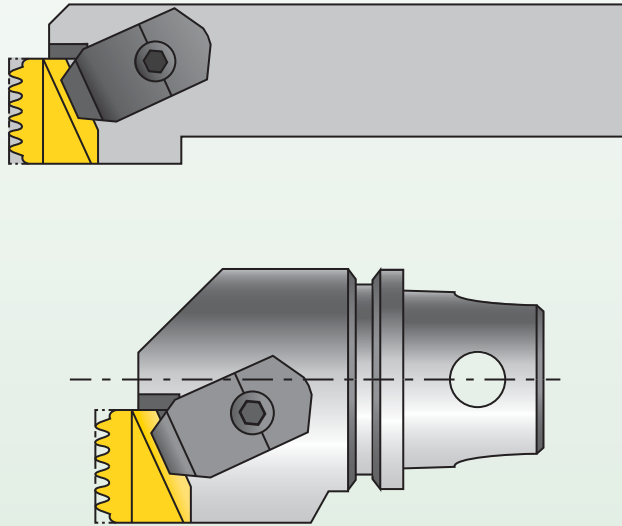


Groove Dimensions and Tolerances for Sheaves

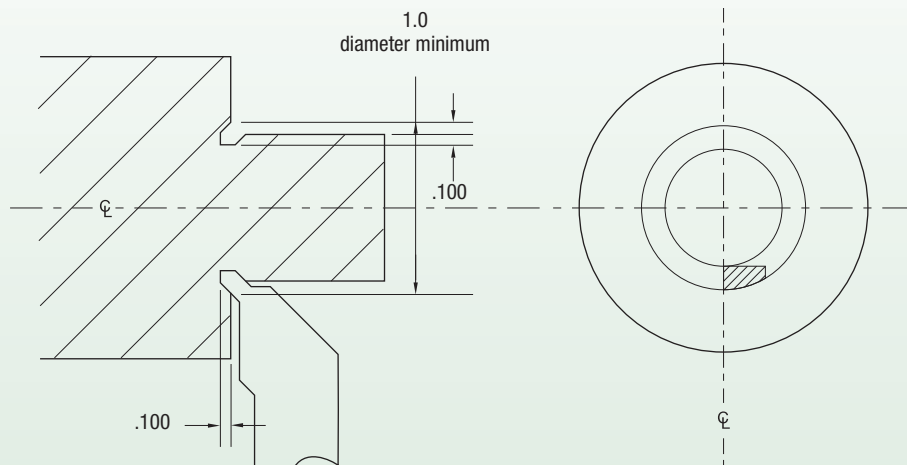
groove cross section	pitch width (P)	groove depth (G)	minimum radius (R2)	radius (R1)	terminal distance	distance between centers of terminal grooves and maximum accumulated tolerance
J	.092 ±.001	.087 ±.005	.008	.0125 ±.0025	1/8	(N-1).092 ±.010
L	.185 ±.002	.201 ±.005	.015	.0125 ±.0025	3/8	(N-1).185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

Multiple Tooth Poly-Vee Grooving

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

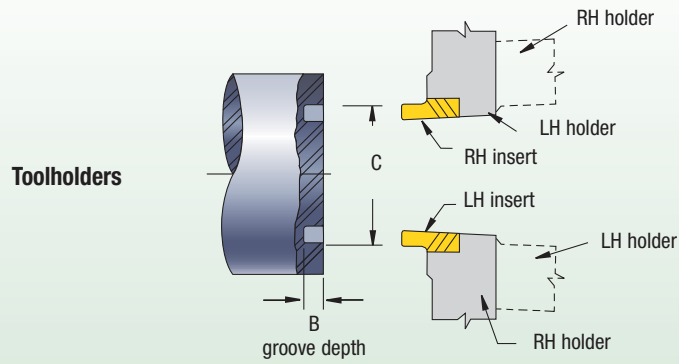


Machining Guidelines for Undercutting Operations Performed with Custom Solution and TopGroove NU Inserts (NU3094, NU3125, and NU3156)



NOTE: Items shown are non-standard items.

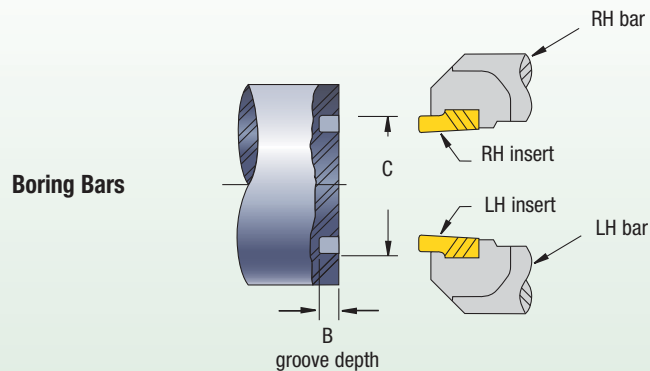
Machining Guidelines for Face Grooving Operations • External



Standard NF/NDF Inserts

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

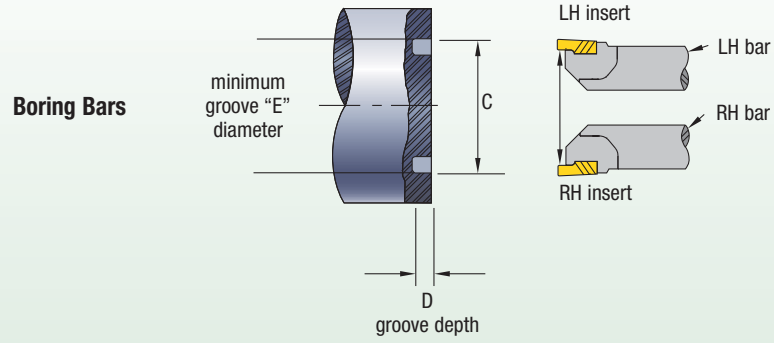
Machining Guidelines for Face Grooving Operations • External



Standard NG/NGD Inserts

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

Machining Guidelines for Face Grooving Operations • Internal



Standard NG/NGD Inserts

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

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

ProGroove™

ProGroove™ Grooving and Cut-Off

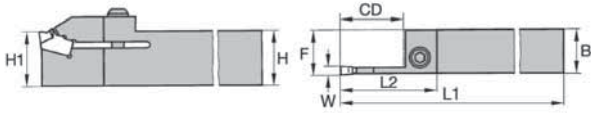
With easy-to-change inserts available in multiple high-performance carbide grades, the ProGroove system ensures accurate, reliable, and reproducible cutting edge performance.

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



ProGroove



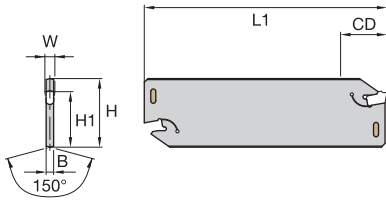


Right Hand Tool

■ Grooving and Cut-Off

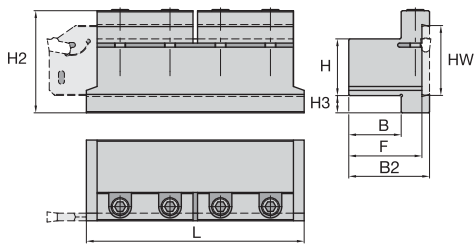
order number	catalog number	W	CD	H	B	F	L1	L2	H1	cap screw	wrench
	right hand										
2962743	12250023000	.122	.787	.750	.750	.764	5.000	1.260	.750	12148596200	12148041200
2962745	12250023200	.122	.984	1.000	1.000	1.012	6.000	1.575	1.000	12148596200	12148041200
2962751	12250025200	.201	1.260	1.000	1.000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

Turning



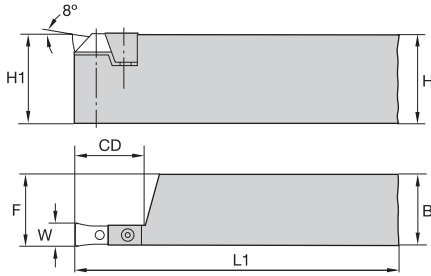
■ Cut-Off Blades

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



■ Cut-Off Blade Holders

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

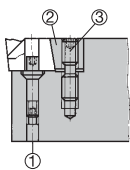


■ Grooving

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

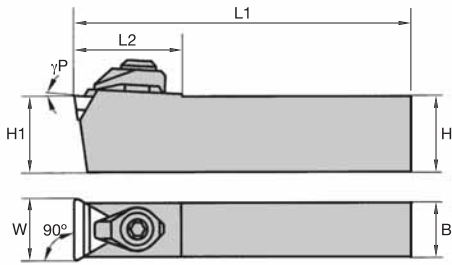
■ Spare Parts

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



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

Turning



■ Grooving

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

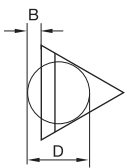
NOTE: KS holders are supplied without chipbreaker. For chipbreaker order numbers, see below.

■ For Grooving without Chipbreaker

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

■ For Grooving with Chipbreaker (Order Additional Clamp and Chipbreaker)

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



WIN WITH WIDIA™



ProGroove™

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

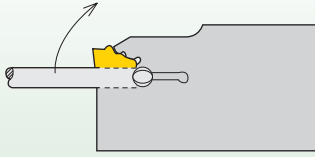
ProGroove Grooving and Cut-Off

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

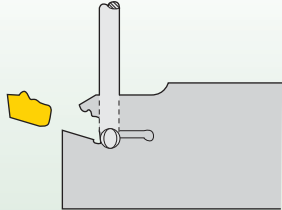
To learn more, contact your local Authorized Distributor or visit www.widia.com.

WIDIA 

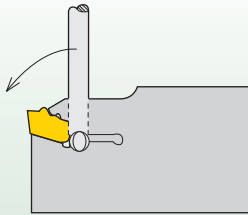
ProGroove System



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

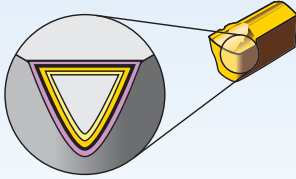


In this position, the wrench is self-locking, leaving both hands free for changing the cutting insert.



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





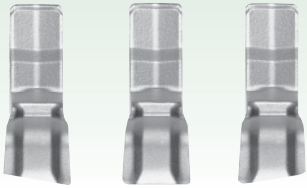
Coatings provide high-speed capability and are engineered for finishing to light roughing.

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

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

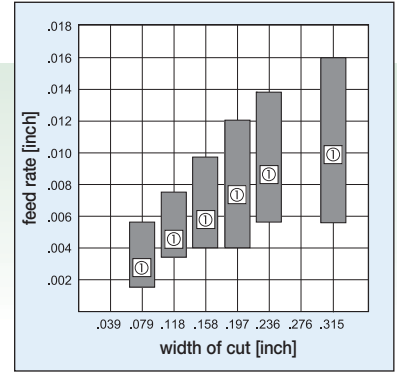
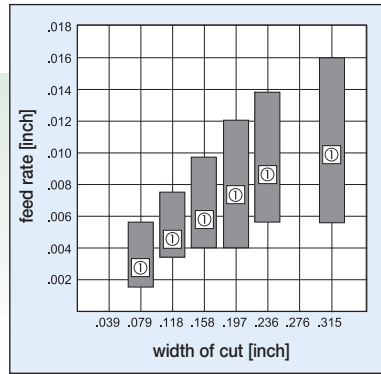
Coating		Grade Description		05	10	15	20	25	30	35	40	45
Grade TN6030		PVD-TiAlN Nano-layer coated carbide. Medium and heavy machining for steels and nodular cast irons. Recommended at medium cutting speeds when good toughness properties are required.	P									
	M											
	K											
	N											
	S											
	H											
Grade TN7525		MT-CVD/CVD — TiN-TiCN-Al ₂ O ₃ -TiN coated carbide. Light and medium machining for steels and nodular cast irons.	P									
	K											
	N											
	S											
	H											
Grade TN7535		MT-CVD/CVD — TiN-TiCN-Al ₂ O ₃ coated carbide. Medium and heavy machining for steels and nodular cast iron.	P									
	K											
	N											
	S											
	H											
Grade TN8025		MT-CVD/CVD-TiN-TiCN-Al ₂ O ₃ -ZrCN coated carbide. Light and medium machining for all stainless steels. Can be used both with or without coolant.	M									
	P											
	K											
	N											
	S											
	H											
Grade THM		Uncoated carbide for light and medium machining. For cast iron and all non-ferrous metals and non-metals. Also capable of machining hardened materials at low cutting speeds.	K									
	N											
	S											
	H											
Grade TTM		Uncoated carbide with good toughness and wear properties. Medium machining for steels.	P									
	M											
	K											
	N											
	S											
	H											

ProGroove • U



left-hand neutral right-hand

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

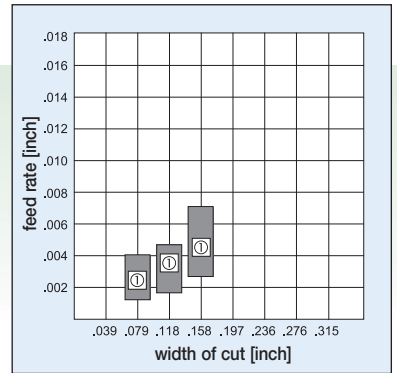
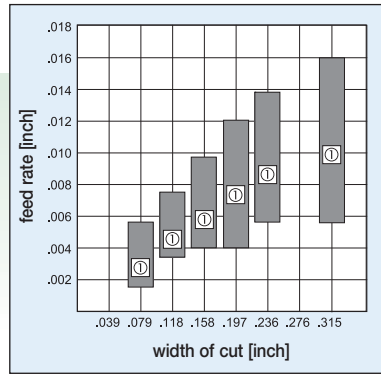


ProGroove • M

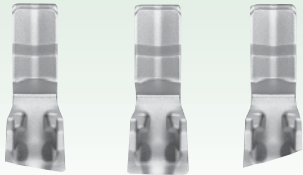


neutral

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

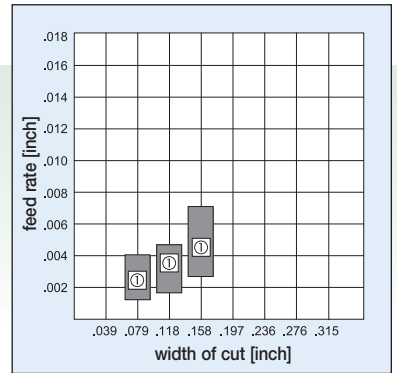
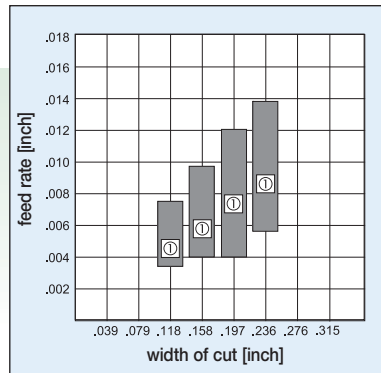


ProGroove • S



left-hand neutral right-hand

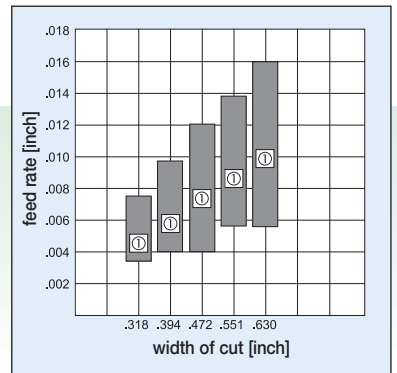
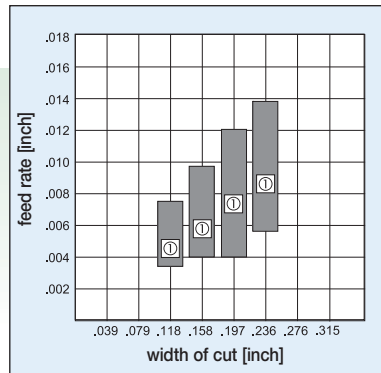
For low-burr parting with straight flanks and smooth surface finishes. All inserts are recommended for parting and grooving slender workpieces, part diameter <1.25", and thin-wall tubes.



ProGroove • R



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



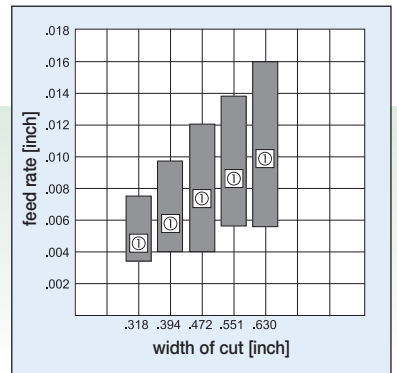
LG System • 0 and 1



0 1

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

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

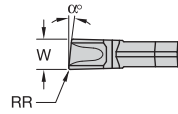
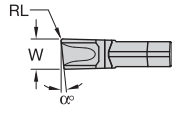
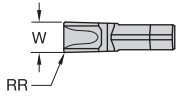
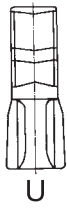




Turning

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

Turning



● first choice
○ alternate choice

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

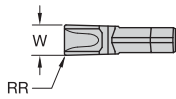
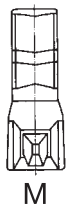
■ PGU

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

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

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

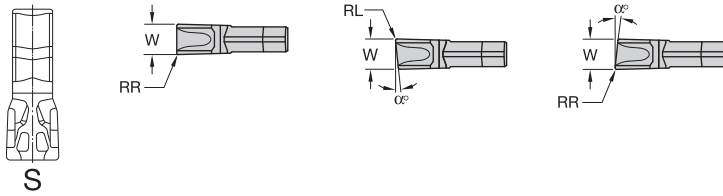
NOTE: W tolerance on all = ±.002" (±0,05mm).



■ PGM

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

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



● first choice
○ alternate choice

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



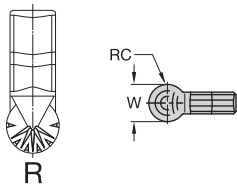
■ **PGS**

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

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

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

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

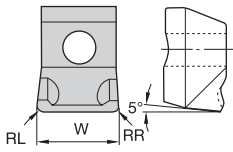


■ **PGR**

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

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

Turning



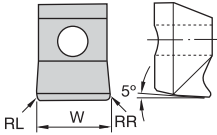
● first choice
○ alternate choice

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

■ LGN0

catalog number	W		RR		TN6030	TN7525	TN7535	TN6025	THM	TTM
	mm	in	mm	in						
123568080	8,15	.321	0,80	.032	●	●	●	●	●	●
123568100	10,15	.400	0,80	.032	●	●	●	●	●	●
123568120	12,20	.480	0,80	.032	●	●	●	●	●	●
123568140	14,20	.559	0,80	.032	●	●	●	●	●	●
123568160	16,20	.638	0,80	.032	●	●	●	●	●	●

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



■ LGN1

catalog number	W		RR		TN6030	TN7525	TN7535	TN6025	THM	TTM
	mm	in	mm	in						
123568081	8,15	.321	0,80	.032					●	
123568121	12,20	.480	0,80	.032					●	
123568161	16,20	.638	0,80	.032					●	

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

On the Web



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



Separator

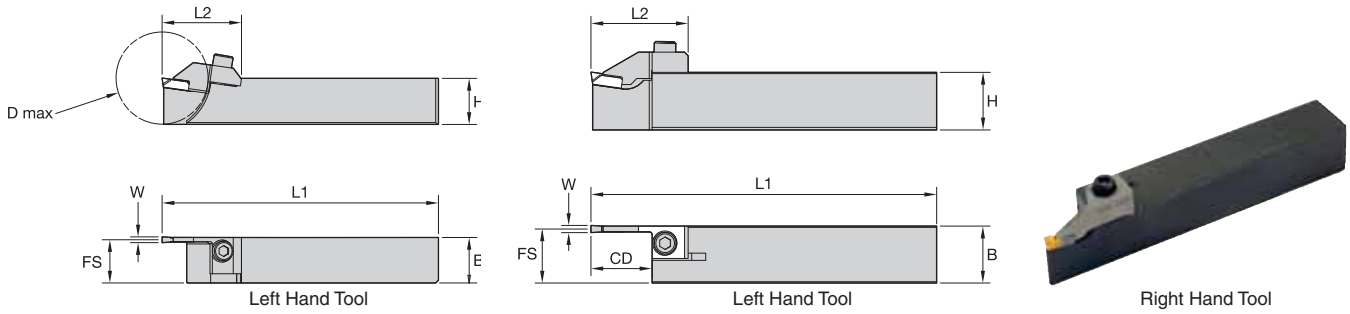
Features

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

Benefits

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



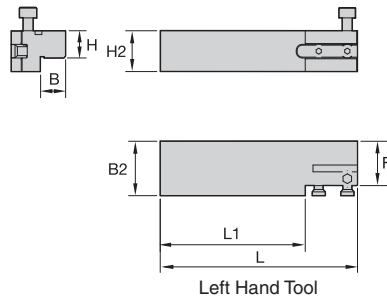
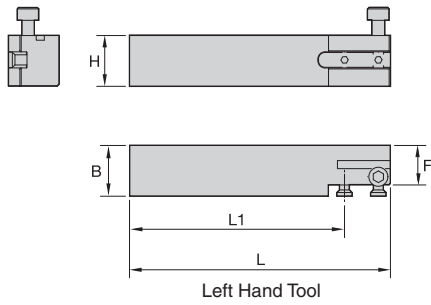


■ Square Shank

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

NOTE: Above toolholders are supplied with clamp.

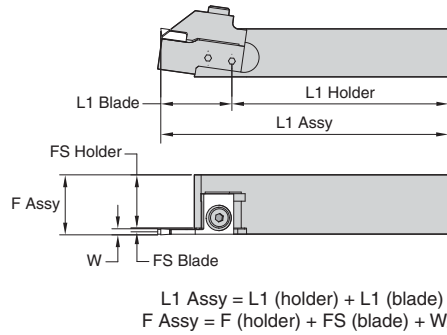
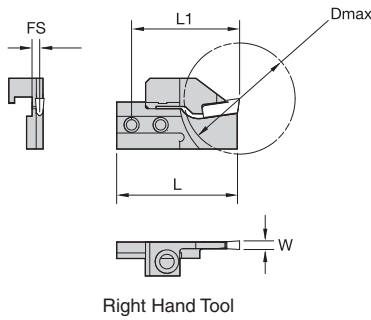
Turning



■ 1/2" and 3/4" Shank Toolholders

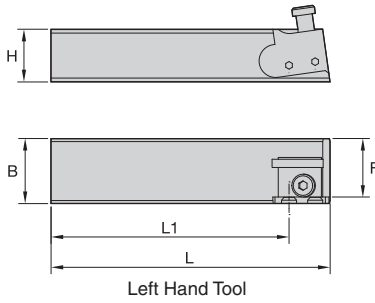
order number	catalog number	H	B	B2	L	L1	H2	F	hand	support blade screw	clamp screw
3538689	206178	.745	.750	—	3.625	2.913	—	.575	N - Neutral	606167	619124
3563801	206179	.500	.460	1.000	3.625	2.913	.750	.815	R - Right	606167	619124

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



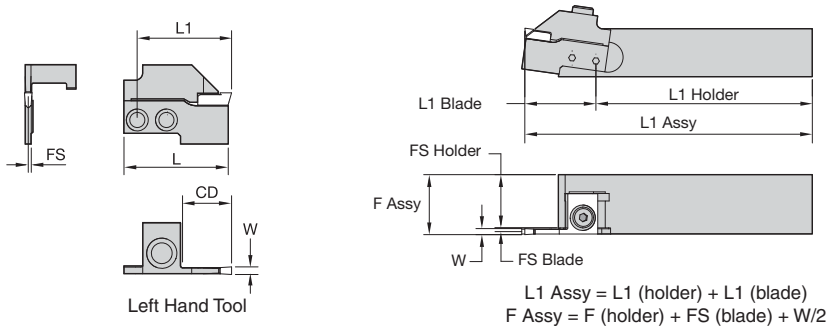
■ 1/2" and 3/4" Shank Blades

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



■ 1" and 1-1/4" Shank Toolholders

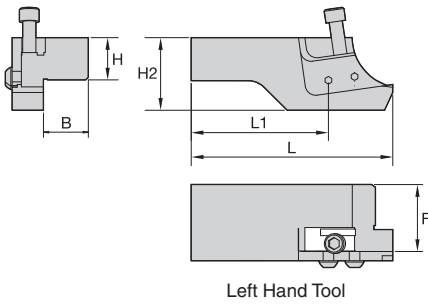
order number	catalog number	H	B	L	L1	F	support blade screw	clamp screw
	right hand							
3538669	206141	1.000	1.234	5.291	4.510	1.109	606164	619121
3538670	206143	1.250	1.484	5.291	4.510	1.359	606164	619121
	left hand							
3563786	206142	1.000	1.234	5.291	4.510	1.109	606164	619121



■ 1" and 1-1/4" Shank Blades

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

Turning



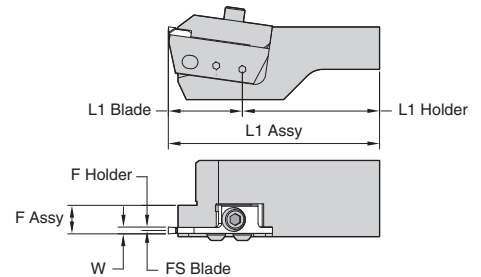
■ Universal Style 2-1/4" Bar Capacity

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

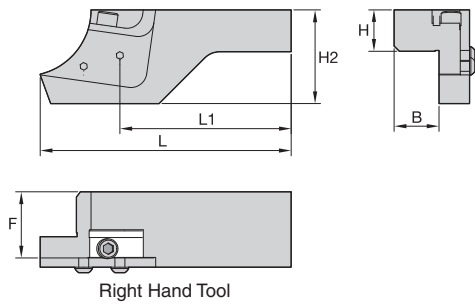
NOTE: .750" shank holders 206118 and 206128 use different clamps.

■ Components

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



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

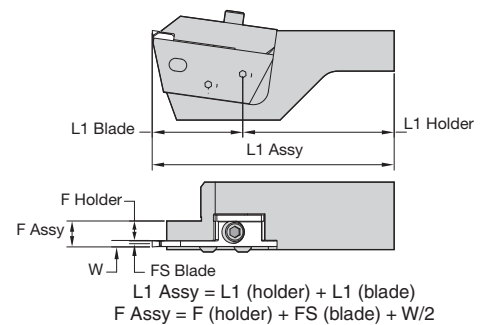


■ Universal Style 3" Bar Capacity

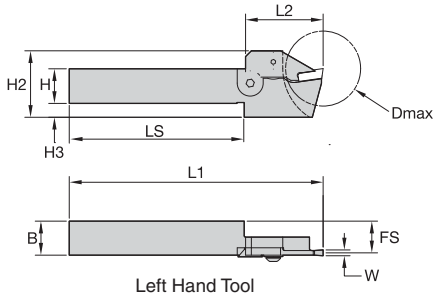
order number	catalog number	B	H	H2	F	L1	L	support blade screw	clamp screw
	right hand								
3538660	206115	.964	1.000	2.219	1.454	3.754	5.640	606171	S352
3538661	206116	1.064	1.000	2.219	1.554	3.754	5.640	606171	619112
3587587	206121	1.194	1.250	2.219	1.684	4.004	5.890	606171	619112
	left hand				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

■ Components

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



Turning



■ Sub-Spindle

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

WIN WITH WIDIA™



Separator™

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

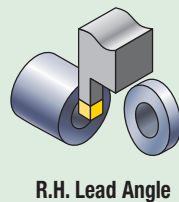
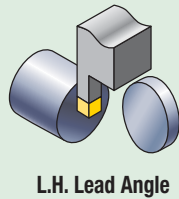
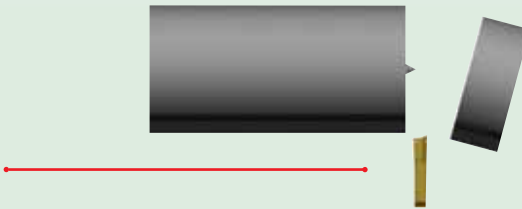
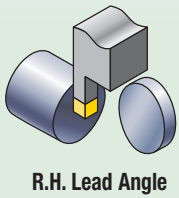
Separator Toolholders and Inserts

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

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

WIDIA 

1 Choose the application to be performed:
Choose lead angle of insert for application.





2 Identify the material to be machined:

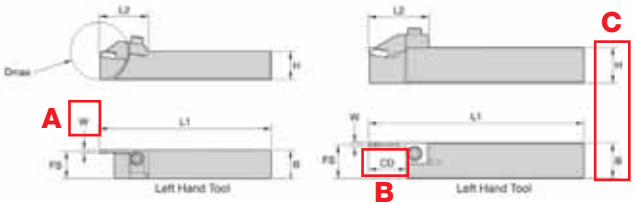

Each tool has a material grid marked with a letter indicating the materials that can be machined.

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

3 Select your toolholder based on the application:

- A Choose the appropriate width of insert required for the application.
- B Choose the shortest cutting depth "CD" dimension for increased tool rigidity.
- C Select the largest toolholder shank "H" and "B" dimensions for maximum rigidity.

■ Square Shank

order number	catalog number	W	D max	CD	B	FB	H	L2	L1	clamp	clamp screw
353865	206173	.094	1.063	—	.365	.328	.375	.987	2.630	435152	619122
353867	206175	.094	1.063	—	.490	.453	.500	.978	6.000	435152	619122
353879	206167	.094	1.500	—	.815	.578	.625	1.293	4.500	435140	619123
353863	206171	.094	1.500	—	.740	.703	.750	1.293	4.500	435140	619120
353872	206148	.125	1.000	—	.488	.437	.500	.929	6.000	435130	619122
353861	206169	.125	1.500	—	.813	.562	.625	1.293	4.500	435126	619123
3563767	206139	.125	1.500	—	.738	.687	.750	1.293	4.500	435126	619120
3558744	206420	.125	—	1.000	.988	.937	1.000	1.887	6.000	435180	619164
3538745	206421	.188	—	1.000	.978	.908	1.000	1.891	6.000	435180	619164
353866	206174	.094	1.063	—	.365	.328	.375	.987	2.630	435153	619122



4 Select chipbreaker style for the application:

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

insert type	steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys	hardened materials
first choice	X²-Ultra (X ² has wipers)	X²-Ultra	X²-Ultra	X²-Ultra	X²-Ultra	—
second choice	S²-Ultra	S²-Ultra	Classic	S²-Ultra	S²-Ultra	—

5 Select grade:

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

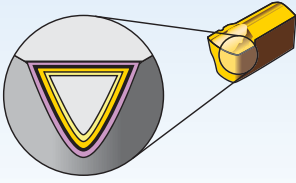
See page A98 for Grades and Grade Descriptions.

6 Determine cutting data:

- A Based on material group and grade, identify starting speed (vc).
- B First choice starting speed is in **bold**.

See page A100–A101 for cutting data.

ANSI ISO 513		VDI 3223											
Material Group	Grade	Cutting Speed • vc SFM											
		C2			C5			GC			M40		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	1	—	—	—	300	400	500	570	645	720	125	260	370
	2	—	—	—	240	350	460	490	560	630	110	220	330
	3	—	—	—	210	275	340	410	465	520	90	165	240
	4	—	—	—	220	295	360	460	500	540	100	195	290
	5	—	—	—	190	270	350	370	420	470	80	155	230
	6	—	—	—	225	308	390	460	500	540	100	195	290
	7	—	—	—	190	270	350	390	440	490	85	160	235
	8	—	—	—	180	260	340	340	395	450	75	150	220
	9	—	—	—	125	198	270	230	295	360	60	120	180
	10	—	—	—	190	250	310	300	390	430	80	155	230
	11	—	—	—	105	188	270	205	305	405	68	115	170
	12	—	—	—	235	313	390	450	510	570	120	225	330
	13.1	—	—	—	220	290	300	340	390	440	95	155	215
13.2	—	—	—	100	140	180	170	200	230	55	90	125	
M	14.1	160	190	220	—	—	—	—	GC	—	100	145	190
	14.2	150	178	205	—	—	—	—	GC	—	85	130	170
	14.3	125	140	155	—	—	—	—	GC	—	70	95	120
	14.4	90	105	120	—	—	—	—	GC	—	58	75	100
K	15	450	550	650	—	—	—	—	GC	—	250	350	450
	16	375	440	500	—	—	—	—	GC	—	170	265	360
	17	425	500	570	—	—	—	—	GC	—	200	310	420
	18	300	375	450	—	—	—	—	GC	—	150	240	330



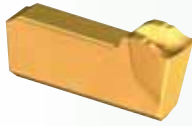
Coatings provide high-speed capability and are engineered for finishing to light roughing.

- 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	Speed (m/min)																		
			05	10	15	20	25	30	35	40	45										
C2		A general-purpose tungsten carbide for use on cast irons, non-ferrous alloys, and many high-temperature alloys.	M																		
	HW-K15		K																		
C5		A general-purpose, alloyed tungsten carbide for steel cutting.	P																		
	HW-P35		M																		
GC		Coated carbide. CVD — TiC-TiCN-TiN. Tri-phase coating on a hard, low binder content, fine-grained grade. High-speed, general-purpose grade for all kinds of steel. Gold in color.	P																		
	HC-P20		M																		
M40		A premium, single-phase PVD-TiN coating over a tough, specially formulated substrate that performs well under extremely low to moderate speed conditions found on screw machines. Ideal for carbon steels, alloy steels, most stainless steels, and many high-temperature alloys.	P																		
	HC-P35		M																		
M43		PVD-TiAlN multilayer coating over a tough, shock-resistant, fine-grained carbide substrate with increased oxidation resistance. Recommended on low to medium cutting speeds when good toughness properties are required.	P																		
	HC-P25		M																		
M433B		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.	M																		
	HC-M30		S																		
M45		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.	P																		
	HC-P30		M																		
M93		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.	P																		
	HC-P20		M																		

Separator • X² and X²-Ultra



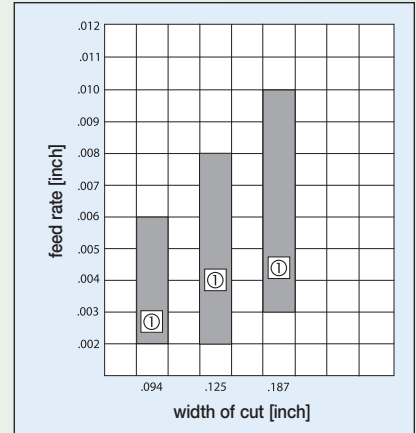
X²

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



X²-Ultra

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



Separator • S² and S²-Ultra



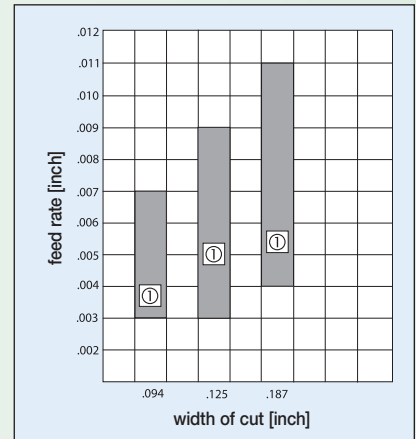
S²

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



S²-Ultra

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

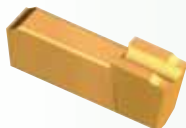


Separator • Classic and F²



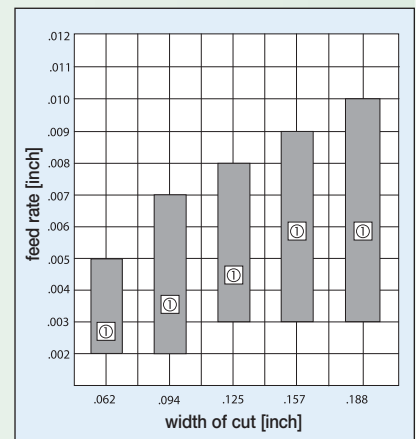
Classic

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



F²

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



Turning

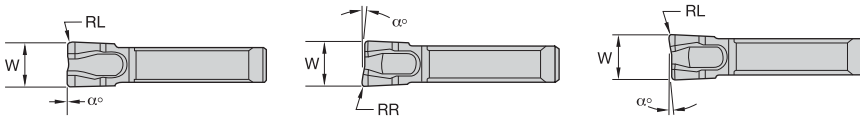
ANSI ISO 513	VDI 3323	Cutting Speed • vc SFM											
		C2			C5			GC			M40		
Material Group		min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	1	—	—	—	300	400	500	570	645	720	125	260	370
	2	—	—	—	240	350	460	490	560	630	110	220	330
	3	—	—	—	210	275	340	410	465	520	90	165	240
	4	—	—	—	220	305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

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



Turning

Turning



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

● first choice
○ alternate choice

■ X²

catalog number	W		RR		α°	hand	C2	C5	GC	M40	M43	M43B	M45	M93
	mm	in	mm	in										
507305	2,39	.094	0,14	.006	—	N - Neutral								
507308	3,20	.126	0,17	.007	—	N - Neutral					●		●	●

catalog number	W		RR		α°	hand	C2	C5	GC	M40	M43	M43B	M45	M93
	mm	in	mm	in										
507307	2,39	.094	0,14	.006	5	L - Left							●	●
507310	3,20	.126	0,17	.007	5	L - Left							●	●

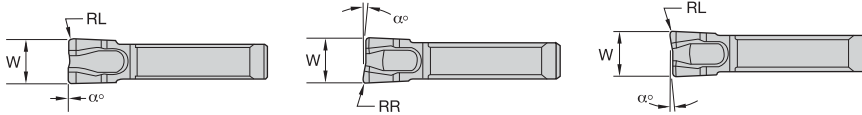
catalog number	W		RL		α°	hand	C2	C5	GC	M40	M43	M43B	M45	M93
	mm	in	mm	in										
507306	2,39	.094	0,14	.006	5	R - Right							●	●
507309	3,20	.126	0,17	.007	5	R - Right							●	●

■ X² Ultra

catalog number	W		RR		α°	hand	C2	C5	GC	M40	M43	M43B	M45	M93
	mm	in	mm	in										
507354	2,39	.094	0,15	.006	—	N - Neutral						●		
507357	3,20	.126	0,15	.006	—	N - Neutral						●		

catalog number	W		RR		α°	hand	C2	C5	GC	M40	M43	M43B	M45	M93
	mm	in	mm	in										
507356	2,39	.094	0,13	.005	5	L - Left							●	
507359	3,20	.126	0,15	.006	5	L - Left							●	

catalog number	W		RL		α°	hand	C2	C5	GC	M40	M43	M43B	M45	M93
	mm	in	mm	in										
507355	2,39	.094	0,13	.005	5	R - Right							●	
507358	3,20	.126	0,15	.006	5	R - Right							●	



Turning

P	Blue	○	○	●	●	●	●	●	●	●
M	Yellow	○	○	●	●	●	●	●	●	●
K	Red	○	○	○	○	○	○	○	○	○
N	Green	○	○	○	○	○	○	○	○	○
S	Orange	○	○	○	○	○	○	○	○	○
H	Grey	●	●	●	●	●	●	●	●	●

● first choice
○ alternate choice

■ S²

catalog number	W		RR		α°	hand	C2	C5	GC	M40	M43	M43B	M45	M93
	mm	in	mm	in										
507275	2,39	.094	0,20	.008	—	N - Neutral				●	●	●	●	●
507278	3,20	.126	0,25	.010	—	N - Neutral				●	●	●	●	●
507281	4,78	.188	0,25	.010	—	N - Neutral					●	●	●	●

catalog number	W		RR		α°	hand	C2	C5	GC	M40	M43	M43B	M45	M93
	mm	in	mm	in										
507277	2,39	.094	0,20	.008	5	L - Left							●	●
507280	3,20	.126	0,20	.008	5	L - Left				●			●	●
507283	4,78	.188	0,20	.008	5	L - Left							●	●

catalog number	W		RL		α°	hand	C2	C5	GC	M40	M43	M43B	M45	M93
	mm	in	mm	in										
507276	2,39	.094	0,20	.008	5	R - Right				●	●	●	●	●
507301	2,39	.094	—	—	5	R - Right							●	●
507298	3,20	.126	—	—	5	R - Right				●	●	●	●	●
507279	3,20	.126	0,20	.008	5	R - Right				●	●	●	●	●
507282	4,78	.188	0,20	.008	5	R - Right					●	●	●	●

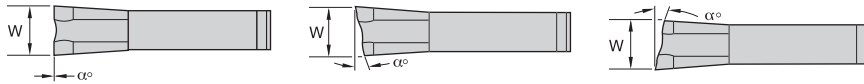
■ S² Ultra

catalog number	W		RR		α°	hand	C2	C5	GC	M40	M43	M43B	M45	M93
	mm	in	mm	in										
507329	2,39	.094	0,15	.006	—	N - Neutral						●	●	
507332	3,18	.125	0,15	.006	—	N - Neutral						●	●	

catalog number	W		RR		α°	hand	C2	C5	GC	M40	M43	M43B	M45	M93
	mm	in	mm	in										
507331	2,39	.094	0,15	.006	5	L - Left							●	●
507334	3,18	.125	0,15	.006	5	L - Left							●	●

catalog number	W		RL		α°	hand	C2	C5	GC	M40	M43	M43B	M45	M93
	mm	in	mm	in										
507330	2,39	.094	0,15	.006	5	R - Right							●	●
507333	3,18	.125	0,15	.006	5	R - Right							●	●

Turning



● first choice
○ alternate choice

P	Blue	○	○	●	●	●	●	●	●
M	Yellow	○		●	●	●	●	●	●
K	Red	○		○					
N	Green	○			●	●			
S	Orange			○	●	●	●	○	
H	Grey	●							

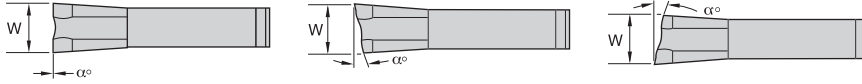
■ Classic

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

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

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

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



● first choice
○ alternate choice

P	Blue	○	○	●	●	●	●	●	●
M	Yellow	○		●	●	●	●	●	●
K	Red	○	○	○	○	○	○	○	○
N	Green	○		●	●	●	●	●	●
S	Orange	○	○	○	○	○	○	○	○
H	Grey	●							



Turning

■ F²

catalog number	W			hand	C2	C5	GC	M40	M43	M43B	M45	M93
	mm	in	α°									
507240	2,39	.094	—	N - Neutral				●			●	
507244	3,20	.126	—	N - Neutral				●			●	
catalog number	W			hand	C2	C5	GC	M40	M43	M43B	M45	M93
	mm	in	α°									
507255	2,39	.094	12	L - Left				●				
507257	3,18	.125	4	L - Left							●	
catalog number	W			hand	C2	C5	GC	M40	M43	M43B	M45	M93
	mm	in	α°									
507241	2,39	.094	4	R - Right				●			●	
507242	2,39	.094	12	R - Right				●			●	
507243	2,39	.094	18	R - Right				●			●	
507245	3,18	.125	4	R - Right				●			●	
507246	3,18	.125	12	R - Right				●			●	
507247	3,18	.125	18	R - Right				●			●	
507252	4,75	.187	4	R - Right				●			●	
507253	4,78	.188	12	R - Right				●			●	

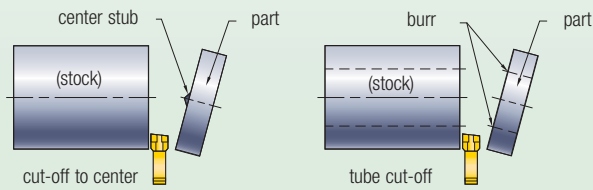
Definitions and Guidelines

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

Reduce burr of cut-off faces:

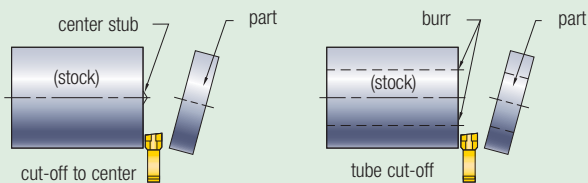
- Use lead angle-type inserts (Figures 1 and 2). Lead angle on a cut-off insert reduces the burr that remains on the part but decreases tool life and increases tool side deflection and possibly cycle time.

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



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

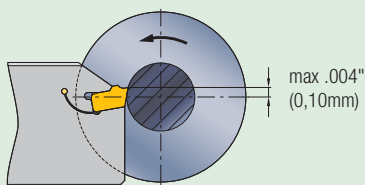
Figure 2
Insert selection **right-hand lead**



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

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

Figure 3
Above center



- If 0° lead angle is mandatory, use the narrowest possible cut-off insert and blade. This will minimize the center stub or cut-off burr length. Decrease the feed rate to maximum .002" (0,05mm) or less at the point where diameter equals insert width.

- On tubing-type parts that require a chamfer on the I.D., align I.D. chamfer tool with cut-off surface. This will enable the chamfering operation to actually separate the part from the bar (see Figure 4). Note the part may drop onto the chamfering bar, which, in this case, will act like a catcher for the part.

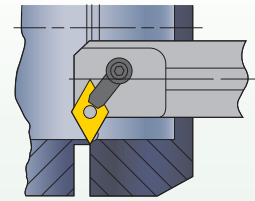


Figure 4
Internal chamfer line up

Improve surface finish of cut-off faces:

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

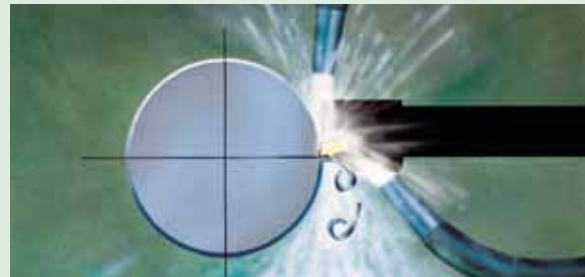


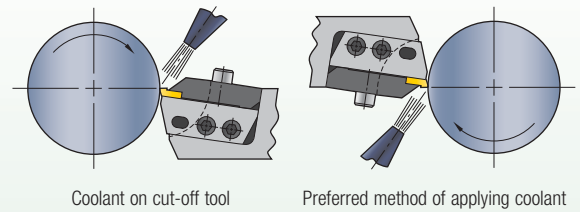
Figure 5
Preferred method for applying coolant

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

Improve chip control:

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

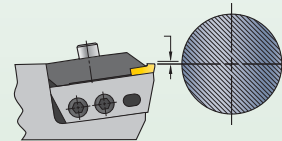
Figure A



Improve flatness of cut-off surfaces:

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

Figure B



Minimize edge chipping:

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

Improve surface finish:

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

(continued)

(continued)

Eliminate chatter:

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

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

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

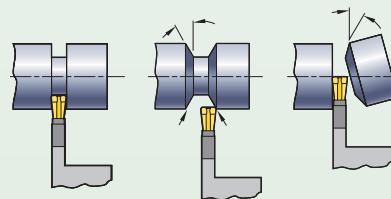
Eliminate built-up edge:

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

Chamfer and cut-off operations:

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

Figure C



Modifications for Increased Depth of Cut

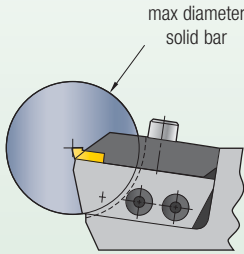


Figure 1
Standard bar capacity shown

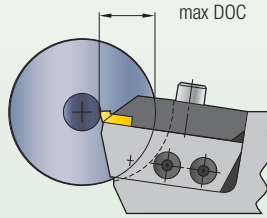


Figure 2
Larger bar diameter shown

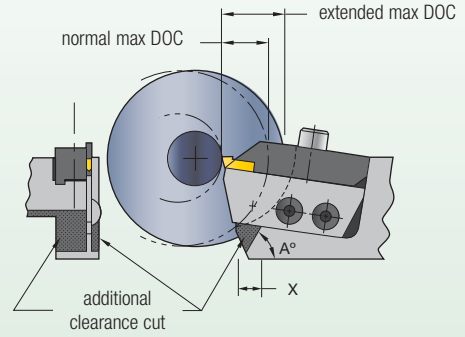


Figure 3
Modified toolholder with larger bar diameter shown

Capacity Chart for 2-1/4" Diameter Bar Capacity Tooling

bar diameter	2.5"	3.0"	3.5"	4.0"	4.5"	5.0"	6.0"	NOTE
max DOC	0.94"	0.75"	0.62"	0.56"	0.50"	0.47"	0.44"	with no modification on toolholder
	1.12"	1.03"	0.97"	0.91"	0.87"	0.84"	0.78"	with no modification on toolholder X = .40" A = 50"

Capacity Chart for 3" Diameter Bar Capacity Tooling

bar diameter	3.5"	4.0"	4.5"	5.0"	6.0"	NOTE
max DOC	1.12"	1.00"	0.88"	0.78"	0.69"	with no modification on toolholder
	1.44"	1.37"	1.31"	1.25"	1.12"	with no modification on toolholder X = .40" A = 50"

Ranger™

Adjustable Face Grooving System.

Features

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

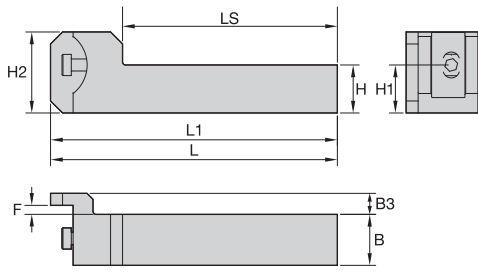


Ranger

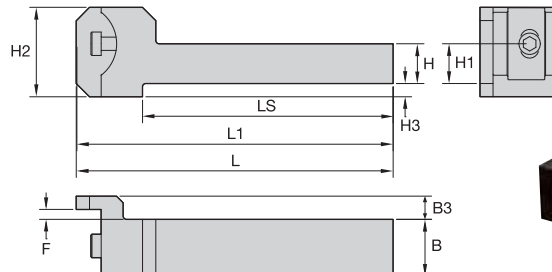
Benefits

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





Right Hand Tool



Right Hand Tool



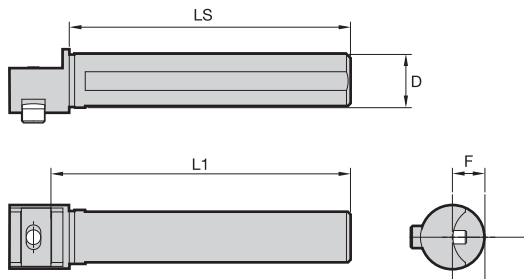
Left Hand Assembly



■ Square Shank

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

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



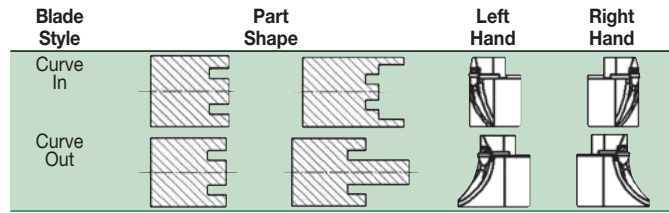
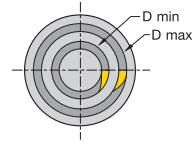
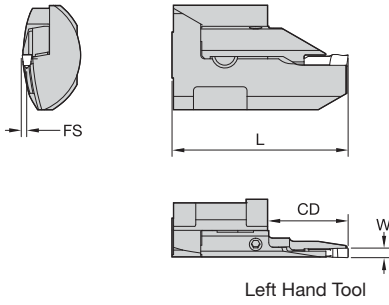
Left Hand Assembly

■ Round Shank

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

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

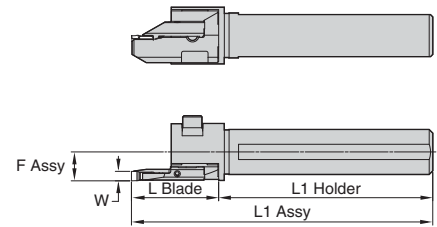
Turning



■ Curve In

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

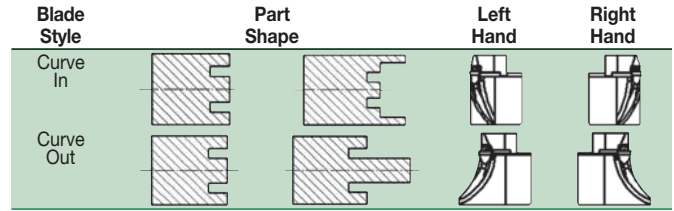
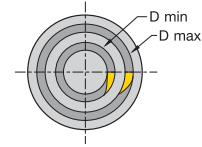
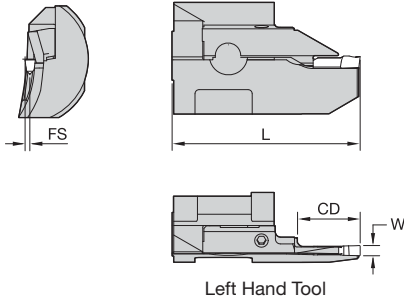
NOTE: RH cartridge goes with LH toolholder.
LH cartridge goes with RH toolholder.



For Round Shank

$$F \text{ Assy} = W/2 + F \text{ (holder)} + FS \text{ (blade)}$$

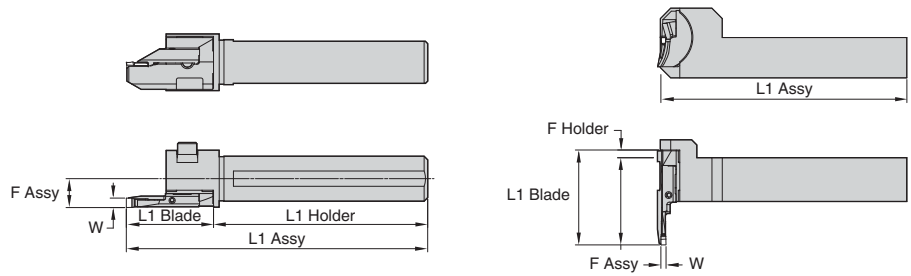
$$L1 \text{ Assy} = L1 \text{ (holder)} + L \text{ (blade)}$$



■ Curve Out

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

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



For Round Shank

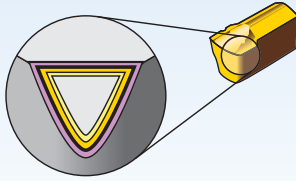
$$F \text{ Assy} = W/2 + F \text{ (holder)} + FS \text{ (blade)}$$

$$L1 \text{ Assy} = L1 \text{ (holder)} + L1 \text{ (blade)}$$

For Square Shank

$$F \text{ Assy} = F \text{ (holder)} + L1 \text{ (blade)}$$

$$L1 \text{ Assy} = W/2 + L1 \text{ (holder)} + FS \text{ (blade)}$$

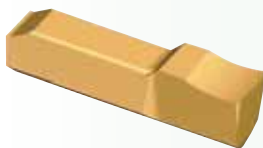


Coatings provide high-speed capability and are engineered for finishing to light roughing.

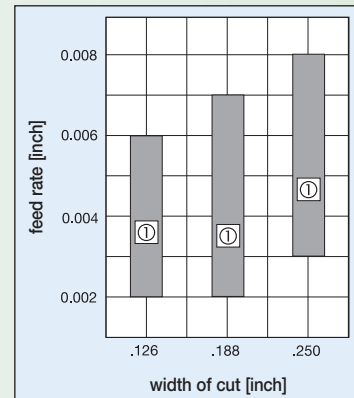
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

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

Ranger • Face Grooving



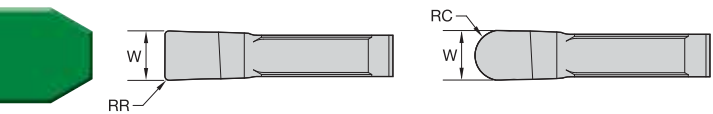
- Inserts available for plunge-groove and full-nose radii.
- Geometry design to provide clearance deep grooving.
- Superior chip control.





Turning

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



Turning

● first choice
○ alternate choice

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

■ Face Grooving

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

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

Technical Recommendations • Ranger Tool Systems

Application Information:

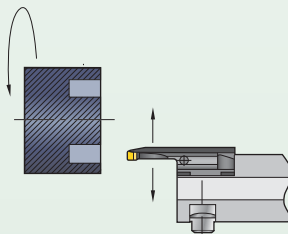
- When changing inserts, be sure the new insert locates against the positive stop on the clamp.
- Never tighten the insert clamping screw without an insert in the pocket. Permanent damage to the clamp could occur.
- Toolholder projection length out of the tool block should be as short as possible to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

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

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

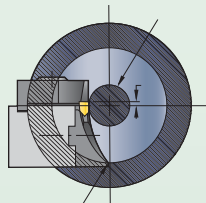
Widening a Face Groove

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



WMT™ Face Grooving Clearances

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



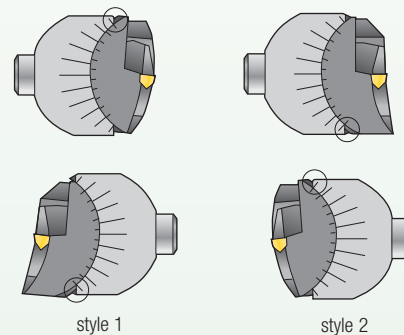
Adjusting Information for Ranger Tooling

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

- Appropriate diameter range setting can be accomplished as follows:

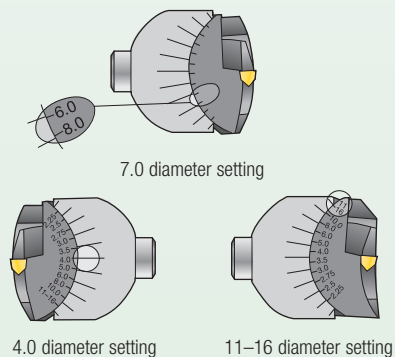
Step 1 Loosen the support blade locking screw and rotate the support blade so that the 2.25 mark is above the top line on the toolholder. [Below the line on toolholder for style 2.]

2.25 diameter settings



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

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



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

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

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

S-LOC™

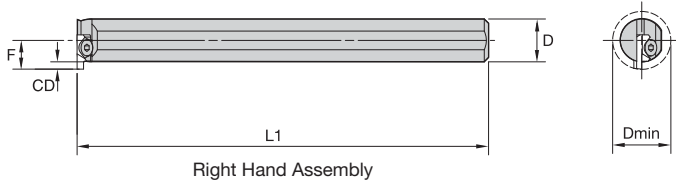
I.D. Boring, Grooving, Face Grooving, and Threading.

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



S-LOC



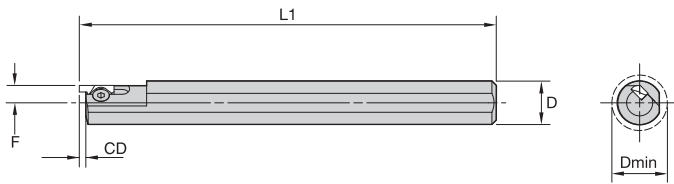


Right Hand Assembly

■ **I.D. Grooving**

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

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

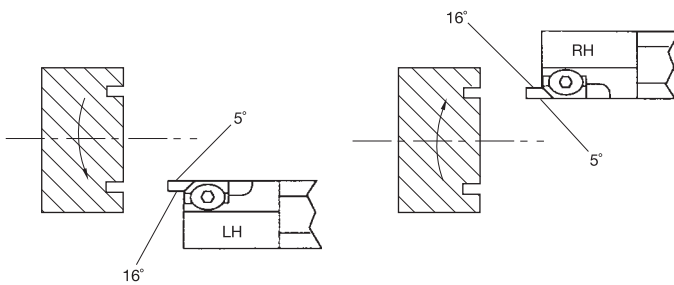


Left Hand Assembly

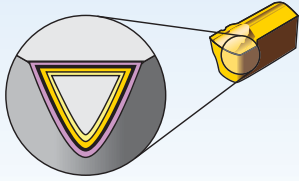
■ **Face Grooving**

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

NOTE: 1/2" and larger outside diameter.



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



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

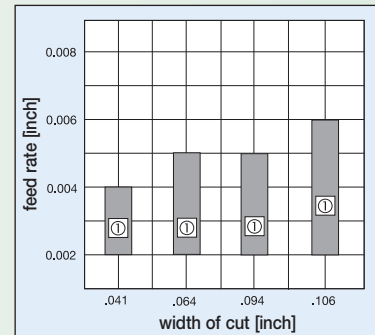
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

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

S-LOC



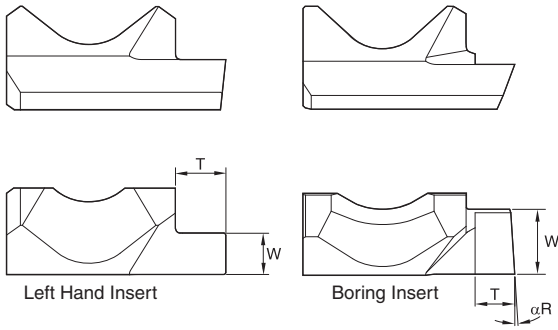
- Unique clamping surface on inserts.
- Used in I.D. boring and grooving applications.
- Superior chip control.



① Recommended feed

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

Turning



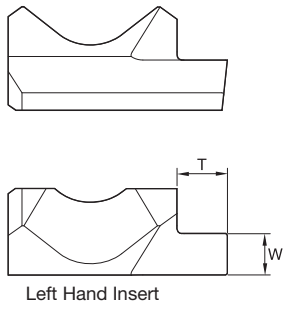
● first choice
○ alternate choice

P	●
M	●
K	○
N	●
S	○
H	○

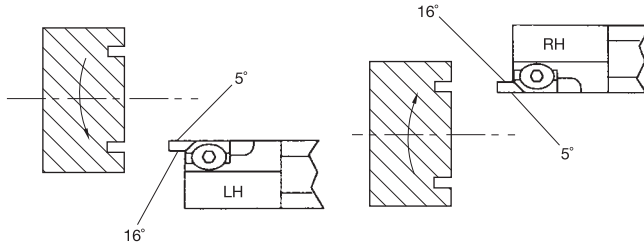
■ I.D. Grooving

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

NOTE: Insert 510102 is used for boring.



Left Hand Insert



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

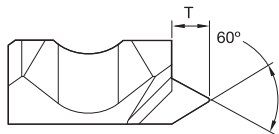
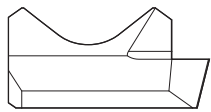
- first choice
- alternate choice

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



■ Face Grooving

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



Left Hand Insert

■ Threading

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

NOTE: Minimum 10 threads per inch.

WIDIA™ Threading Systems

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

Threading



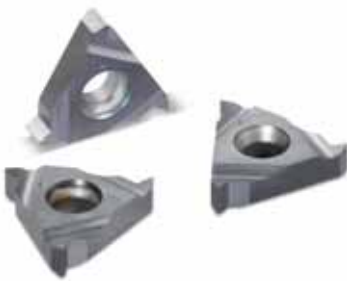
TopThread

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

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

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

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



Laydown Threading

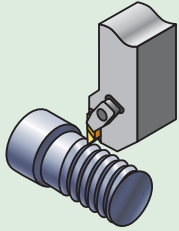
The Laydown Threading design is specially engineered to enable single-point threading in small diameter bores.

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

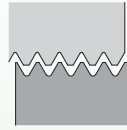
TopThread External Threading

Square Shank Toolholder Sizes:

- Inch — .375–1.5"
- Metric — 10–32mm



Fine Pitch



Cresting (Full Profile):

UN maximum TPI of 32
ISO minimum pitch of 1,5mm

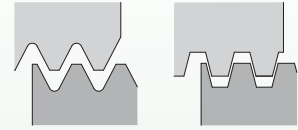
Partial Profile — Flat Top (NTF and NTK):

UN maximum TPI of 44
ISO minimum pitch of 0,6mm

Partial Profile — Chip Control (NT-K):

UN maximum TPI of 36
ISO minimum pitch of 0,7mm

Coarse Pitch/Heavy Duty



Cresting (Full Profile):

UN minimum TPI of 7
ISO maximum pitch of 3mm

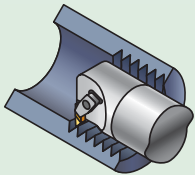
Partial Profile — Flat Top and Chip Control (NT-C and NT-CK):

UN minimum TPI of 4.5
ISO maximum pitch of 5,5mm

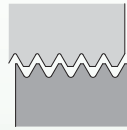
TopThread Internal Threading

Boring Bar Diameters:

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



Fine Pitch



Cresting (Full Profile):

UN maximum TPI of 16
ISO minimum pitch of 1,5mm

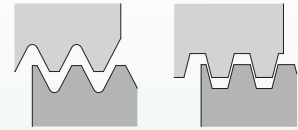
Partial Profile — Flat Top (NT-1L, NTF and NTK):

UN maximum TPI of 24
ISO minimum pitch of 1mm

Partial Profile — Chip Control (NT-K):

UN maximum TPI of 20
ISO minimum pitch of 1,25mm

Coarse Pitch/Heavy Duty



Cresting (Full Profile):

UN minimum TPI of 8
ISO maximum pitch of 3mm

Partial Profile — Flat Top and Chip Control (NT-C and NT-CK):

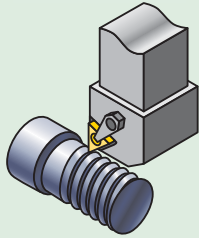
UN minimum TPI of 4.5
ISO maximum pitch of 5,5mm



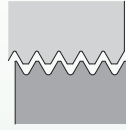
Laydown External Threading

Square Shank Toolholder Sizes:

- Inch — .500–1.25" available
- Metric — 8–40mm available



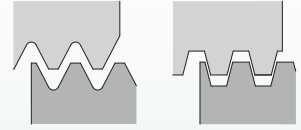
Fine Pitch



Cresting (Full Profile) and Partial Profile:

UN maximum TPI of 48
ISO minimum pitch of 0,5mm

Coarse Pitch/Heavy Duty



Cresting (Full Profile):

UN minimum TPI of 8
ISO maximum pitch of 5mm

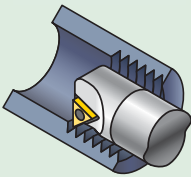
Partial Profile:

UN minimum TPI of 5
ISO maximum pitch of 5mm

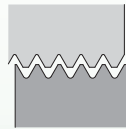
Laydown Internal Threading

Boring Bar Diameters:

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



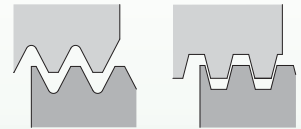
Fine Pitch



Cresting (Full Profile) and Partial Profile:

UN maximum TPI of 48
ISO minimum pitch of 0,5mm

Coarse Pitch/Heavy Duty



Cresting (Full Profile):

UN minimum TPI of 8
ISO maximum pitch of 5mm

Partial Profile:

UN minimum TPI of 5
ISO maximum pitch of 5mm

WIDIA™ TopThread™

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

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

TopThread

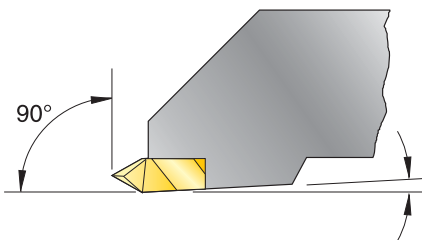
TopThread Insert Technology

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

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

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

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



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

The Simple Solution

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

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

Step 1 • Select Threading Method and Hand of Tooling

Required Information:

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



hand of thread

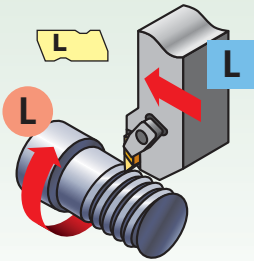


hand of toolholder

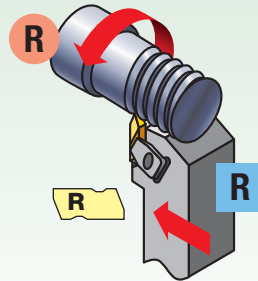


hand of insert

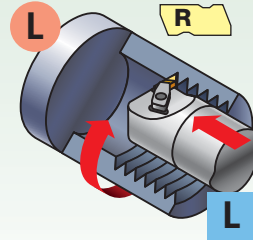
Feed direction toward the chuck • standard helix



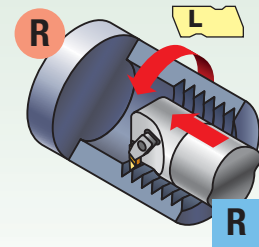
external left-hand thread



external right-hand thread

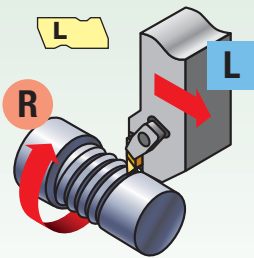


internal left-hand thread

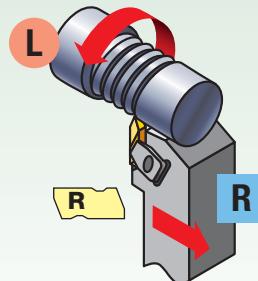


internal right-hand thread

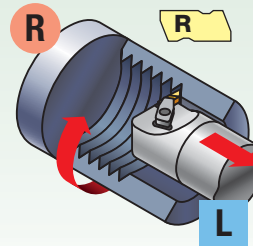
Feed direction away from the chuck • reverse helix



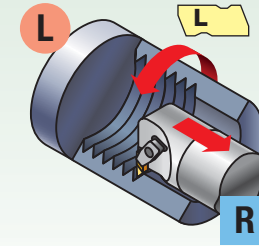
external right-hand thread



external left-hand thread



internal right-hand thread



internal left-hand thread

Step 2 • Select Holder from Catalog Page

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

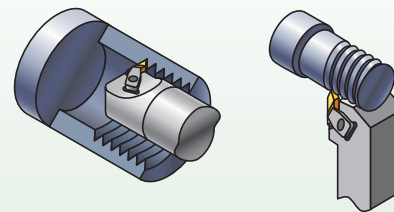
Required Information:

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

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

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

Select the appropriate holder for the insert size and hand:



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

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

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



Step 3 • Choose Insert for Application

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

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

Step 4 • Select Grade and Speed

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

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

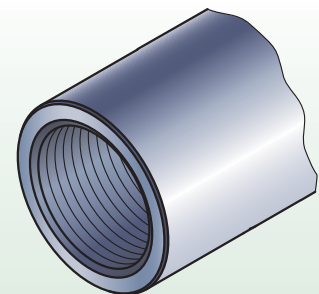
NOTE: Also available as an optimum cutting tool for steel and stainless steel or partial profile threading. Increase speed by 15% over the recommendations above.

Examples:
 Chip Control: NT-K or NT-CK (partial profile only)
 Neutral: NT, NT-C, NTF, NTC, NJ, NJF, NDC-V, NA, NDC, NTB-A/B
 Positive: NTP, NTK, NJP, NJK

TopThread Threading Example:

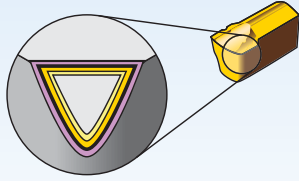
application: 8 TPI Acme internal right-hand thread
 material: alloy steel
 workpiece diameter: 4.5" (114,3mm)
 good cutting conditions
 feed towards the chuck

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



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

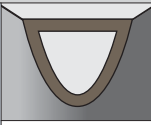
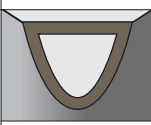
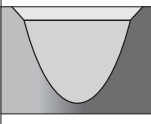
style			thread profile	standard	tolerance class	cresting	application	page(s)
chip control — K	neutral	positive						
NT-K	NT	NTP	Partial Profile 60°	—	—	N	General use for 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches.	A147–A148
NT-CK			Partial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



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

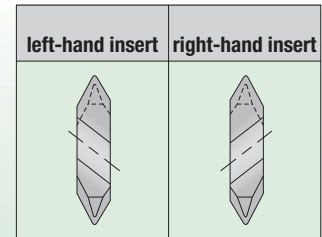
- Reduce cycle times — high speed and feed capability.
- Longer tool life — new multilayer coating provides better wear resistance.

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

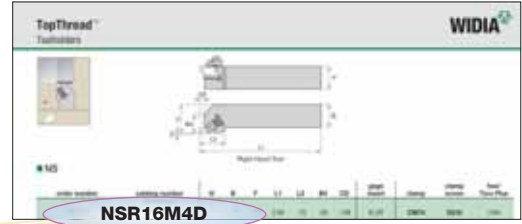
Coating		Grade Description	05	10	15	20	25	30	35	40	45	
Grade TN6010		PVD-TiAlN multilayer coated carbide. For finishing and general machining of steels, stainless steels, cast irons, non-ferrous materials, and difficult-to-machine materials. Recommended at high cutting speeds under stable conditions.	P									
	HC-P10		M									
			K									
			N									
			S									
Grade TN6025		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									
	HC-P25		M									
			K									
			N									
			S									
Grade THM		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									
	HW-K15		N									
			S									
			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		16	M	4	D																																																														
Insert Holding Method	Insert Mounting Location	Hand of Tool	Drop Head	Shank Size	Tool Length	Insert Size	Qualified Surface and Length																																																														
<p>N — TopThread*</p> <p>*Proprietary standard only.</p>	<p>End mount</p> <p>Side mount, offset</p> <p>Side mount, no offset</p>			<p>Inch: Indicates the holder cross section. For shanks 5/8" square and larger, it represents the number of sixteenths of width and height. For shanks under 5/8" square, the number of sixteenths of cross section is preceded by a zero. For rectangular holders, the first digit represents the number of eighths of width and the second digit the number of quarters of height, except for a toolholder 1-1/4" x 1-1/2", which is given the number 91.</p>	<table border="1"> <thead> <tr> <th>L1</th> <th>ISO</th> </tr> </thead> <tbody> <tr><td>32</td><td>A</td></tr> <tr><td>40</td><td>B</td></tr> <tr><td>50</td><td>C</td></tr> <tr><td>60</td><td>D</td></tr> <tr><td>70</td><td>E</td></tr> <tr><td>80</td><td>F</td></tr> <tr><td>90</td><td>G</td></tr> <tr><td>100</td><td>H</td></tr> <tr><td>110</td><td>J</td></tr> <tr><td>125</td><td>K</td></tr> <tr><td>140</td><td>L</td></tr> <tr><td>150</td><td>M</td></tr> <tr><td>160</td><td>N</td></tr> <tr><td>170</td><td>P</td></tr> <tr><td>180</td><td>Q</td></tr> <tr><td>200</td><td>R</td></tr> <tr><td>250</td><td>S</td></tr> <tr><td>300</td><td>T</td></tr> <tr><td>350</td><td>U</td></tr> <tr><td>400</td><td>V</td></tr> <tr><td>450</td><td>W</td></tr> <tr><td>500</td><td>Y</td></tr> <tr><td>special length</td><td>x</td></tr> </tbody> </table>	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	<table border="1"> <thead> <tr> <th>insert size</th> <th>W1</th> </tr> </thead> <tbody> <tr><td>2</td><td>.150"</td></tr> <tr><td>3</td><td>.195"</td></tr> <tr><td>4</td><td>.255"</td></tr> <tr><td>5</td><td>.380"</td></tr> <tr><td>6</td><td>.383"</td></tr> <tr><td>8</td><td>.438"</td></tr> </tbody> </table>	insert size	W1	2	.150"	3	.195"	4	.255"	5	.380"	6	.383"	8	.438"	
L1	ISO																																																																				
32	A																																																																				
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6	.383"																																																																				
8	.438"																																																																				
				<p>End mount</p> <p>Side mount</p>																																																																	

- A – qualified back and end, 4" (101,60mm) long
- B – qualified back and end, 4.5" (114,30mm) long
- C – qualified back and end, 5" (127,00mm) long
- D – qualified back and end, 6" (152,40mm) long
- E – qualified back and end, 7" (177,80mm) long
- V – qualified back and end, 3.5" (88,90mm) long

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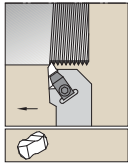
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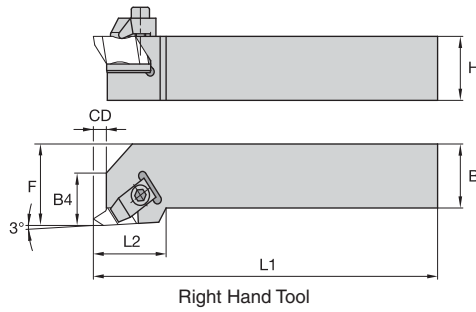
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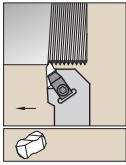
See page A132 for inserts.



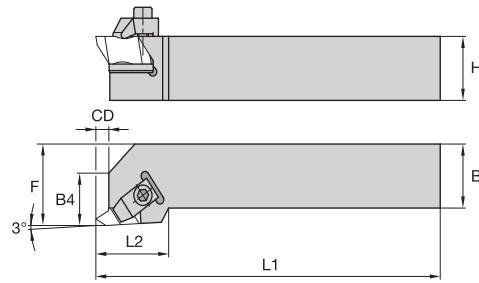
■ NS

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

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



See page A132 for inserts.

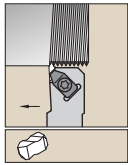


Right Hand Tool

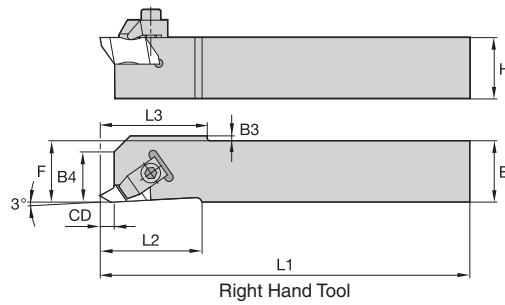
■ NS (with Shim)

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

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



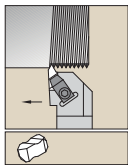
See page A132 for inserts.



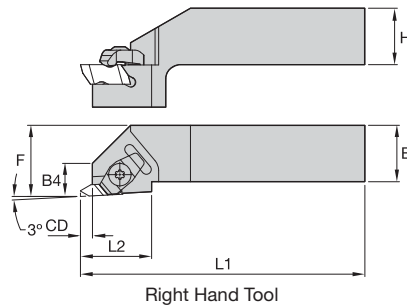
■ NAS

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

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



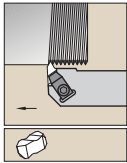
See page A132 for inserts.



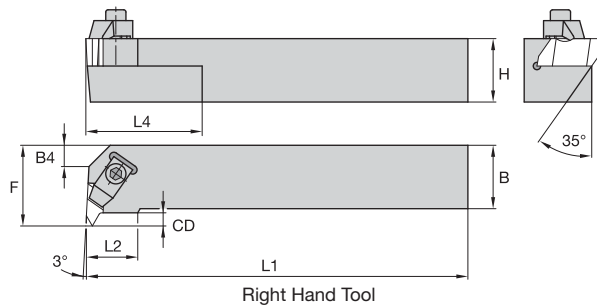
■ NS-DH

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

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



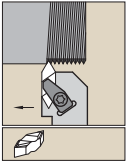
See page A132 for inserts.



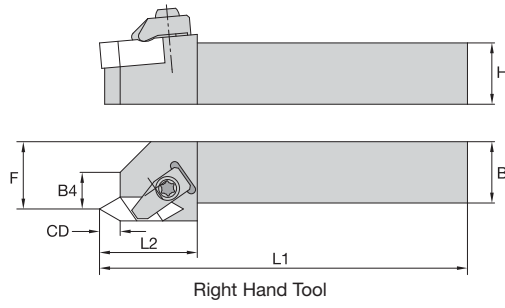
■ **NE**

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

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



See page A132 for inserts.



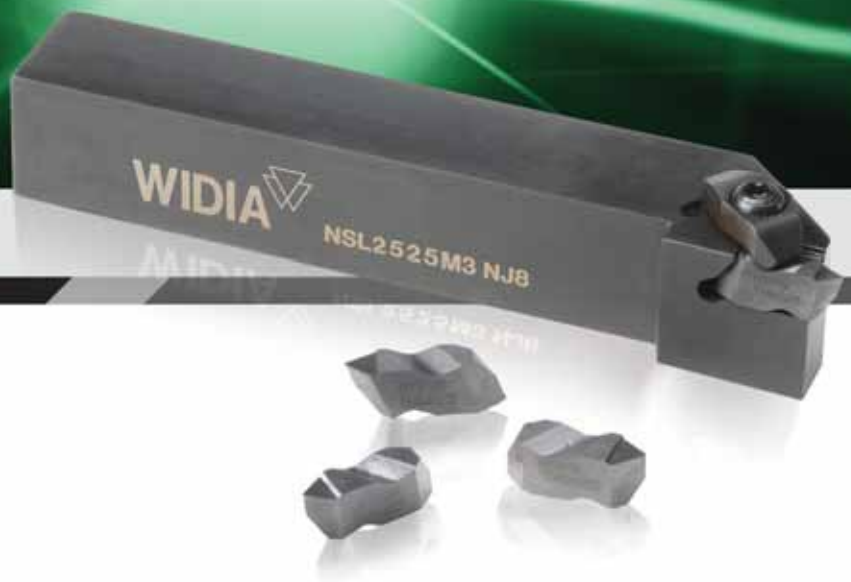
■ NSU

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

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

WIN WITH WIDIA™

WIDIA 



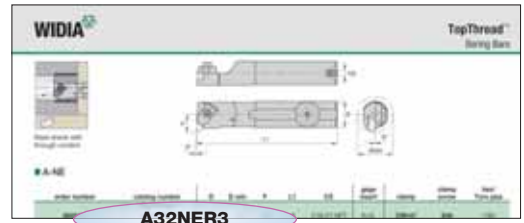
TopThread™ System

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

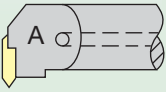
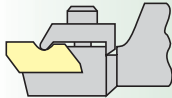


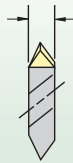
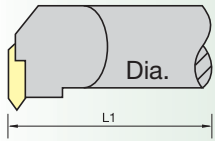

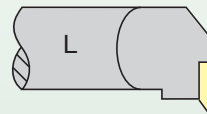
- Largest selection of insert geometries and grades in the industry.
- Rigid insert clamping design ensures the best tool life, surface finish, and workpiece quality.
- Minimizes built-up edges, reduces cutting forces, and precisely cuts most common materials.
- Ensures accurate, high-quality threads.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

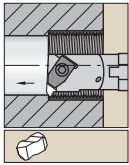
TopThread
Boring Bar Identification System

Turning

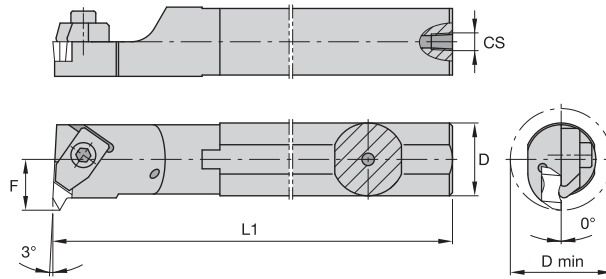


A32NER3

A	32	N	E	R	3																
Bar Type	Bar Diameter	Insert Holding Method	Insert Location	Hand of Tool	Insert Size																
Steel with coolant		N — TopThread*	End mount	Right hand	W1																
																					
	A two-digit number that indicates the bar diameter in 1/16" increments.	*Proprietary standard only.	Side mount	Left hand	<table border="1"> <thead> <tr> <th>insert size</th> <th>W1</th> </tr> </thead> <tbody> <tr><td>1</td><td>.100"</td></tr> <tr><td>2</td><td>.150"</td></tr> <tr><td>3</td><td>.195"</td></tr> <tr><td>4</td><td>.255"</td></tr> <tr><td>5</td><td>.380"</td></tr> <tr><td>6</td><td>.383"</td></tr> <tr><td>8</td><td>.438"</td></tr> </tbody> </table>	insert size	W1	1	.100"	2	.150"	3	.195"	4	.255"	5	.380"	6	.383"	8	.438"
insert size	W1																				
1	.100"																				
2	.150"																				
3	.195"																				
4	.255"																				
5	.380"																				
6	.383"																				
8	.438"																				
																					



Steel shank with through coolant.

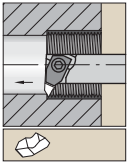


■ **A-NE**

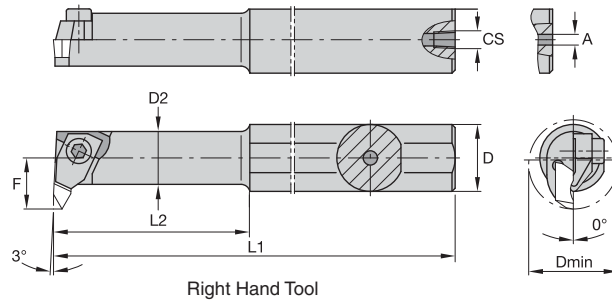
order number	catalog number	D	D min	F	L1	CS	gage insert	clamp	clamp screw	hex/Torx plus
	right hand									
3632117	A08NER2	.500	.730	.437	8	1/16-27 NPT	N.2L	CM147	S39	7/64
3632114	A10NER2	.625	1.000	.500	10	1/8-27 NPT	N.2L	CM75	S310	7/64
3632118	A12NER2	.750	1.125	.562	10	1/8-27 NPT	N.2L	CM75	S310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

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

Turning



Necked steel shank with through coolant.



■ A-NE-1

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

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

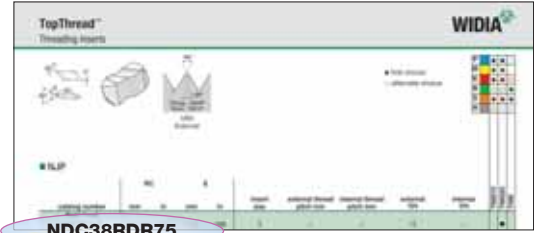
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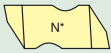
TopThread Insert Identification System



NDC38RDR75

N
Type of Insert

N — TopThread*



*Proprietary standard only.

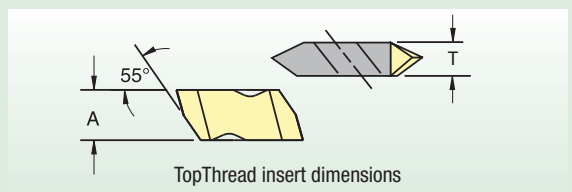
D
Insert Style

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

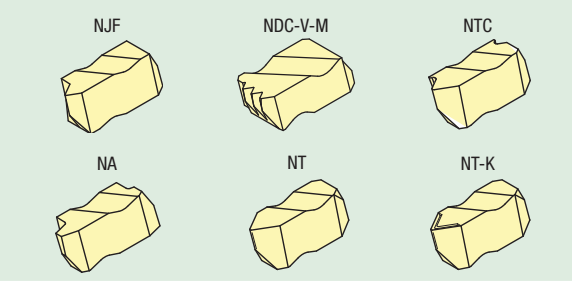
C
Additional Information

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

3
Insert Size



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



8RD
Industry Thread Identification

Indicates API or drilling industry form designation (e.g., 10RD, 8RD, .038) or controlled root radius threading inserts indicate the root radius in .001" increments (NJ, NJF, NJP, NJK) or M indicates metric ISO thread

R
Hand of Insert

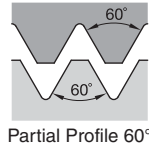
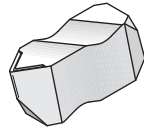
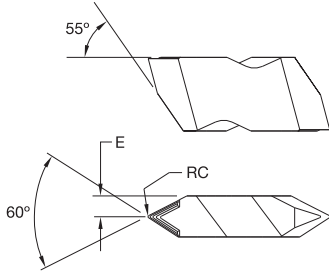
- R — Right hand
- L — Left hand

75
Definition of Insert

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

Additional Information

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



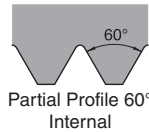
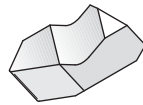
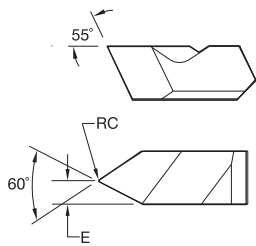
- first choice
- alternate choice

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



■ NT-K

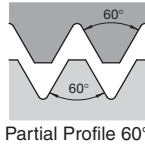
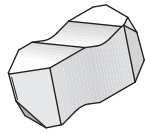
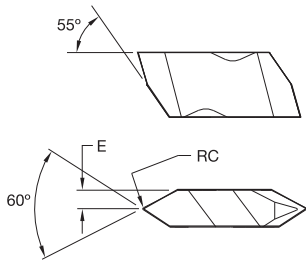
catalog number	RC		E		insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
	mm	in	mm	in								
right hand												
NT2RK	0,10	.004	1,91	.075	2	0,70-3,00	1,25-3,50	8-36	7-20	●	●	
NT3RK	0,17	.007	2,49	.098	3	1,25-4,00	2,00-5,00	6-20	5-12	●	●	
NT4RK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



■ NT-1L

catalog number	RC		E		insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
	mm	in	mm	in								
left hand												
NT1L	0,08	.003	1,09	.043	1	—	1,00-2,00	—	12-24	●	●	

Turning

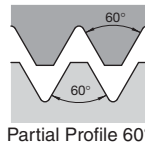
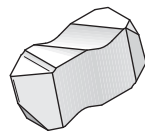
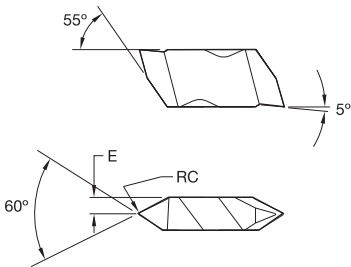


● first choice
○ alternate choice

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

■ NT

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

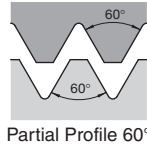
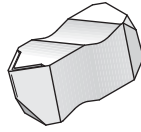
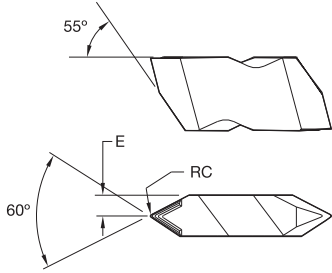


■ NTP

catalog number	RC		E		insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
	mm	in	mm	in								
right hand												
NTP2R	0,10	.004	1,91	.075	2	0,70–3,00	1,25–3,50	8–36	7–20	●	●	
NTP3R	0,17	.007	2,49	.098	3	1,25–4,00	2,00–5,00	6–20	5–12	●	●	
NTP4R	0,17	.007	3,25	.128	4	1,25–6,25	2,00–6,25	4–20	4–12		●	
left hand												
NTP2L	0,10	.004	1,91	.075	2	0,70–3,00	1,25–3,50	8–36	7–20	●	●	
NTP3L	0,17	.007	2,49	.098	3	1,25–4,00	2,00–5,00	6–20	5–12	●	●	



Turning

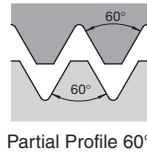
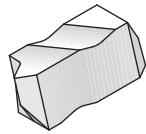
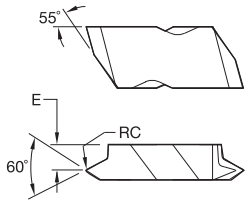


- first choice
- alternate choice

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

■ **NT-CK**

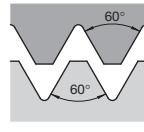
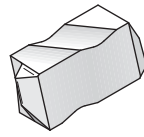
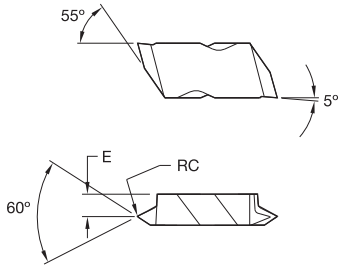
catalog number	RC		E		insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
	mm	in	mm	in								
right hand NT3RCK	0,34	.014	2,46	.097	3	2,50–4,00	4,00	6–11	6	●	●	



■ **NTF**

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

Turning



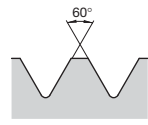
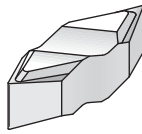
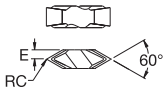
Partial Profile 60°

● first choice
○ alternate choice

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

■ NTK

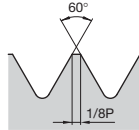
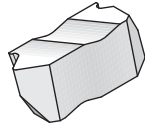
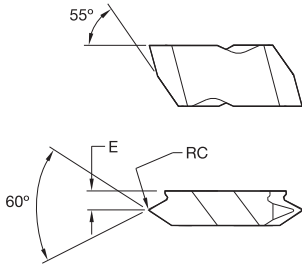
catalog number	RC		E		insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
	mm	in	mm	in								
right hand NTK2R	0,08	.003	2,79	.110	2	0,60–1,75	1,00–2,00	14–44	12–24	●	●	
NTK3R left hand	0,08	.003	3,58	.141	3	0,60–2,50	1,00–2,50	10–44	9–24	●	●	
NTK3L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



Partial Profile 60°
External

■ NTU

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



American
UN-External

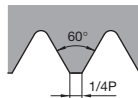
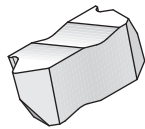
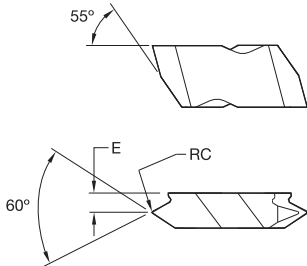
● first choice
○ alternate choice

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

Turning

■ NTC-E

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

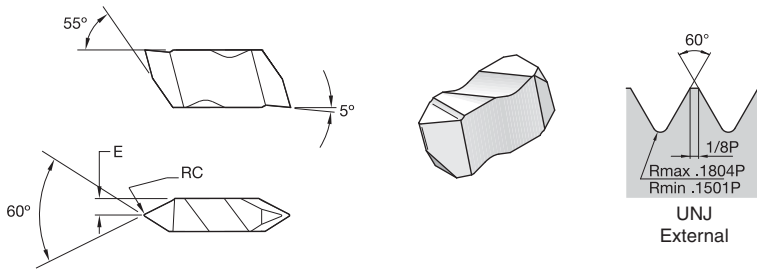


American
UN-Internal

■ NTC-I

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

Turning

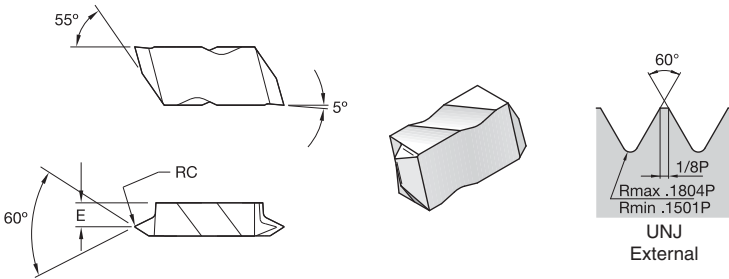


- first choice
- alternate choice

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

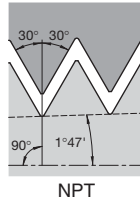
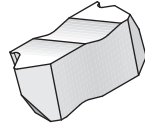
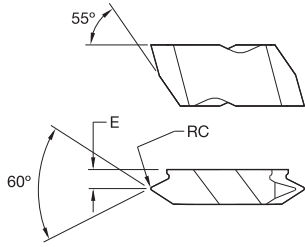
■ NJP

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



■ NJK

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



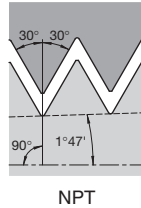
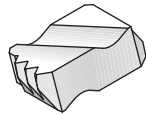
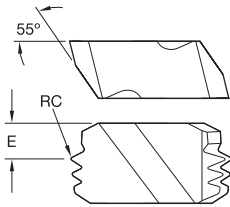
- first choice
- alternate choice

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

Turning

■ **NDC-V**

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

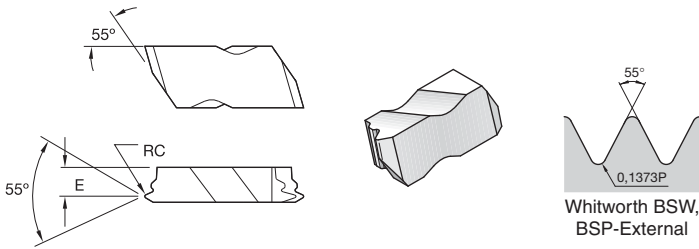


NPT

■ **NDC-V-M**

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

Turning

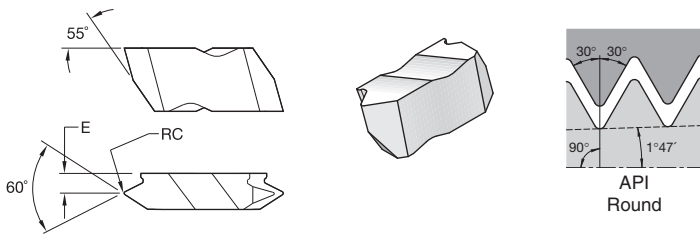


- first choice
- alternate choice

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

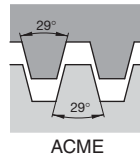
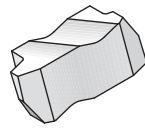
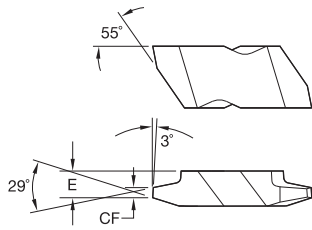
■ **NWC-E**

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



■ **NDC-RD**

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



● first choice
○ alternate choice

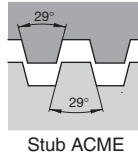
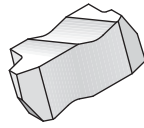
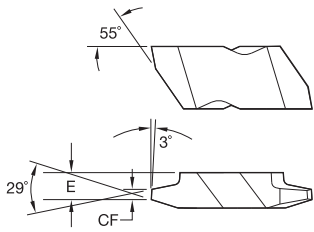
P	●	●	●
M	●	●	●
K	●	●	○
N	○	○	●
S	●	●	●
H	○	○	○

Turning

■ NA

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

Turning



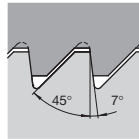
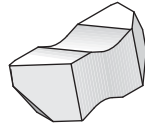
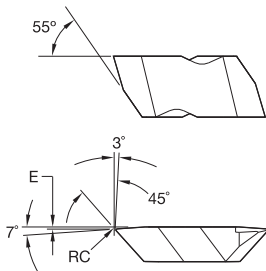
Stub ACME

● first choice
○ alternate choice

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

■ NAS

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



American Buttress-Pull

■ NTB-B

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



Turning

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

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

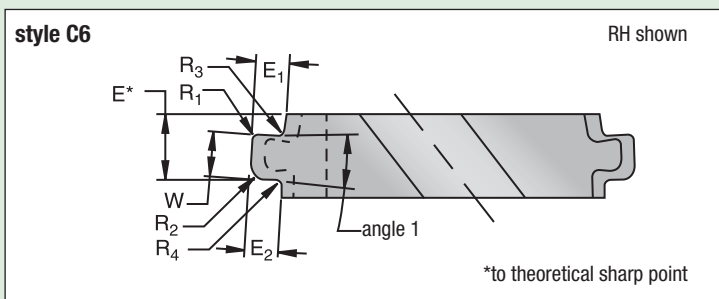
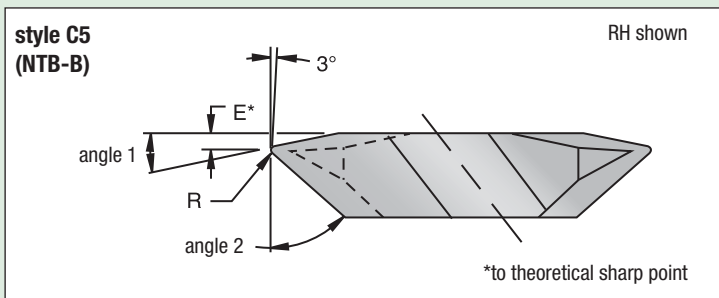
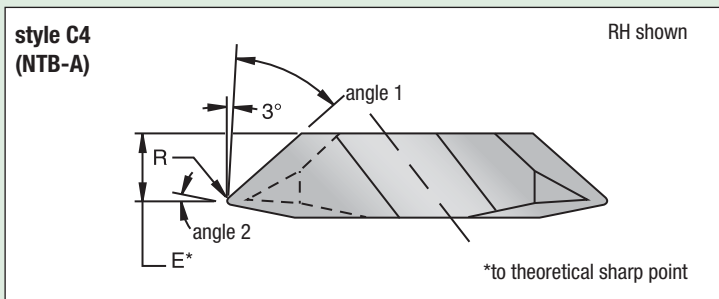
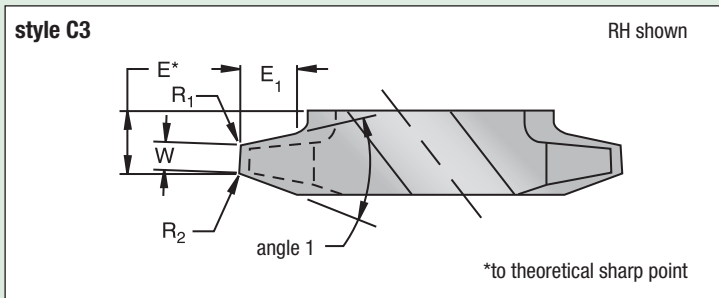
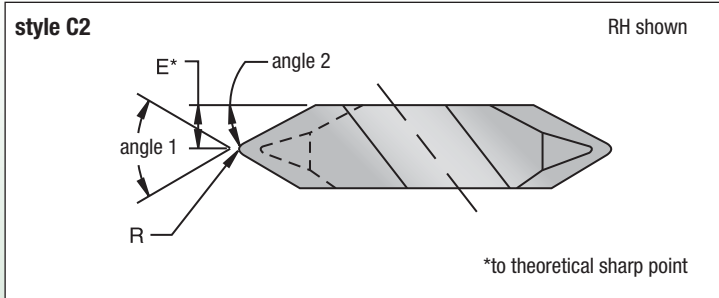
When WIDIA's large inventory of standard products does not completely satisfy your productivity requirements, consider having TopThread inserts custom ground to meet your unique application needs.

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

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

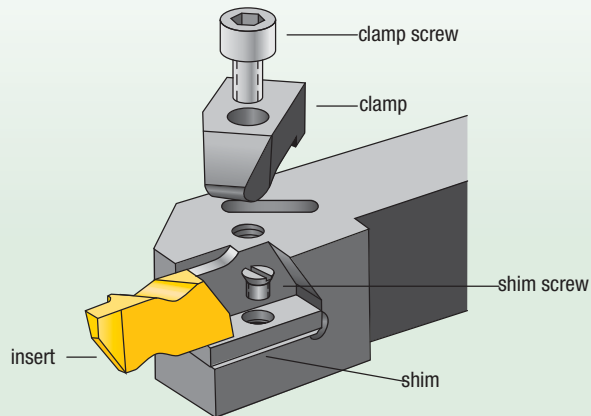
Features and Benefits:












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



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

**TopThread and TopGroove
Toolholders and Boring Bars**



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

*25mm diameter boring head.

**Boring head.

WIDIA™ Laydown Threading

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

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

Laydown

Laydown Insert Technology

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

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

Reliable TopClamp™ locking guarantees precise insert positioning accuracy.

Choose from both steel and carbide boring bars to satisfy all machining application needs.

Get more parts per insert with the economy of the Laydown Threading insert's three cutting edges.



The Laydown Threading Solution

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

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

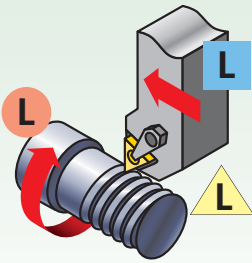
Step 1 • Select Threading Method and Hand of Tooling

Required Information:

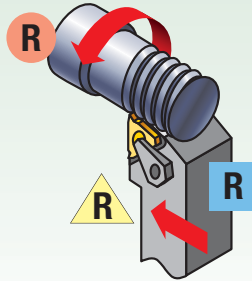
- External/internal operation.
- Spindle rotation/hand of thread.
- Feed direction.



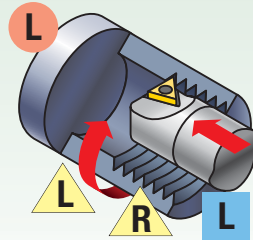
Feed direction toward the chuck • standard helix



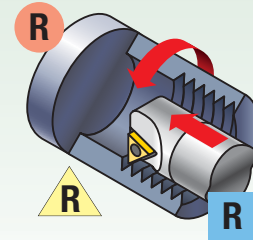
external left-hand thread



external right-hand thread

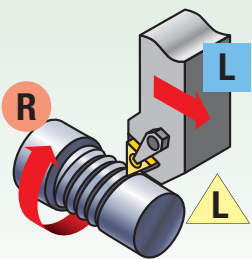


internal left-hand thread

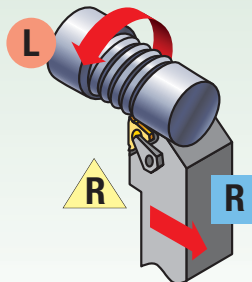


internal right-hand thread

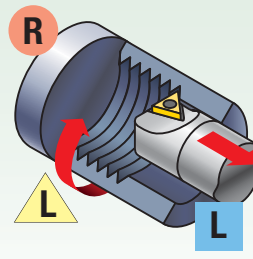
Feed direction away from the chuck • reverse helix



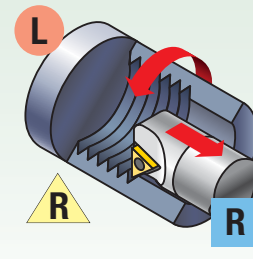
external right-hand thread



external left-hand thread



internal right-hand thread



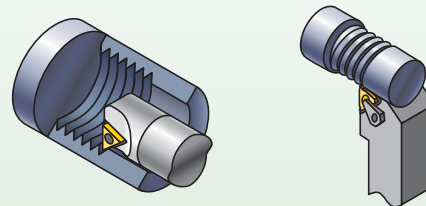
internal left-hand thread

Step 2 • Select Holder from Catalog Page

Required Information:

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

Select the appropriate holder for the insert size and hand:

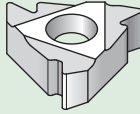


The insert size must match the gage insert size of your toolholder selection:

catalog number	gage insert	minimum bore diameter	shim
S0812LSER2	2IRA60	650"	—
S2020LSER3	3IR...	1.45"	SM-Y13

Step 3 • Choose Insert for Application

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

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

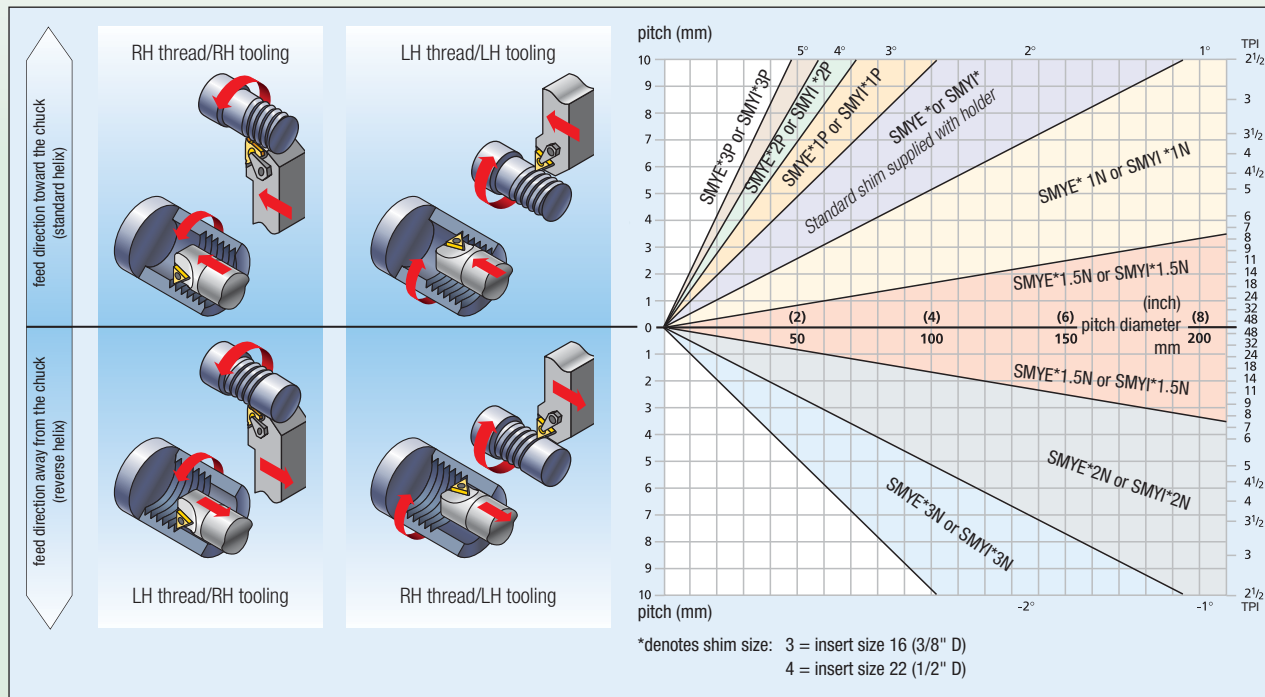
See *threading insert overview* on page A164.

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

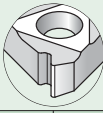


If recommended shim is different from shim supplied with toolholder, order shim separately.

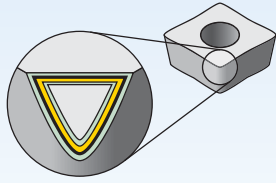
NOTE: Optimize your threading operation by using the proper infeed angle and the recommended infeed values. See the Technical Section on pages A189–A197. Also see detailed shim selection information on page A210–A211.

Step 5 • Select Grade and Speed

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

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

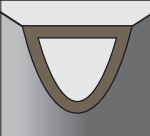
style		thread profile	standard	tolerance class	cresting	application	page(s)
	flat top						
	60	Partial profile 60°	—	—	N	General use for 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches.	A173–A175
	ISO	Metric ISO	ISO R262, DIN 13	6g/6H	Y	Widely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



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

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

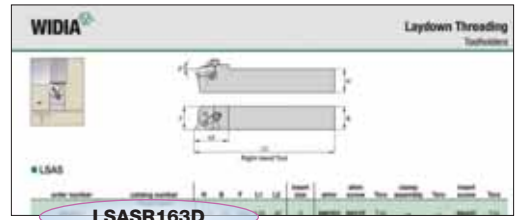
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

Coating		Grade Description	05	10	15	20	25	30	35	40	45		
Grade	 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										
			M										
			K										
			N										
			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 optimized for the best tool life at that pitch.
- Non-cresting partial profile inserts offer the flexibility to cut a variety of thread pitches with one insert.
- Right-hand Laydown Threading toolholders use right-hand inserts. Left-hand Laydown Threading toolholders use left-hand inserts.
- Right-hand Laydown Threading boring bars use right-hand inserts. Left-hand Laydown Threading boring bars use left-hand inserts.

Laydown Threading Toolholder Identification System

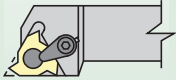


LSASR163D

L

Insert
Style

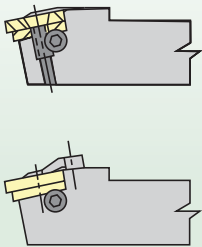
L —
Laydown triangle



S

Insert
Holding
Method

S —
Insert screw or clamp only



AS

Tool
Style

Straight shank



Offset shank

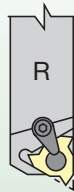
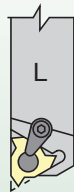


R

Hand
of Tool

Left hand

Right hand



Drop
Head



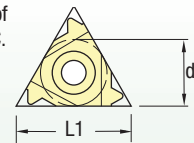
16

Shank
Size

Inch:

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

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



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

D

Qualified
Surface and
Length

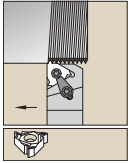
C —
qualified
back and
end, 5" long

D —
qualified
back and
end, 6" long

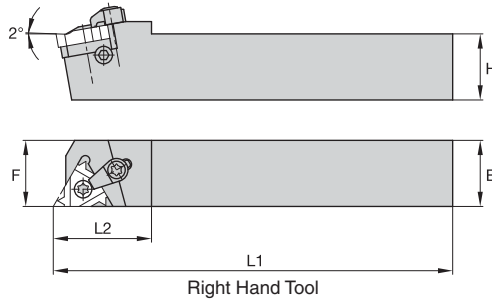
E —
qualified
back and
end, 7" long

T —
qualified
back and
end, 3.25"
long

Q —
qualified
metric
holder

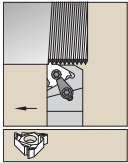


See page A164 for inserts.

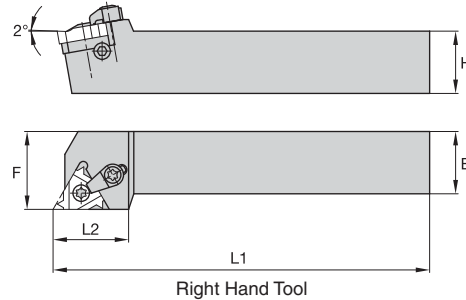


■ **LSAS**

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



See page A164 for inserts.

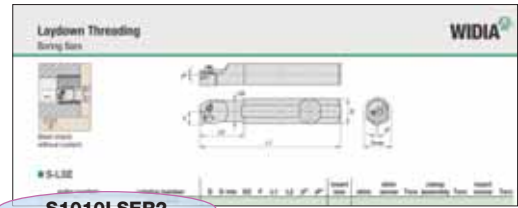


■ **LSS**



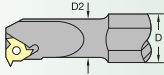
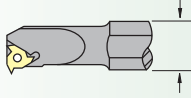

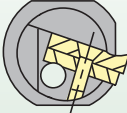
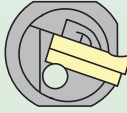



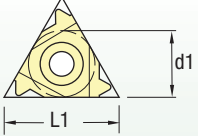
order number	catalog number	H	B	F	L1	L2	insert size	shim	shim screw	Torx	clamp assembly	Torx	insert screw	Torx
	right hand													
2968591	LSSR123D	.750	.750	1.000	6.00	1.00	3	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968592	LSSR163D	1.000	1.000	1.250	6.00	1.00	3	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968594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

Laydown Threading Boring Bar Identification System

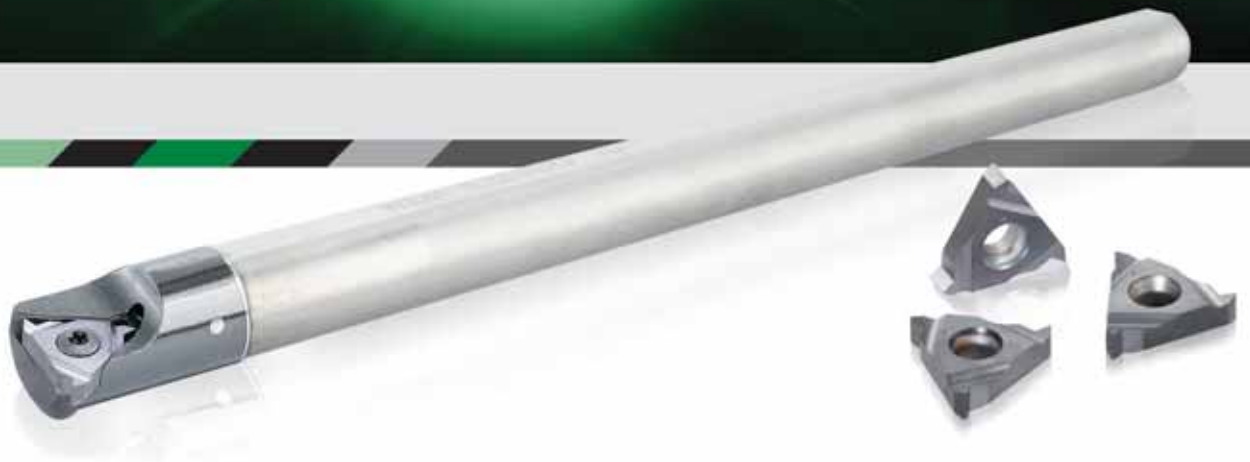
Turning



S1010LSER2

S	10	10	L	S	E	R	2																
Bar Type	Primary Necked Shank Bar Diameter	Secondary (mounting) Bar Diameter	Insert Style	Insert Holding Method	Bar Style	Hand of Tool	Insert Size																
<p>E — Carbide with coolant</p>  <p>S — Steel shank without coolant</p> 	<p>Indicates the primary bar diameter in 1/16" increments.</p>  <p>NOTE: Boring bars with primary bar diameters larger than 5/8" are supplied with clamp and insert screw. Secure the insert with either the clamp or insert screw. Do not use both.</p>	<p>Indicates the secondary bar diameter in 1/16" increments.</p> 	<p>L — Laydown triangle</p> 	<p>S — Insert screw or clamp only</p>  	<p>E — End cutting edge mount</p> 	<p>Left hand</p>  <p>Right hand</p> 	<p>Size equals number of 1/8" increments of IC.</p>  <table border="1" data-bbox="1018 1691 1396 1877"> <thead> <tr> <th>inch insert size</th> <th>metric insert size</th> <th>d1 inch</th> <th>L1 mm</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>11</td> <td>1/4</td> <td>11,0</td> </tr> <tr> <td>3</td> <td>16</td> <td>3/8</td> <td>16,5</td> </tr> <tr> <td>4</td> <td>22</td> <td>1/2</td> <td>22,0</td> </tr> </tbody> </table>	inch insert size	metric insert size	d1 inch	L1 mm	2	11	1/4	11,0	3	16	3/8	16,5	4	22	1/2	22,0
inch insert size	metric insert size	d1 inch	L1 mm																				
2	11	1/4	11,0																				
3	16	3/8	16,5																				
4	22	1/2	22,0																				

WIN WITH WIDIA™



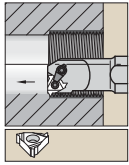
Laydown Threading System

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

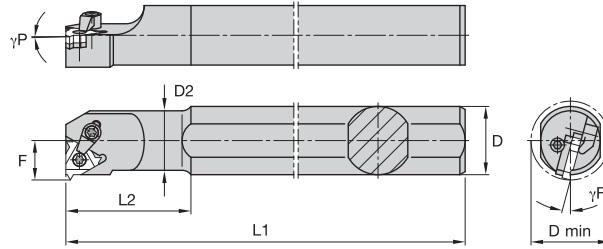
- Low-profile design enables unrestricted chip flow.
- Precision-ground thread forms for precise cuts.
- Ideal choice for fine-pitch threads, high-helix/multi-start threads, and single-point threading in small diameter bores.

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

WIDIA 



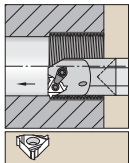
Steel shank without coolant.
See page A164 for inserts.



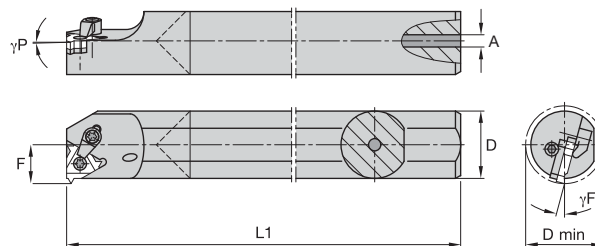
S-LSE

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

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



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



Right Hand Tool

E-LSE

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

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

Our complete portfolio. Your complete satisfaction.

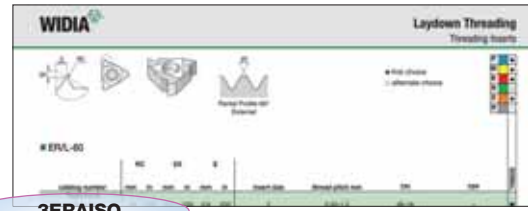


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Laydown Threading Insert Identification System

Turning



3ERAISO

3

Insert
Size

E

Insert Type

- E — External thread
- I — Internal thread
- UE — External thread
- UI — Internal thread
- VE — External thread
- VI — Internal thread

R

Hand
of Insert

- R — Right-hand thread
- L — Left-hand thread

A

Thread
Pitch

ISO

Thread
Profile

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

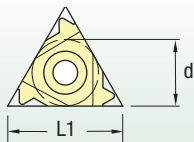
- 55** Partial Profile 55°
- 60** Partial Profile 60°
- ISO** ISO Metric 60°
- TR** ISO Trapezoidal
- UN** ISO Inch/American UN 60°
- UNJ** Controlled Root Radius 60°
- ACME** American ACME
- W** Whitworth 55°
- BSPT** British Standard Pipe Thread 55°
- NPT** American National Pipe Thread 60°
- BUT** 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 inserts

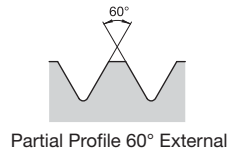
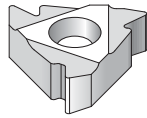
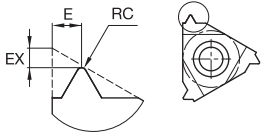
symbol	inch	mm
A	48–16	0,5–1,5
AG	48–8	0,5–3,0
G	14–8	1,7–3,0
N	7–5	3,5–5,0
Q	4–5	5,5–6,0

Full profile inserts

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



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



- first choice
- alternate choice

P	●
M	●
K	●
N	○
S	●
H	●



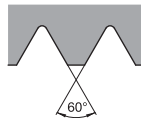
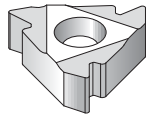
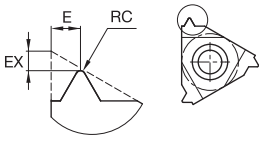
■ ER/L-60

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

Laydown Threading

Threading Inserts

Turning



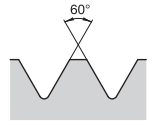
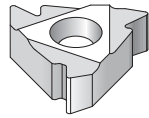
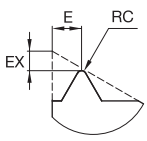
Partial Profile 60° Internal

- first choice
- alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

■ IR/L-60

catalog number	RC		EX		E		insert size	thread pitch mm	TPI	TPF	TNG025
	mm	in	mm	in	mm	in					
right hand 2IRA60	0,05	.002	0,8	.031	0,9	.035	2	0,50-1,5	48-16	—	●
3IRA60	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,5	48-16	—	●
3IRAG60	0,05	.002	1,2	.047	1,7	.067	3	0,50-3,0	48-8	—	●
3IRG60	0,15	.006	1,2	.047	1,7	.067	3	1,75-3,0	14-8	—	●
4IRN60	0,31	.012	1,7	.067	2,5	.098	4	3,5-5,0	7-5	—	●
left hand 3LAG60	0,05	.002	1,2	.047	1,7	.067	3	0,50-3,0	48-8	—	●



Partial Profile 60° External

- first choice
- alternate choice

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



Turning

■ ER-60

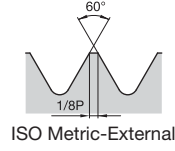
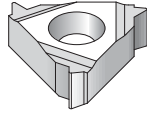
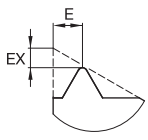
catalog number	RC		EX		E		insert size	thread pitch mm	TPI	TPF	PN120	TTS
	mm	in	mm	in	mm	in						
right hand 44315900	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,5	48-8	-	●	●
44315901	0,28	.011	1,2	.047	1,7	.067	3	1,75-3,0	14-8	-	●	●

Laydown Threading

Threading Inserts



Turning

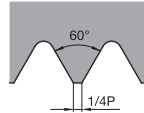
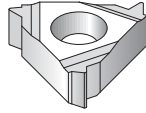
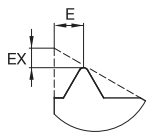


- first choice
- alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

■ ER/L-ISO

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TNG025
	mm	in	mm	in					
right hand									
2ER15ISO	1,0	.039	0,8	.032	2	1,5	—	—	●
3ER30ISO	1,2	.047	1,6	.063	3	3,0	—	—	●
3ER25ISO	1,1	.043	1,5	.059	3	2,5	—	—	●
3ER20ISO	1,0	.039	1,3	.051	3	2,0	—	—	●
3ER175ISO	0,9	.035	1,2	.047	3	1,75	—	—	●
3ER15ISO	0,8	.031	1,0	.039	3	1,5	—	—	●
3ER125ISO	0,8	.031	0,9	.035	3	1,25	—	—	●
3ER10ISO	0,7	.027	0,7	.027	3	1,0	—	—	●
3ER08ISO	0,6	.024	0,6	.024	3	0,80	—	—	●
3ER075ISO	0,6	.024	0,6	.024	3	0,75	—	—	●
3ER07ISO	0,6	.024	0,6	.024	3	0,70	—	—	●
3ER05ISO	0,6	.024	0,4	.016	3	0,50	—	—	●
4ER50ISO	1,7	.067	2,5	.098	4	5,0	—	—	●
4ER35ISO	1,6	.063	2,3	.090	4	4,5	—	—	●
4ER45ISO	1,7	.067	2,4	.094	4	4,5	—	—	●
4ER40ISO	1,6	.063	2,3	.090	4	4,0	—	—	●
5ER60ISO	2,9	.114	2,0	.079	5	6,0	—	—	●
5ER55ISO	2,7	.106	1,9	.075	5	5,5	—	—	●
left hand									
2EL175ISO	0,8	.031	1,1	.043	2	1,75	—	—	●
2EL15ISO	0,8	.031	1,0	.039	2	1,5	—	—	●
2EL125ISO	0,8	.031	0,9	.035	2	1,25	—	—	●
2EL10ISO	0,7	.028	0,7	.028	2	1,0	—	—	●
2EL08ISO	0,6	.024	0,6	.024	2	0,8	—	—	●
2EL075ISO	0,6	.024	0,6	.024	2	0,75	—	—	●
2EL07ISO	0,6	.024	0,6	.024	2	0,7	—	—	●
2EL06ISO	0,6	.024	0,6	.024	2	0,6	—	—	●
2EL05ISO	0,6	.024	0,4	.016	2	0,5	—	—	●
3EL30ISO	1,2	.047	1,6	.063	3	3,0	—	—	●
3EL25ISO	1,1	.043	1,5	.059	3	2,5	—	—	●
3EL20ISO	1,3	.051	1,0	.039	3	2,0	—	—	●
3EL175ISO	0,9	.035	1,2	.047	3	1,75	—	—	●
3EL15ISO	0,8	.031	1,0	.039	3	1,5	—	—	●
3EL10ISO	0,7	.027	0,7	.027	3	1,0	—	—	●
3EL06ISO	0,6	.024	0,6	.024	3	0,6	—	—	●
3EL045ISO	0,7	.028	0,4	.016	3	0,45	—	—	●
3EL04ISO	0,7	.028	0,4	.016	3	0,4	—	—	●
3EL035ISO	0,8	.031	0,4	.016	3	0,35	—	—	●
4EL40ISO	1,6	.063	2,3	.090	4	4,0	—	—	●
4EL50ISO	1,7	.067	2,5	.098	4	—	—	—	●



ISO Metric-Internal

- first choice
- alternate choice

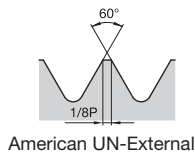
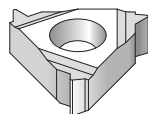
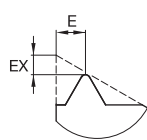
P	●
M	●
K	●
N	○
S	●
H	●



■ IR/L-ISO

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TNG025
	mm	in	mm	in					
right hand									
2IR15ISO	0,8	.032	1,0	.039	2	1,5	—	—	●
2IR10ISO	0,6	.024	0,7	.028	2	1,0	—	—	●
3IR30ISO	1,1	.043	1,5	.059	3	3,0	—	—	●
3IR25ISO	1,1	.043	1,5	.059	3	2,5	—	—	●
3IR20ISO	1,0	.039	1,3	.051	3	2,0	—	—	●
3IR175ISO	0,9	.035	1,2	.047	3	1,75	—	—	●
3IR15ISO	0,8	.032	1,0	.039	3	1,5	—	—	●
3IR125ISO	0,8	.032	0,9	.035	3	1,25	—	—	●
3IR10ISO	0,6	.024	0,7	.028	3	1,0	—	—	●
4IR50ISO	1,6	.063	2,3	.091	4	5,0	—	—	●
4IR45ISO	1,6	.063	2,4	.095	4	4,5	—	—	●
4IR40ISO	1,6	.063	2,3	.091	4	4,0	—	—	●
4IR35ISO	1,6	.063	2,3	.091	4	3,5	—	—	●
5IR60ISO	1,8	.071	2,5	.098	5	6,0	—	—	●
5IR55ISO	1,6	.063	2,3	.091	5	—	—	—	●
left hand									
2IL15ISO	0,8	.032	1,0	.039	2	1,5	—	—	●
2IL125ISO	0,8	.031	0,9	.035	2	1,25	—	—	●
2IL08ISO	0,6	.024	0,6	.024	2	0,8	—	—	●
2IL075ISO	0,6	.024	0,6	.024	2	0,75	—	—	●
2IL07ISO	0,6	.024	0,6	.024	2	0,7	—	—	●
2IL06ISO	0,6	.024	0,6	.024	2	0,6	—	—	●
2IL05ISO	0,6	.024	0,4	.016	2	0,50	—	—	●
2IL04ISO	0,7	.028	0,4	.016	2	0,4	—	—	●
2IL035ISO	0,8	.031	0,4	.016	2	0,35	—	—	●
3IL30ISO	1,1	.043	1,5	.059	3	3,0	—	—	●
3IL25ISO	1,1	.043	1,5	.059	3	2,5	—	—	●
3IL20ISO	1,0	.039	1,3	.051	3	2,0	—	—	●
3IL15ISO	0,8	.032	1,0	.039	3	1,5	—	—	●
3IL10ISO	0,6	.024	0,7	.028	3	1,0	—	—	●
3IL07ISO	0,6	.024	0,6	.024	3	0,7	—	—	●
3IL06ISO	0,6	.024	0,6	.024	3	0,6	—	—	●
3IL05ISO	0,6	.024	0,4	.016	3	0,50	—	—	●
3IL04ISO	0,8	.031	0,4	.016	3	0,4	—	—	●
3IL035ISO	0,8	.031	0,3	.012	3	0,35	—	—	●
4IL40ISO	1,6	.063	2,3	.090	4	4,0	—	—	●
4IL35ISO	1,6	.063	2,3	.090	4	3,5	—	—	●
4IL45ISO	1,6	.063	2,4	.094	4	—	—	—	●
5IL60ISO	1,8	.071	2,5	.098	5	6,0	—	—	●
5IL55ISO	1,6	.063	2,3	.091	5	5,5	—	—	●

Turning

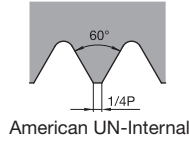
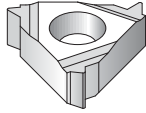
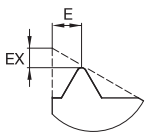


- first choice
- alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

■ ER/L-UN

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TNG025
	mm	in	mm	in					
right hand 3ER8UN	1,2	.047	1,6	.063	3	—	8	—	●
3ER48UN	0,6	.024	0,6	.024	3	—	48	—	●
3ER40UN	0,6	.024	0,6	.024	3	—	40	—	●
3ER36UN	0,6	.024	0,6	.024	3	—	36	—	●
3ER32UN	0,6	.024	0,6	.024	3	—	32	—	●
3ER28UN	0,6	.024	0,7	.028	3	—	28	—	●
3ER24UN	0,7	.028	0,8	.032	3	—	24	—	●
3ER20UN	0,8	.032	0,9	.035	3	—	20	—	●
3ER18UN	0,8	.032	1,0	.039	3	—	18	—	●
3ER16UN	0,9	.035	1,1	.043	3	—	16	—	●
3ER12UN	1,1	.043	1,4	.055	3	—	12	—	●
3ER11UN	1,1	.043	1,5	.059	3	—	11	—	●
3ER10UN	1,1	.043	1,5	.059	3	—	10	—	●
left hand 3EL8UN	1,2	.047	1,6	.063	3	—	8	—	●
3EL13UN	1,0	.039	1,3	.051	3	—	13	—	●
3EL12UN	1,1	.043	1,4	.055	3	—	12	—	●
3EL11UN	1,1	.043	1,5	.059	3	—	11	—	●
3EL10UN	1,1	.043	1,5	.059	3	—	10	—	●



- first choice
- alternate choice

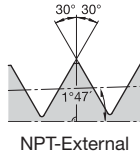
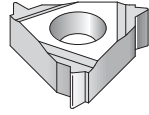
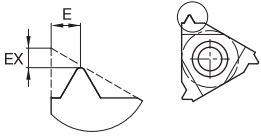
P	●
M	●
K	●
N	○
S	●
H	●



■ IR/L-UN

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TNG025
	mm	in	mm	in					
right hand 2IR18UN	0,8	.031	1,0	.039	2	—	18	—	●
2IR16UN	0,9	.035	1,1	.043	2	—	16	—	●
3IR8UN	1,1	.043	1,5	.059	3	—	8	—	●
3IR32UN	0,6	.024	0,6	.024	3	—	32	—	●
3IR28UN	0,6	.024	0,7	.027	3	—	28	—	●
3IR24UN	0,7	.028	0,8	.032	3	—	24	—	●
3IR20UN	0,8	.032	0,9	.035	3	—	20	—	●
3IR18UN	0,8	.032	1,0	.039	3	—	18	—	●
3IR16UN	0,9	.035	1,1	.043	3	—	16	—	●
3IR14UN	0,9	.035	1,2	.047	3	—	14	—	●
3IR12UN	1,1	.043	1,4	.055	3	—	12	—	●
3IR11UN left hand	1,1	.043	1,5	.059	3	—	11	—	●
3IL9UN	1,2	.047	1,7	.067	3	—	9	—	●
3IL8UN	1,1	.043	1,5	.059	3	—	8	—	●
3IL64UN	0,8	.031	0,4	.016	3	—	64	—	●
3IL56UN	0,7	.028	0,4	.016	3	—	56	—	●

Turning

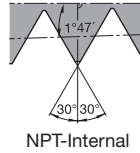
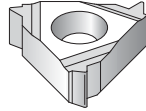
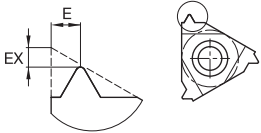


- first choice
- alternate choice

P	■	●
M	■	●
K	■	●
N	■	○
S	■	●
H	■	●

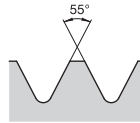
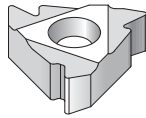
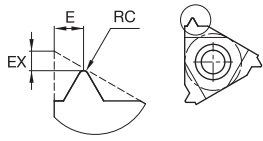
ER/L-NPT

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TNG025
	mm	in	mm	in					
right hand 3ER27NPT	0,7	.028	0,8	.032	3	—	27	.75	●
3ER18NPT	0,8	.032	1,0	.039	3	—	18	.75	●
3ER14NPT	0,9	.035	1,2	.047	3	—	14	.75	●
3ER115NPT	1,1	.043	1,5	.059	3	—	11.5	.75	●
3ER8NPT	1,3	.051	1,8	.071	3	—	8	.75	●



IR/L-NPT

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



Partial Profile
55° External

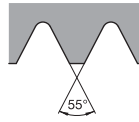
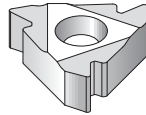
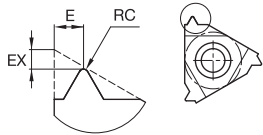
- first choice
- alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

Turning

ER/L-55

catalog number	RC		EX		E		insert size	thread pitch mm	TPI	TPF	TNG025
	mm	in	mm	in	mm	in					
right hand 3ERAG55	0,08	.003	1,2	.047	1,7	.067	3	0,50-3,0	48-8	—	●
3ERA55	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,5	48-16	—	●
3ERG55	0,20	.008	1,2	.047	1,7	.067	3	1,75-3,0	14-8	—	●
4ERN55	0,43	.017	1,7	.067	2,5	.098	4	3,5-5,0	7-5	—	●

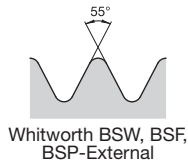
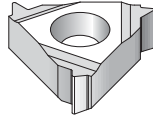
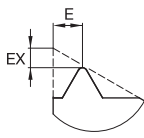


Partial Profile
55° Internal

IR/L-55

catalog number	RC		EX		E		insert size	thread pitch mm	TPI	TPF	TNG025
	mm	in	mm	in	mm	in					
right hand 2IRA55	0,05	.002	0,8	.031	0,9	.035	2	0,50-1,5	48-16	—	●
3IRAG55	0,07	.003	1,2	.047	1,7	.067	3	0,50-3,0	48-8	—	●
3IRA55	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,5	48-16	—	●
3IRG55	0,21	.008	1,2	.047	1,7	.067	3	1,75-3,0	14-8	—	●
4IRN55	0,43	.017	1,7	.067	2,5	.098	4	3,5-5,0	7-5	—	●
left hand 3ILAG55	0,07	.003	1,2	.047	1,7	.067	3	0,50-3,0	48-8	—	●
3ILA55	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,5	48-16	—	●

Turning

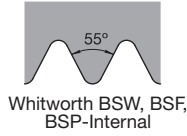
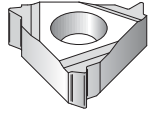
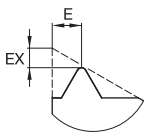


- first choice
- alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

■ ER/L-W

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TNG025
	mm	in	mm	in					
right hand									
3ER32W	0,6	.024	0,6	.024	3	—	32	—	●
3ER28W	0,6	.024	0,7	.028	3	—	28	—	●
3ER24W	0,7	.028	0,8	.032	3	—	24	—	●
3ER19W	0,8	.032	1,0	.039	3	—	19	—	●
3ER18W	0,8	.031	1,0	.039	3	—	18	—	●
3ER16W	0,9	.035	1,1	.043	3	—	16	—	●
3ER14W	1,0	.039	1,2	.047	3	—	14	—	●
3ER11W	1,1	.043	1,5	.059	3	—	11	—	●
3ER10W	1,1	.043	1,5	.059	3	—	10	—	●
3ER8W	1,2	.047	1,5	.059	3	—	8	—	●
4ER5W	1,7	.067	2,4	.094	4	—	—	—	●
left hand									
3EL36W	0,6	.024	0,6	.024	3	—	36	—	●
3EL12W	1,1	.043	1,4	.055	3	—	12	—	●
3EL11W	1,1	.043	1,5	.059	3	—	11	—	●
5EL45W	1,8	.071	2,6	.102	5	—	4.5	—	●
5EL4W	2,0	.079	2,9	.114	5	—	4	—	●



- first choice
- alternate choice

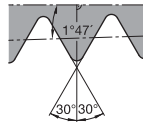
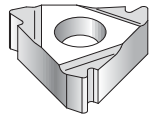
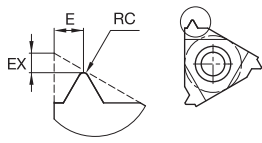
P	●
M	●
K	●
N	○
S	●
H	●



■ IR/L-W

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TNG025
	mm	in	mm	in					
right hand									
2IR19W	0,8	.032	1,0	.039	2	—	19	—	●
2IR14W	0,9	.035	1,1	.043	2	—	14	—	●
3IR19W	0,8	.032	0,9	.035	3	—	19	—	●
3IR18W	0,8	.031	1,0	.039	3	—	18	—	●
3IR16W	0,9	.035	1,1	.043	3	—	16	—	●
3IR14W	1,0	.039	1,2	.047	3	—	14	—	●
3IR11W	1,1	.043	1,5	.059	3	—	11	—	●
3IR8W	1,2	.047	1,5	.059	3	—	8	—	●
4IR7W	1,6	.063	2,3	.090	4	—	7	—	●
4IR6W	1,6	.063	2,3	.090	4	—	6	—	●
4IR5W	1,7	.067	2,4	.094	4	—	—	—	●
left hand									
3IL14W	1,0	.039	1,2	.047	3	—	14	—	●
5IL45W	1,8	.071	2,6	.102	5	5,5 - 6,0	4,5	—	●
5IL4W	2,0	.079	2,9	.114	5	—	4	—	●

Turning



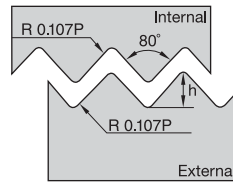
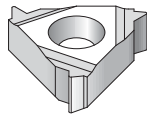
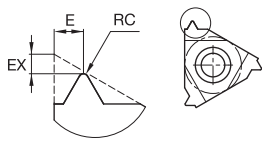
API Round-Internal

- first choice
- alternate choice

P	■	●
M	■	●
K	■	●
N	■	○
S	■	●
H	■	●

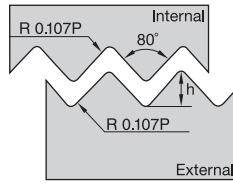
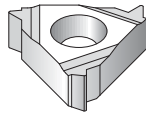
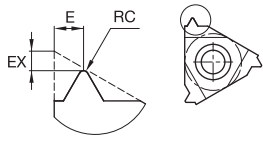
IR-APIRD

catalog number	RC		EX		E		insert size	thread pitch mm	TPI	TPF	TNG025
	mm	in	mm	in	mm	in					
right hand 3IR10APIRD	0,34	.013	1,2	.047	1,4	.055	3	—	10	.75	●



ER-PG

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



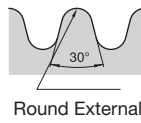
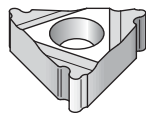
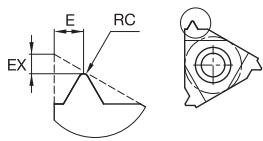
- first choice
- alternate choice

P	●
M	●
K	●
N	○
S	●
H	●



IR-PG

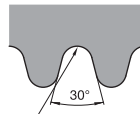
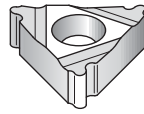
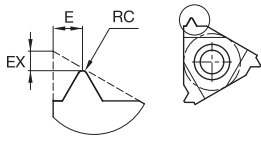
catalog number	RC		EX		E		insert size	thread pitch mm	TPI	TPF	TNG025
	mm	in	mm	in	mm	in					
right hand 3IR18PG	0,09	.004	0,1	.039	0,8	.032	3	—	18	—	●
3IR16PG	0,11	.004	1,1	.043	0,8	.032	3	—	16	—	●



ER-RD

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

Turning



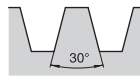
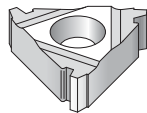
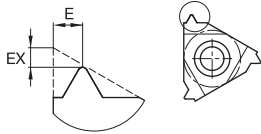
R = .221P
Round-Internal

- first choice
- alternate choice

P	■	●
M	■	●
K	■	●
N	■	○
S	■	●
H	■	●

IR/L-RD

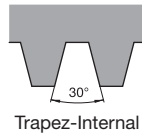
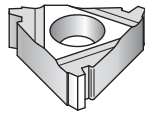
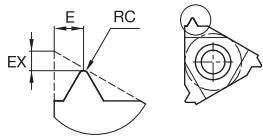
catalog number	RC		EX		E		insert size	thread pitch mm	TPI	TPF	TNG025
	mm	in	mm	in	mm	in					
right hand											
3IR8RD	0,70	.028	1,4	.055	1,4	.055	3	—	8	—	●
4IR6RD	0,93	.037	1,5	.059	1,7	.067	4	—	6	—	●
4IR4RD	1,40	.055	2,3	.091	2,2	.087	4	—	4	—	●
left hand											
3IL6RD	—	—	1,4	.055	1,5	.059	3	6,0	—	—	●
3IL8RD	0,06	.022	1,4	.055	1,4	.055	3	—	8	—	●
5IL4RD	—	—	2,2	.087	2,3	.091	5	4,0	—	—	●



Trapez-External

ER/L-TR

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



- first choice
- alternate choice

P	●
M	●
K	●
N	○
S	●
H	●



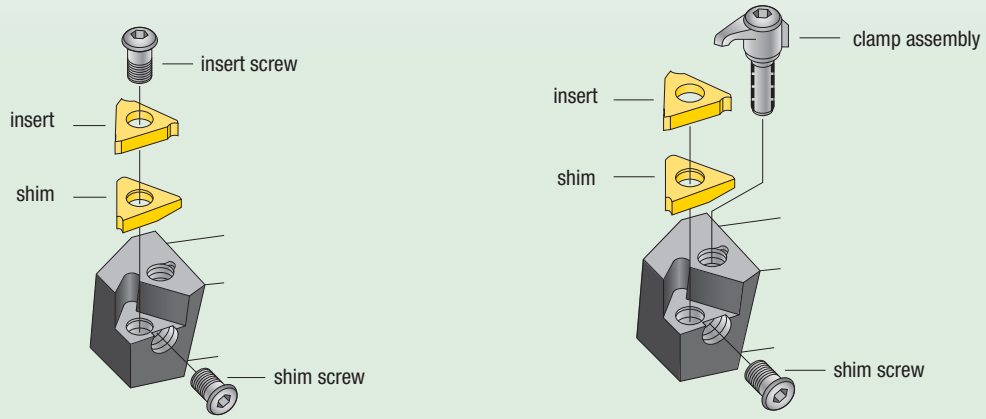
■ IR/L-TR

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

Laydown Threading Toolholders

In all cases, the proper shim selection is important.

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



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

SM

Shim

-

Y

Y-shim for Laydown standard inserts

E

E — External
I — Internal

3

IC — 1/8"

-

2P

Shim Angle

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

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

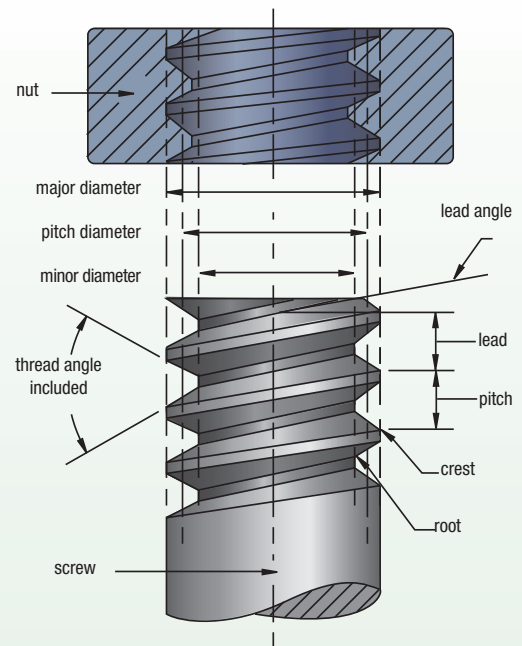
Slanted Shim Kit

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

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

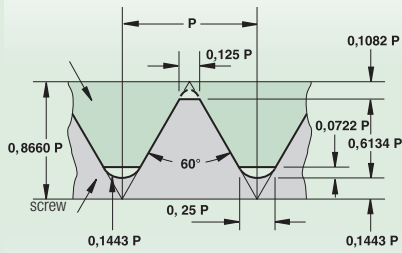
Screw Thread Definitions

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



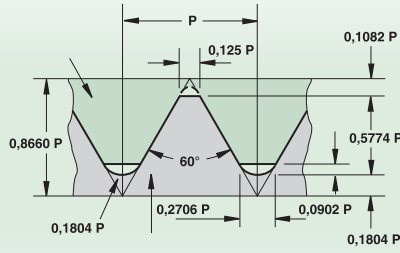
*NOTE: Threads per inch (TPI) not shown:
The number of threads per inch measured axially.
The terms pitch and TPI are often used interchangeably. TPI=1/pitch*

ISO M (Metric) and UN (Unified National)



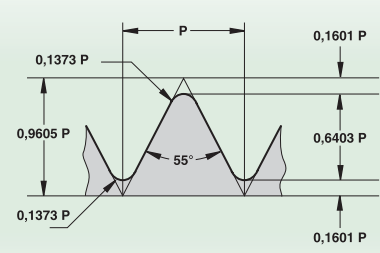
Use: All branches of mechanical industry.

UNJ (controlled root radius)



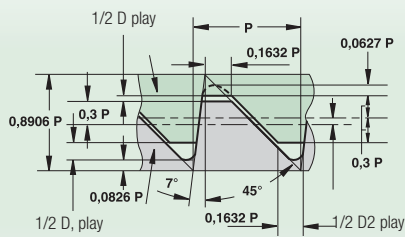
Use: Aircraft and space industry.

Whitworth (BSW)



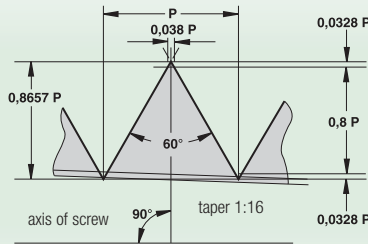
Use: Fittings and pipe couplings for gas, water, and sewer lines (replaced by ISO).

American Buttress



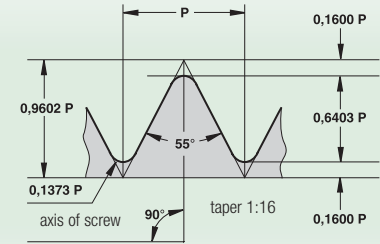
Use: Fittings and pipe couplings.

NPT (American National Pipe Thread)



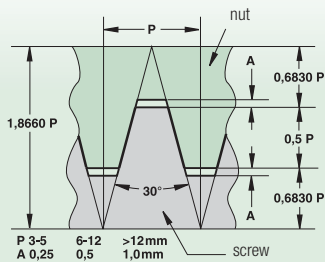
Use: Fittings and pipe couplings.

BSPT (British Standard Pipe Thread)



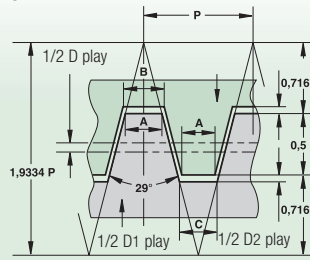
Use: Pipe thread for steam, gas, and water lines.

TR DIN 103



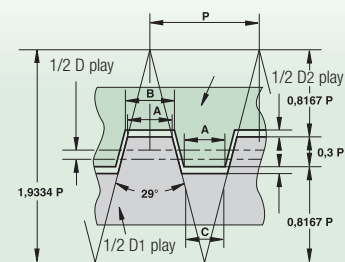
Use: Mechanical industry for motion transmission screws.

Acme



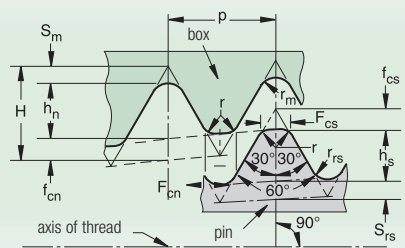
A = 0,0307 P
 B = 0,3707 P—x D play
 C = 0,3707 P—(D1 play—D2 play)
 Use: Acme-General is used in mechanical industry for motion transmission screws.

Acme, truncated (Stub)



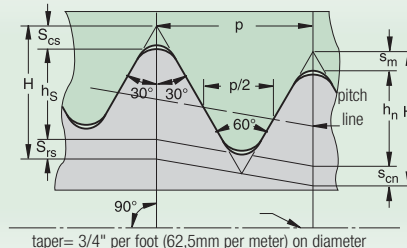
A = 0,4224 P
 B = 0,4224 P—x D play
 C = 0,4224 P—(D1 play—D2 play)
 Use: Where normal Acme is too deep.

API Rotary Shoulder Connection



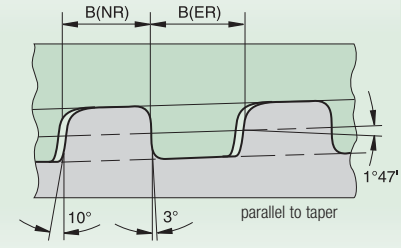
NOTE: Taper shown exaggerated.

API Casing and Tubing Round Thread Form



NOTE: Taper shown exaggerated.

API Buttress





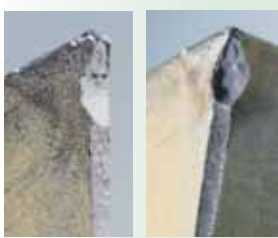




**Suggested Grades and Speeds for Threading
Various Workpiece Materials**

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

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

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

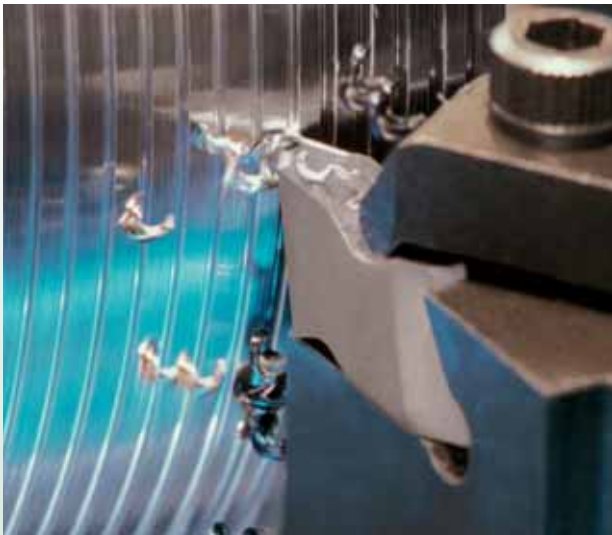
problem	cause	possible solution
thread with torn finish 	<ul style="list-style-type: none"> • Burrs. • Torn finish. • Steps. 	<ul style="list-style-type: none"> • Use positive rake or full profile insert. • Increase coolant concentration. • Alter infeed. • Increases SFM. • Check machine "Z" travel axis. • Check insert form. • Check for correct shim in LT system.
chatter 	<ul style="list-style-type: none"> • Poor rigidity. • Incorrect speed. • Insert movement. • Improper infeed. • Off centerline. • Wrong edge prep. 	<ul style="list-style-type: none"> • Minimize tool overhang. • Check for workpiece deflection. • Adjust SFM. • Check insert and clamp. • Use modified feed angle. • Verify that tool cutting position is at workpiece centerline. • Adjust hone level by ordering special insert.
built-up edge 	<ul style="list-style-type: none"> • Speed too low. • Insufficient coolant. • Chip load. • Wrong edge prep. 	<ul style="list-style-type: none"> • Increase SFM. • Increase coolant concentration and/or flow. • Adjust infeed angle. • Increase depth of cut per pass. • Adjust hone level by ordering special insert.
deformation 	<ul style="list-style-type: none"> • Wrong grade. • Speed too high. • Improper infeed angle. • Insufficient coolant. 	<ul style="list-style-type: none"> • Use a more wear-resistant grade (e.g., TN6010™). • Reduce SFM. • Alter infeed method/angle. • Increase coolant flow.
chipping 	<ul style="list-style-type: none"> • Improper infeed. • Chip load. • Wrong grade. • Incorrect speed. • Poor rigidity. • Wrong edge prep. 	<ul style="list-style-type: none"> • Alter infeed to modified flank. • Increase or decrease number of passes. • Eliminate spring passes. • Use tougher grade (e.g., TN6025™). • Increase SFM if chipping on trailing edge. • Decrease SFM if chipping on leading edge. • Minimize tool overhang. • Check for insert movement/check clamp. • Check for possible part deflection. • Adjust hone size by ordering special insert.
broken nose 	<ul style="list-style-type: none"> • Heavy chip load. • Small nose radius. • Wrong grade. • Improper infeed. • Wrong edge prep. 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Wrong grade. • Insufficient coolant. • Off centerline. 	<ul style="list-style-type: none"> • Use a more wear-resistant grade (e.g., TN6025). • Increase coolant flow. • Check the centerline height of the tool. (The smaller the diameter, the more critical the need for centerline accuracy.)

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

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

The Last Pass

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

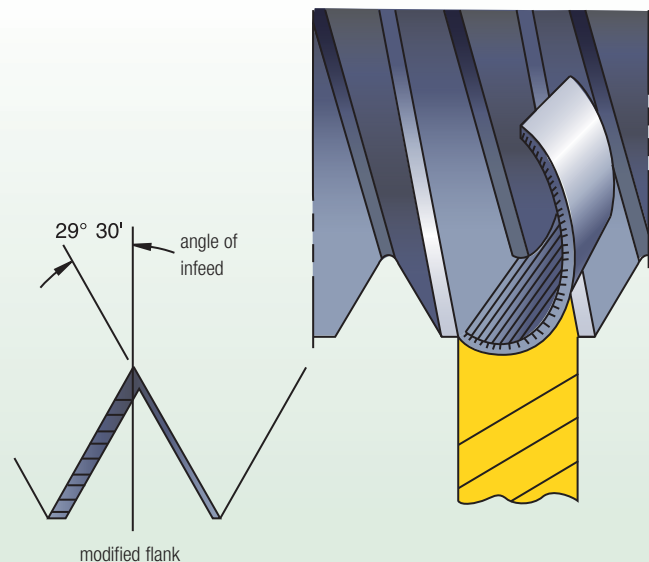


Machine Programming

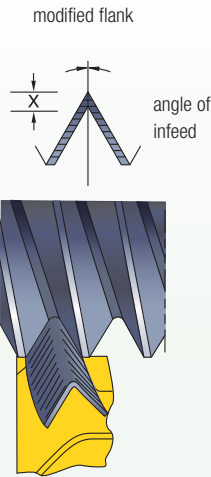
Modern CNC controls allow the programmer to easily adjust infeed angle, the number of passes, and depth of cut for each pass. The chip control threading insert performs best at an infeed angle of 29° 30', although 15° to 30° is acceptable. Also, it is important to maintain a minimum of .005" (0,127mm)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

Infeed Angle

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



Radial



Advantage —

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

Disadvantage —

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

Flank



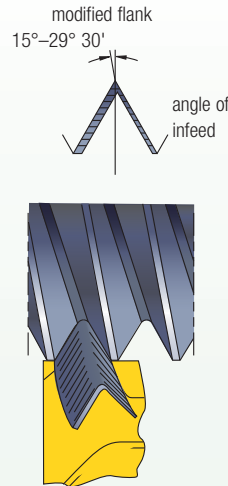
Advantage —

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

Disadvantage —

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

Modified flank



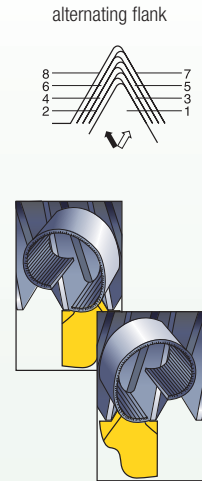
Advantage —

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

Disadvantage —

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

Alternating flank



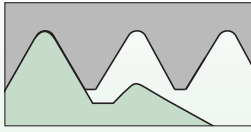
Advantage —

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

Disadvantage —

- Difficult to cut on conventional machinery.

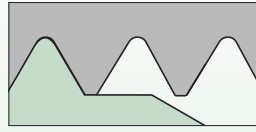
Partial Profile



Tooth profile with universal profile shape:

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

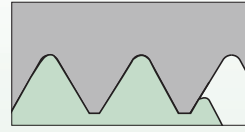
Full Profile



Tooth profile with full profile shape including tooth height:

- For burr-free, precise threads in the specified pitch.
- General application.
- Machining allowance for outside/core diameter around .004–.006".

Multi-Tooth Profile



Multi-tooth full profile generally with 2–3 teeth:

- Highly productive threading with fewer passes and longer tool life.
- Requires a rigid setup and long thread runout.
- Minimum clearance width approximately 1.25 x E as per indexable insert dimensions table.

Formulas

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

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

Legend

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

Maximum Cutting Speeds

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

inch formula: maximum cutting speed (SFM) =

$$\text{part diameter (inch)} \times 3.14 \times TPI \times \frac{\text{max IPM}}{12"}$$

metric formula: maximum cutting speed (m/min) =

$$\text{part diameter (mm)} \times 3.14 \times (1/\text{pitch}) \times \frac{\text{max mm/min}}{1000\text{mm}}$$

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

Constant Volume Infeed Values for Threading Operations

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

Example:

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

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

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

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

Using Radial Infeed

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

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

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

Using Flank Infeed

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

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

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

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

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

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

Metric ISO, External Thread Cutting

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

Metric ISO, Internal Thread Cutting

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

UN Thread, External Thread Cutting

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

UN Thread, Internal Thread Cutting

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

NPT Thread, External, and Internal Machining

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

BSPT Thread, External, and Internal Machining

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

Trapezoid Thread to DIN 103, External, and Internal Machining

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

Round Thread to DIN 405, External, and Internal Machining

pitch, Gg/Z	10	8	6
depth	.052	.064	.085
number of passes	8	10	12
values for flank infeed (X/Z)			
order of passes	X/Z	X/Z	X/Z
1	.008/-	.009/-	.008/-
2	.008/.002	.008/.002	.01/.003
3	.008/.002	.008/.002	.011/.003
4	.007/.002	.007/.002	.009/.002
5	.006/.002	.007/.002	.008/.002
6	.006/.001	.006/.002	.008/.002
7	.005/.001	.006/.002	.007/.002
8	.004/.001	.005/.001	.006/.002
9		.004/.001	.006/.001
10		.006/.001	.005/.001
11			.004/.001
12			.003/.001

Whitworth, External, and Internal Thread Cutting

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

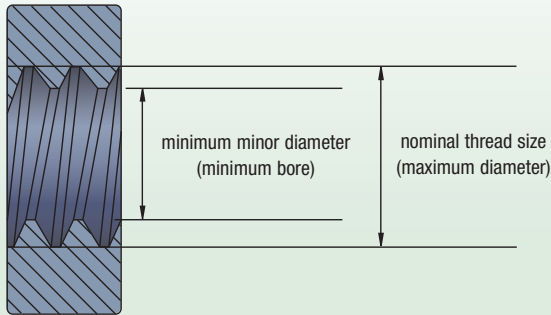
Multi-Tooth Threads, Internal

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

Recommendations for Steel Workpieces (<300 BHN)

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

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



Inch-Sized 60° V-Threading Limits

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

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

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

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

TPI	nominal thread size	minimum minor diameter (inch)	
		NT-1	NT-2
4**	3	2.729	—
4-1/2**	2-7/8	2.634	—
5	2-3/4	2.534	—
6	2-1/2	2.320	—
7	2-1/4	2.095	—
8	2	1.865	—
9	1-15/16	1.817	—
10	1-7/8	1.767	—
11	1-13/16	1.714	—
11-1/2	1-3/4	1.656	—
12	1-3/4	1.660	—
13	1-5/8	1.542	—
14	1-9/16	1.485	—
16*	1-7/16	1.370	—

*Sixteen threads per inch and finer can be cut provided minor diameter is 1.370" or larger.

**NT-4 insert only.

Metric-sized 60° V-Threading Limits

internal threading limitations
NT-1, NT-2 60° V-threading inserts

TPI	nominal thread size		minimum thread diameter (mm)	
	NT-1	NT-2	NT-1	NT-2
4,00	M48 x 4.00	—	43,67	—
3,00	M42 x 3.00	—	38,75	—
2,50	M39 x 2.50	M24 x 2,50	36,29	21,29
2,00	M33 x 2.00	M15 x 2,00	30,84	12,84
1,75	M32 x 1.75	M15 x 1,75	30,11	13,11
1,50	M32 x 1.50	M15 x 1,50	30,38	13,38
1,25	M29 x 1.29	M14 x 1,25	27,65	12,65
1,00*	M27 x 1.00	M14 x 1,00	25,92	12,92
0,75	M22 x 0.75	M12 x 0,75	21,19	11,19

*Thread pitch of 1mm and less can be cut with an NT-2 insert provided the core thread diameter is 25mm or larger (11mm or larger with NT-1).

internal threading limitations
NT-3 and NT-4 60° V-threading inserts

TP	nominal thread size	minimum thread diameter (mm)
6,00**	M76 x 6.00	69,50
5,50**	M73 x 5.50	67,05
5,00	M70 x 5.00	64,59
4,00	M64 x 4.00	59,67
3,00	M52 x 3.00	48,75
2,50	M48 x 2.50	45,29
2,00	M42 x 2.00	39,84
1,75	M40 x 1.75	38,11
1,50*	M38 x 1.50	36,38

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

**NT-4-insert only.

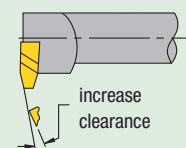
Acme Threading Limits

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

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

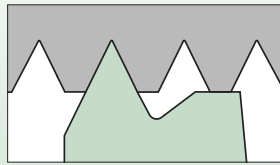
*Sixteen threads per inch and finer can be cut provided minor diameter is 36.5mm (1.438") or larger.

**NA-6 insert only.



Additional secondary clearance can be ground on leading edge of insert to provide sufficient helical clearance for machining coarser threads and multiple start threads. Modified standard inserts may be furnished for machining threads outside of the limits shown.

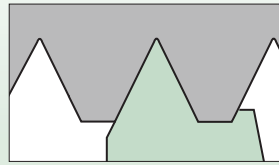
60° V-Thread Crest Turning Application Data



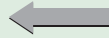
feed direction



NTC crest turning insert for 12 threads per inch and finer ($P \leq 2\text{mm}$)



feed direction



NTC crest turning insert for 11 threads per inch and coarser ($P \geq 3\text{mm}$)

NOTE: NTC inserts automatically control root to crest dimensions. Therefore, in setting up threading operations with NTC inserts, check the O.D. or I.D. at the thread crest for correct dimensions.

60° V-Thread Crest Turning Application Data

insert catalog number	nose radius on insert (inch)	thread radius per MIL-S-8879A (inch)
NJ-3014R/L12	.0125/.0135	.0125/.0150
NJK-3008R/L20	.0075/.0085	.0075/.0090

“J” thread note for catalog

The controlled root radius thread form (SAE8879C) is defined for the external thread only. To machine the corresponding internal thread, choose any insert that will cut a unified class 2B thread, then bore the minor diameter to size. Refer to SAE8879C and MIL-S-8879C and SAEAS8879D for the correct “J” thread minor diameter values.

60° V-Thread Application Data

insert description	insert	D** (inch)	E** (inch)	recommended TPI		recommended TP	
				external	internal	external	internal
	NT-1	.075	.044	—	24–12	—	1,00–2,00
	NT-2	.113	.075	36–8	20–7	0,70–3,00	1,25–3,50
	NT-2-K	.113	.075	36–8	20–7	0,70–3,00	1,25–3,50
	NTF-2	.062	.040	44–14	24–12	0,60–1,75	1,00–2,00
	NTK-2	.062	.040	44–14	24–12	0,60–1,75	1,00–2,00
	NTP-2	.113	.075	36–8	20–7	0,70–3,00	1,25–3,50
	NT-3	.148	.097	20–6	12–5	1,25–4,00	2,00–5,00
	NT-3-K	.148	.097	20–6	12–5	1,25–4,00	2,00–5,00
	NT-3-C	.148	.097	11–6	6 (only)	2,50–4,00	4,00 (only)
	NT-3-CK	.148	.097	11–6	6 (only)	2,50–4,00	4,00 (only)
	NTF-3	.083	.054	44–10	24–9	0,60–2,50	1,00–2,50
	NTK-3	.083	.054	44–10	24–9	0,60–2,50	1,00–2,50
	NTP-3	.148	.097	20–6	12–5	1,25–4,00	2,00–5,00
	NT-4	.196	.127	20–4	12–4	1,25–6,25	2,00–6,25
	NT-4-K	.196	.127	20–4	12–4	1,25–6,25	2,00–6,25
	NTP-4	.196	.127	20–4	12–4	1,25–6,25	2,00–6,25

*Based on maximum insert radius size and class 2A and 2B thread specifications.
 **For metric D and E dimensions, multiply by 25,4.

API Thread Forms • Insert Applications Chart for API Rotary Shouldered Connections

thread form	WIDIA™ insert		tool joint application	minimum box size*
	cresting	non-cresting		
V-.038R 2" TPF 4 TPI	NDC-4038R/L2 4-E/IR4API382	ND-3038R/L	2-3/8 API internal flush 2-7/8 API internal flush 3-1/2 API internal flush 4 API internal flush 4-1/2 API internal flush 5-1/2 API internal flush 6-5/8 API internal flush 4 API full hole API #23, API #26, API #31, API #35, API #38, API #40, API #44, API #46, API #50	API #31 2-7/8 IF
V-.038R 3" TPF 4 TPI	NDC-4038R/L3 4-E/IR4API383	ND-3038R/L	API #56 API #61 API #70 API #77	API #56
V-.050 2" TPF 4 TPI	NDC-4050R/L2 4-E/IRAPI502	ND-4050R/L	5-1/2 API full hole 6-5/8 API regular 6-5/8 API full hole	5-1/2 API full hole
V-.050 3" TPF 4 TPI	NDC-4050R/L3 4-E/IR4API503	ND-4050R/L	5-1/2 API regular 7-5/8 API regular 8-5/8 API regular	5-1/2 API regular
V-.040 3" TPF 5 TPI	NDC-3040R/L3 NDC-4040R/L3 4-E/IR5API403	ND-3040R/L ND-4040R/L	2-3/8 API regular 2-7/8 API regular 3-1/2 API regular 4-1/2 API regular	3-1/2 API regular

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

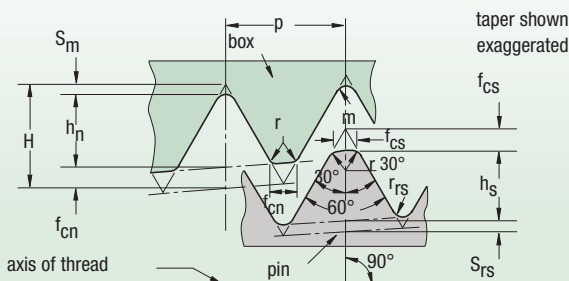
API Thread Forms

Product Thread Dimensions • Rotary Shouldered Connections (Inch)

threadform	taper inch per ft.	thread height, not truncated H	thread height, truncated $h_n=h_s$	root truncation $S_m=S_{rs}$ $f_m=f_{rs}$	crest truncation $f_{cn}=f_{cs}$	width of flat		root radius $r_m=r_{rs}$	radius at thread corners r	pitch p
						crest $f_{cn}=f_{cs}$	crest $f_m=f_{rs}$			
V-.038R	2	.216005	.121844	.038000	.056161	.065	—	.038	.015	.250
V-.038R	3	.215379	.121381	.038000	.055998	.065	—	.038	.015	
V-.040	3	.172303	.117842	.020000	.034461	.040	—	.020	.015	.250
V-.050	3	.215379	.147303	.025000	.043076	.050	—	.025	.015	
V-.050	2	.216005	.147804	.025000	.043201	.050	—	.025	.015	.250

NOTE: All dimensions in inches.

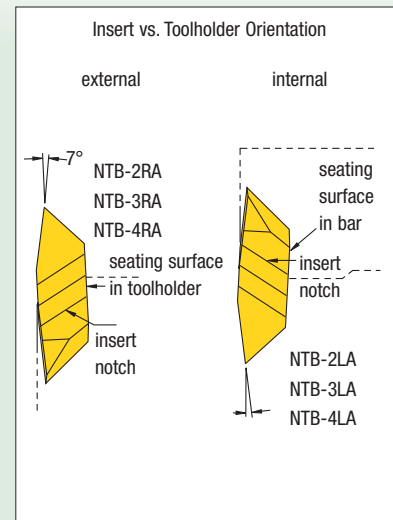
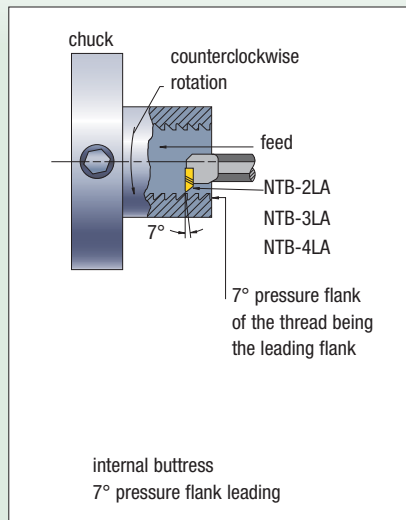
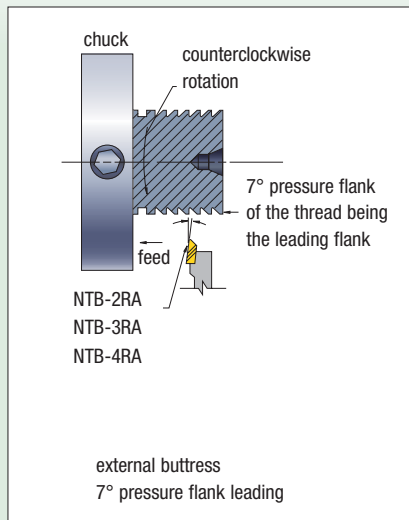
V-.040 and V-.050 Product Thread Form



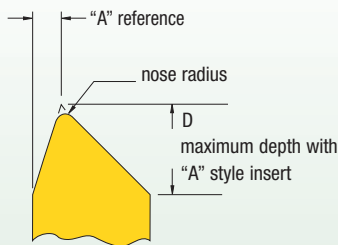
Casing and Tubing Round Thread (Height Dimensions)

thread element	10 TPI $p=.1000$	8 TPI $p=.1250$
H	$=.866p$	.08660
$H_s = h_n$	$=.626p-.007$	.05660
$S_{rs} = S_m$	$=.120p+.002$	.01400
$S_{cs} = S_{cn}$	$=.120p+.005$	.01700
		.02000

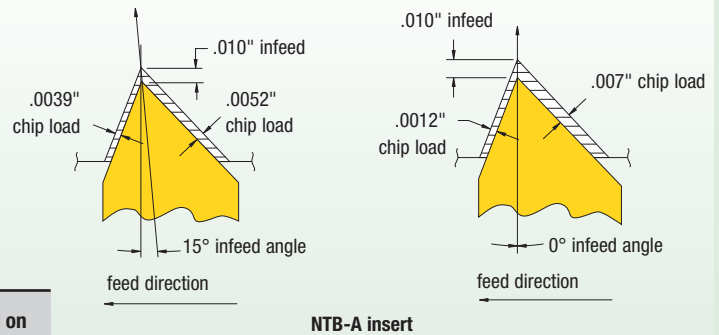
American Buttress (7° Pressure Flank Leading) NTB-A Inserts • Push Type



Reference Dimensions



Infeed Angle vs. Chip Load: 7° Pressure Flank Leading



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.

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.

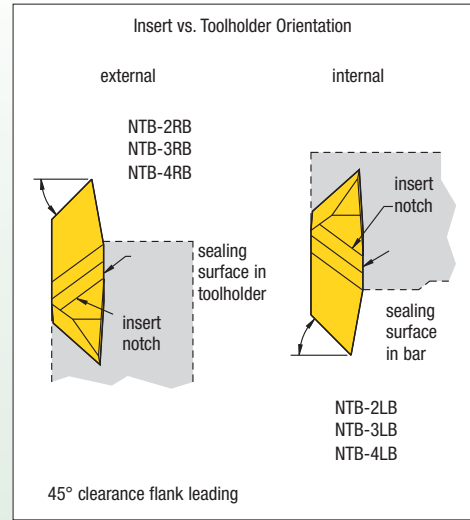
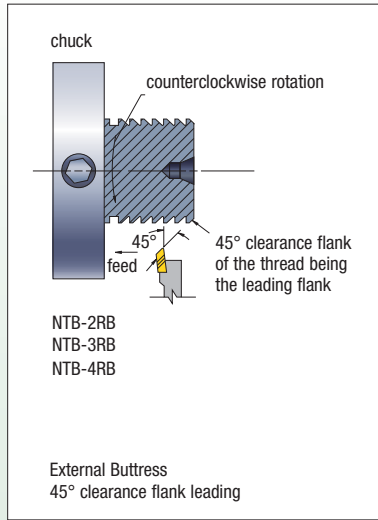
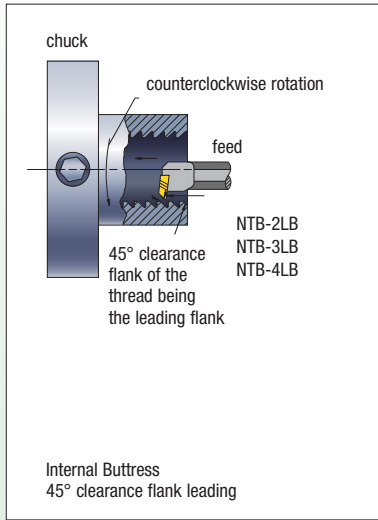
**Can cut 16 or 20 threads per inch provided minor diameter is 1.375" or larger.

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

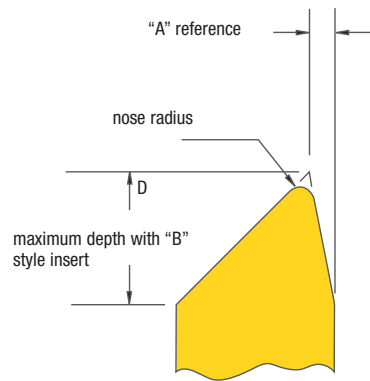
TPI	20	16	12	10	8	6	5	4	3	2-1/2	2	1-1/2	1-1/4	1
maximum root radius	.0036	.0045	.0059	.0071	.0089	.0119	.0143	.0179	.0238	.0286	.0375	.0476	.0572	.0714

NOTE: Special Buttress forms are available upon request.

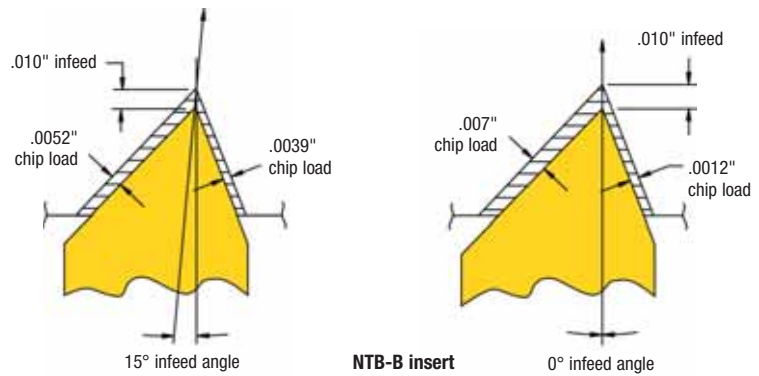
American Buttress (45° Clearance Flank Leading): NTB-B Inserts • PULL-type



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.

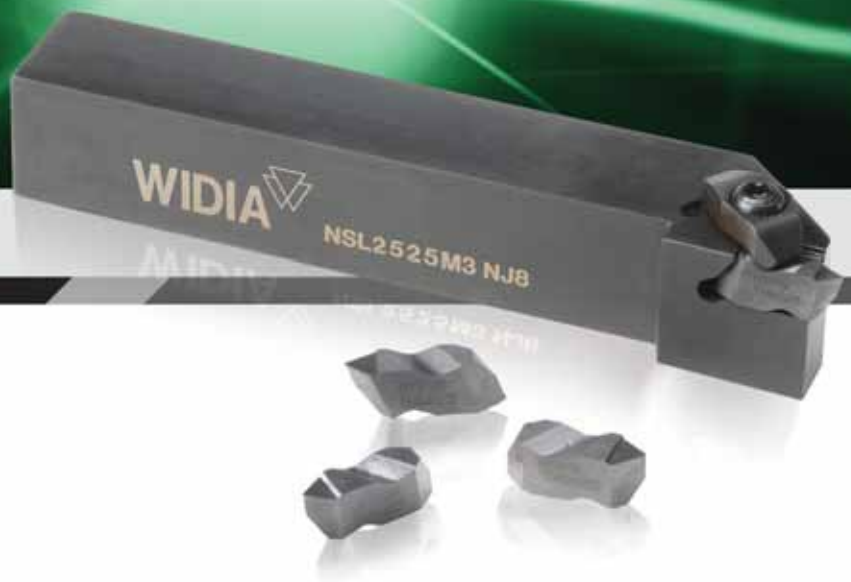
Internal Threading Limitations

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.

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

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

WIDIA 

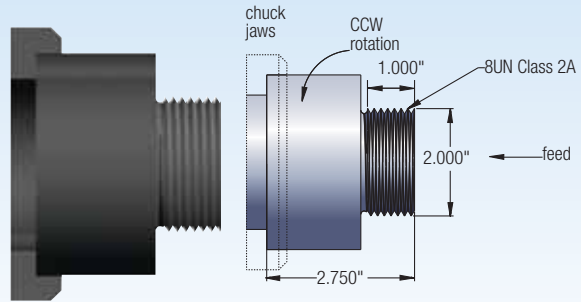
Required Information

From Part Drawing:

- material: 316SS, 200 HB
- thread form: 8UN Class 2A
- operation: external threading
- pitch diameter: 2.00" x 1.00" deep

From Machine Set-Up Data:

- tooling: .750" x .750"
- spindle rotation: counterclockwise
- feed: toward chuck

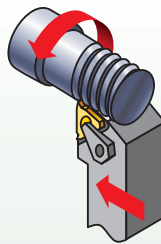


Steps for a Successful Threading Operation

Step 1 • Determine Threading Method

Need to Know:

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



Step 2 • Select Insert



Need to Know:

- Thread form (8 UN Class 2A).
- Hand of insert (right hand — ER).

Choose the High-Performance Solution

catalog number	insert size	TN6025
3ER8UN	3"	●

High-Performance Selection

NOTE: Use insert with largest IC available.

insert: 3ER8UN
grade: TN6025
speed: 500 SFM

Step 3 • Select the Grade and Speed

Need to Know:

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

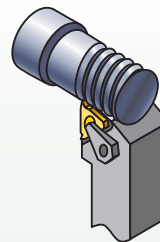
Options: Grade and Speed
Selection Guidelines

threading operation	stainless steel
external	general purpose and high performance
	TN6025
	150–450 SFM

Step 4 • Select Toolholder

Need to Know:

- External or internal operation (external).
- Pitch diameter to determine minimum bore diameter (N/A).
- Type of tooling — toolholder, boring bar (toolholder).
- Hand of tool (right hand).
- Insert size (3/8").



Options:

catalog number	insert size	shim
LSASR-123	3"	SM-YE3

First choice: LSASR-123 holder

Step 5 • Select Shim

Need to Know:

- Thread form — TPI or pitch (8 TPI).
- Pitch diameter (2").
- Helix method (standard).
See Laydown Threading (LT) shim selection chart.

Select SM-YE3 shim

NOTE: The SM-YE3 shim is supplied with the selected toolholder.

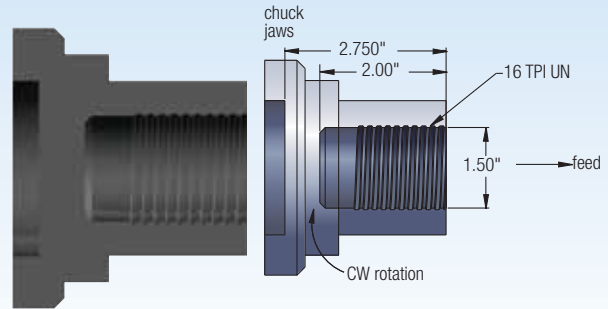
Required Information

From Part Drawing:

- material: 4140 steel
- thread form: 16 TPI UN
- operation: internal threading
- pitch diameter: 1.5" x 2" deep

From Machine Set-Up Data:

- tooling: .075" boring bar
- spindle rotation: clockwise
- feed: away from chuck

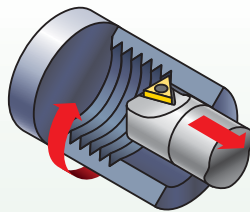


Steps for a Successful Threading Operation

Step 1 • Determine Threading Method

Need to Know:

- Operation (internal).
- Spindle rotation (CW).
Clockwise rotation.
- Feed direction (away from chuck).
- Left-hand toolholder.
- Left-hand insert (NL).
- Reverse helix method.



Step 2 • Select Insert



Need to Know:

- Thread form (16UN Class 2A).
- Hand of insert (left hand — NL).

Choose the High-Performance Solution

catalog number	insert size	TN6025
2ILA60	2"	●
3ILA60	3"	●

High-Performance Selection

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

insert: 3ILA60
grade: TN6025
speed: 450 SFM

Step 3 • Select the Grade and Speed

Need to Know:

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

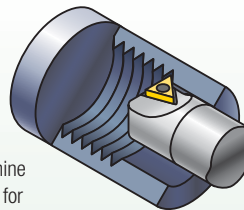
Options: Grade and Speed Selection Guidelines

threading operation	steel
internal	general purpose and high performance
	TN6025
	100–550 SFM

Step 4 • Select Toolholder

Need to Know:

- External or internal operation (internal).
- Pitch diameter to determine minimum bore diameter for internal operations (1.5").
- Type of tooling — toolholder, boring bar (boring bar).
- Hand of tool (left hand).
- Insert size (3/8").



Options:

catalog number	insert size	minimum bore diameter	shim
S1212-LSEL3	3"	.90	SM-YE3
S0812-LSEL2	2"	.65	—

First choice: S1212-LSEL3 bar

Step 5 • Select Shim

Need to Know:

- Thread form — TPI or pitch (16 TPI).
- Pitch diameter (1.5").
- Helix method (reverse).
See Laydown Threading (LT) shim selection chart.

Select SM-YE3-2N shim

NOTE: For this application, the standard shim supplied should be replaced with the recommended shim, SM-YE3-2N.

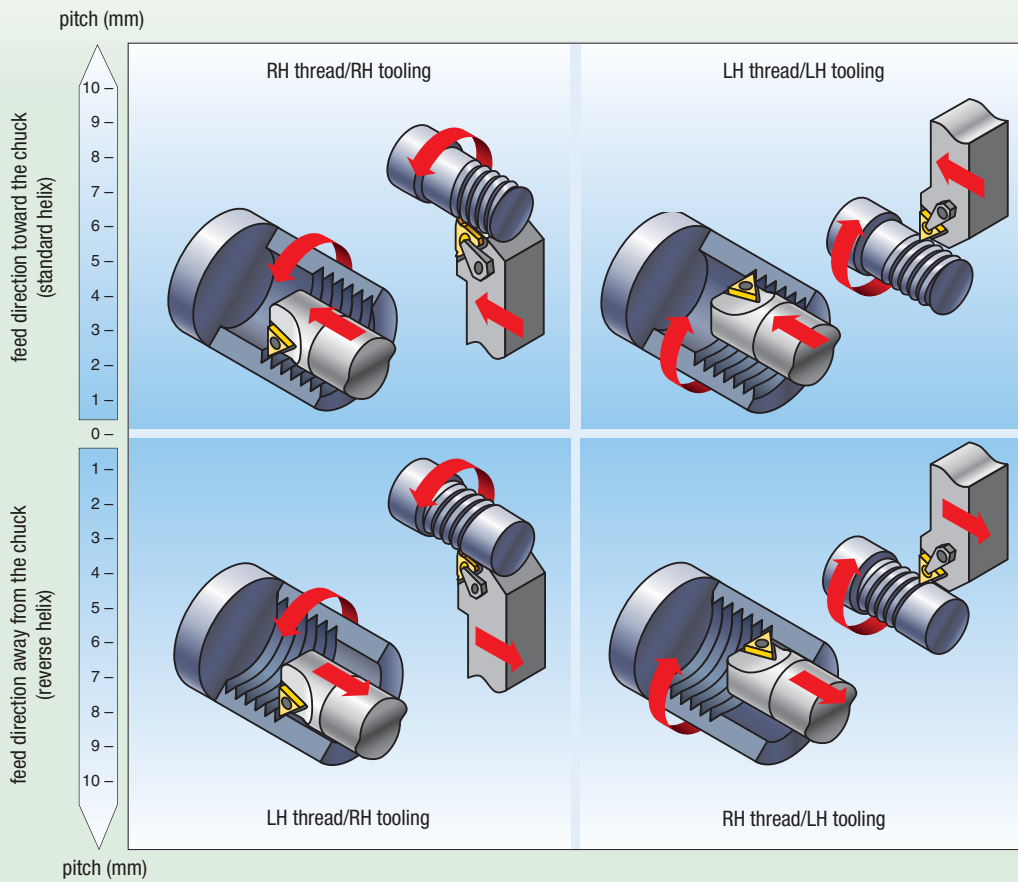
Laydown Threading Shim Selection Guidelines

The following questions must be answered before a successful threading operation can begin:

- A — Select your method of thread cutting:
 - machining toward the chuck (standard helix)
 - machining away from the chuck (reverse helix)
- B — Select lead angle and choose shim.
- C — Select insert and toolholder size.
- D — Select insert grade.
- E — Select speed.
- F — Select number of thread passes.
- G — Select infeed method.

NOTE: When considering method of thread cutting, the part's shape and stability and the flow of chips are determining factors in your decision.

Laydown Selection Chart



NOTE: For multi-start threads, use the lead value instead of the pitch.



Diagram of Thread Lead Angles

To calculate the lead angle of a given thread, use this formula:

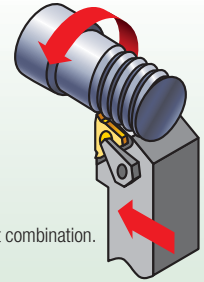
$$\beta = \text{Arctan} \frac{P \cdot S}{\pi D_e}$$

β = thread lead angle
 D_e = effective pitch diameter of thread wear
 $P = 1/\text{TPI}$
 TPI = threads per inch
 S = number of starts
 single-start, lead = pitch
 multiple-start, lead = pitch (x) number of starts

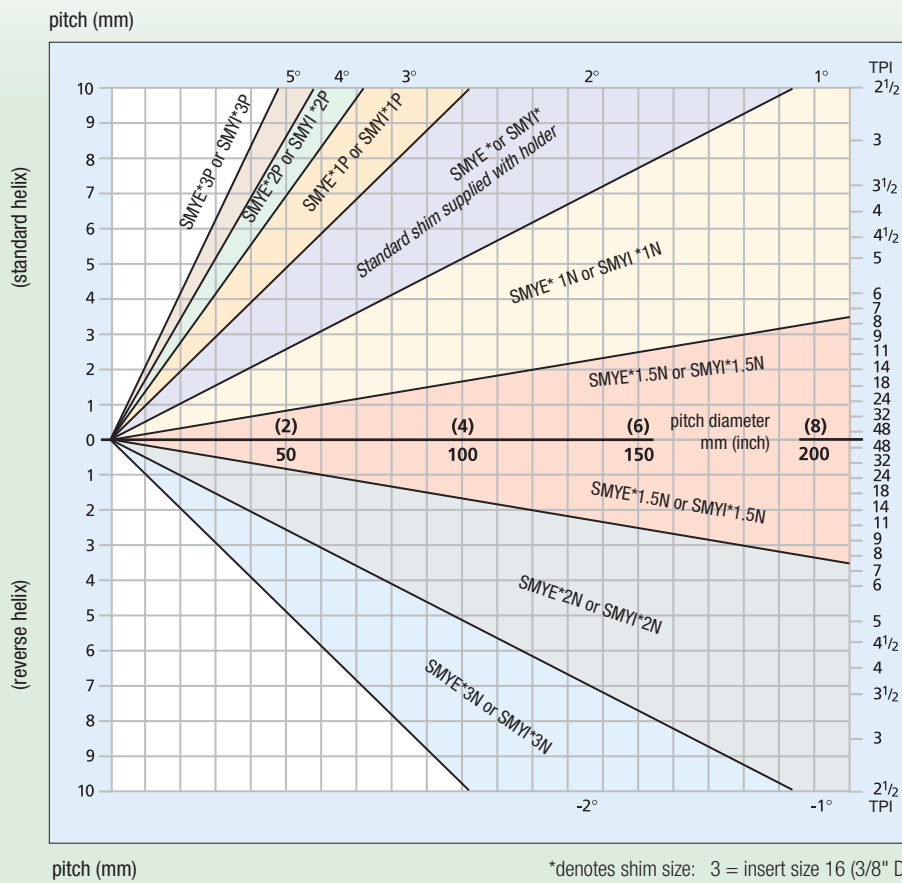
NOTE: Arctan equals Tan^{-1} (see chart below for approximate lead angles).

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 β .

Cutting edge height is constant at every shim and insert combination. All toolholders are supplied with 1-1/2° lead angle.



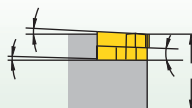
Laydown Selection Chart



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

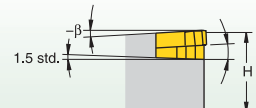
standard helix method:

Used when RH thread is cut with RH tool or LH thread with LH tool.



reverse helix method:

Used when RH thread is cut with LH tool or when LH thread is cut with RH tool.

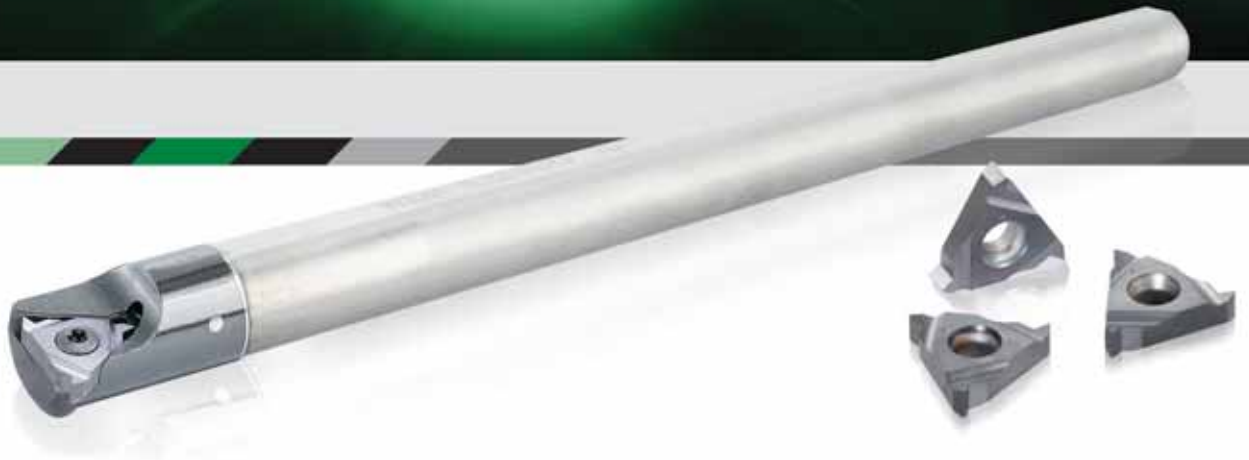


Laydown Threading Shim Selection Table • Inch

insert size	toolholder		shim ordering code (inch)							
	external	internal				standard				
3 (3/8")	RH	LH	SM-YE3-3P	SM-YE3-2P	SM-YE3-1P	SM-YE3	SM-YE3-1N	SM-YE3-1.5N	SM-YE3-2N	SM-YE3-3N
3 (3/8")	LH	RH	SM-YI3-3P	SM-YI3-2P	SM-YI3-1P	SM-YI3	SM-YI3-1N	SM-YI3-1.5N	SM-YI3-2N	SM-YI3-3N
4 (1/2")	RH	LH	SM-YE4-3P	SM-YE4-2P	SM-YE4-1P	SM-YE4	SM-YE4-1N	SM-YE4-1.5N	SM-YE4-2N	SM-YE4-3N
4 (1/2")	LH	RH	SM-YI4-3P	SM-YI4-2P	SM-YI4-1P	SM-YI4	SM-YI4-1N	SM-YI4-1.5N	SM-YI4-2N	SM-YI4-3N
TPI	pitch (mm)		pitch diameter (inch)							
72	—	—	—	—	—	0.12–0.31	0.32–0.84	>0.84	0.84–0.32	0.31–0.12
—	0,35	—	—	—	—	0.12–0.3	0.31–0.84	>0.84	0.84–0.31	0.3–0.12
64	—	—	—	—	—	0.14–0.35	0.36–0.95	>0.95	0.95–0.36	0.35–0.14
—	0,40	—	—	—	—	0.14–0.35	0.36–0.96	>0.96	0.96–0.36	0.35–0.14
56	0,45	—	—	—	—	0.16–0.4	0.41–1.09	>1.09	1.09–0.41	0.4–0.16
—	0,50	—	—	—	0.11–0.16	0.17–0.44	0.45–1.2	>1.20	1.2–0.45	0.44–0.17
48	—	—	—	—	0.12–0.17	0.18–0.46	0.47–1.27	>1.27	1.27–0.47	0.46–0.18
44	—	—	—	—	0.13–0.19	0.2–0.51	0.52–1.38	>1.38	1.38–0.52	0.51–0.2
—	0,60	—	—	0.1–0.12	0.13–0.2	0.21–0.53	0.54–1.44	>1.44	1.44–0.54	0.53–0.21
40	—	—	—	0.11–0.13	0.14–0.21	0.22–0.56	0.57–1.52	>1.52	1.52–0.57	0.56–0.22
—	0,70	—	—	0.12–0.15	0.16–0.23	0.24–0.62	0.63–1.68	>1.68	1.68–0.63	0.62–0.24
36	—	—	—	0.12–0.15	0.16–0.23	0.24–0.62	0.63–1.69	>1.69	1.69–0.63	0.62–0.24
—	0,75	0.11–0.12	0.13–0.16	0.17–0.25	0.26–0.66	0.67–1.8	>1.80	1.8–0.67	0.66–0.26	
32	—	0.12–0.13	0.14–0.17	0.18–0.26	0.27–0.7	0.71–1.9	>1.90	1.9–0.71	0.7–0.27	
—	0,80	0.12–0.13	0.14–0.17	0.18–0.26	0.27–0.71	0.72–1.91	>1.91	1.91–0.72	0.71–0.27	
28	—	0.14–0.14	0.15–0.19	0.2–0.3	0.31–0.8	0.81–2.17	>2.17	2.17–0.81	0.8–0.31	
27	—	0.14–0.15	0.16–0.2	0.21–0.31	0.32–0.83	0.84–2.25	>2.25	2.25–0.84	0.83–0.32	
—	1,00	0.15–0.16	0.17–0.21	0.22–0.33	0.34–0.89	0.9–2.39	>2.39	2.39–0.9	0.89–0.34	
24	—	0.16–0.17	0.18–0.23	0.24–0.35	0.36–0.94	0.95–2.53	>2.53	2.53–0.95	0.94–0.36	
—	1,25	0.19–0.2	0.21–0.27	0.28–0.42	0.43–1.11	1.12–2.99	>2.99	2.99–1.12	1.11–0.43	
20	—	0.19–0.21	0.22–0.27	0.28–0.42	0.43–1.13	1.14–3.04	>3.04	3.04–1.14	1.13–0.43	
18	—	0.21–0.23	0.24–0.31	0.32–0.47	0.48–1.26	1.277–3.38	>3.38	3.38–1.27	1.26–0.48	
—	1,50	0.22–0.25	0.26–0.33	0.34–0.5	0.51–1.34	1.35–3.59	>3.59	3.59–1.35	1.34–0.51	
16	—	0.24–0.26	0.27–0.35	0.36–0.53	0.54–1.41	1.42–3.8	>3.80	3.8–1.42	1.41–0.54	
—	1,75	0.26–0.29	0.3–0.38	0.39–0.59	0.6–1.56	1.57–4.19	>4.19	4.19–1.57	1.56–0.6	
14	—	0.27–0.3	0.31–0.4	0.41–0.61	0.62–1.62	1.63–4.34	>4.34	4.34–1.63	1.62–0.62	
13	—	0.29–0.32	0.33–0.43	0.44–0.66	0.67–1.74	1.75–4.68	>4.68	4.68–1.75	1.74–0.67	
—	2,00	0.3–0.33	0.34–0.44	0.45–0.67	0.68–1.78	1.79–4.79	>4.79	4.79–1.79	1.78–0.68	
12	—	0.32–0.35	0.36–0.46	0.47–0.71	0.72–1.89	1.9–5.07	>5.07	5.07–1.9	1.89–0.72	
11.5	—	0.33–0.37	0.38–0.49	0.5–0.74	0.75–1.97	1.98–5.29	>5.29	5.29–1.98	1.97–0.75	
11	—	0.34–0.38	0.39–0.51	0.52–0.78	0.79–2.06	2.07–5.53	>5.53	5.53–2.07	2.06–0.79	
—	2,50	0.37–0.42	0.43–0.55	0.56–0.84	0.85–2.23	2.24–5.98	>5.98	5.98–2.24	2.23–0.85	
10	—	0.38–0.42	0.43–0.56	0.57–0.86	0.87–2.27	2.28–6.08	>6.08	6.08–2.28	2.27–0.87	
9	—	0.42–0.47	0.48–0.62	0.63–0.95	0.96–2.52	2.53–6.75	>6.75	6.75–2.53	2.52–0.96	
—	3,00	0.45–0.5	0.51–0.66	0.67–1.02	1.03–2.68	2.69–7.18	>7.18	7.18–2.69	2.68–1.03	
8	—	0.47–0.53	0.54–0.7	0.71–1.08	1.09–2.84	2.85–7.6	>7.60	7.6–2.85	2.84–1.09	
—	3,50	0.52–0.59	0.6–0.77	0.78–1.19	1.2–3.13	3.14–8.38	>8.38	8.38–3.14	3.13–1.2	
7	—	0.524–0.61	0.62–0.8	0.81–1.23	1.24–3.25	3.26–8.68	>8.68	8.68–3.26	3.25–1.24	
—	4,00	0.6–0.67	0.68–0.89	0.9–1.36	1.37–3.58	3.59–9.57	>9.57	9.57–3.59	3.58–1.37	
6	—	0.63–0.71	0.72–0.94	0.95–1.44	1.45–3.79	3.8–10.13	>10.13	10.13–3.8	3.79–1.45	
—	5,00	0.75–0.84	0.85–1.11	1.12–1.7	1.71–4.48	4.49–11.97	>11.97	11.97–4.49	4.48–1.71	
5	—	0.76–0.86	0.87–1.13	1.14–1.73	1.74–4.55	4.56–12.16	>12.16	12.16–4.56	4.55–1.74	
4.5	—	0.84–0.95	0.96–1.26	1.27–1.92	1.93–5.06	5.07–13.51	>13.51	13.51–5.07	5.06–1.93	
—	6,00	0.9–1.01	1.02–1.33	1.34–2.04	2.05–5.37	5.38–14.36	>14.36	14.36–5.38	5.37–2.05	
4	—	0.95–1.07	1.08–1.41	1.42–2.16	2.17–5.69	5.7–15.2	>15.20	15.2–5.7	5.69–2.17	
inclination angle			4.5	3.5	2.5	1.5	0.5	0.0	-0.5	-1.5
						standard helix (feed toward the chuck)		reverse helix (feed away from the chuck)		

1. Select TPI or pitch from the left-hand columns.
2. Follow row to specified pitch diameter and the correct feed direction.
3. Follow the column to the top for the required shim based on the toolholder and insert size.

WIN WITH WIDIA™



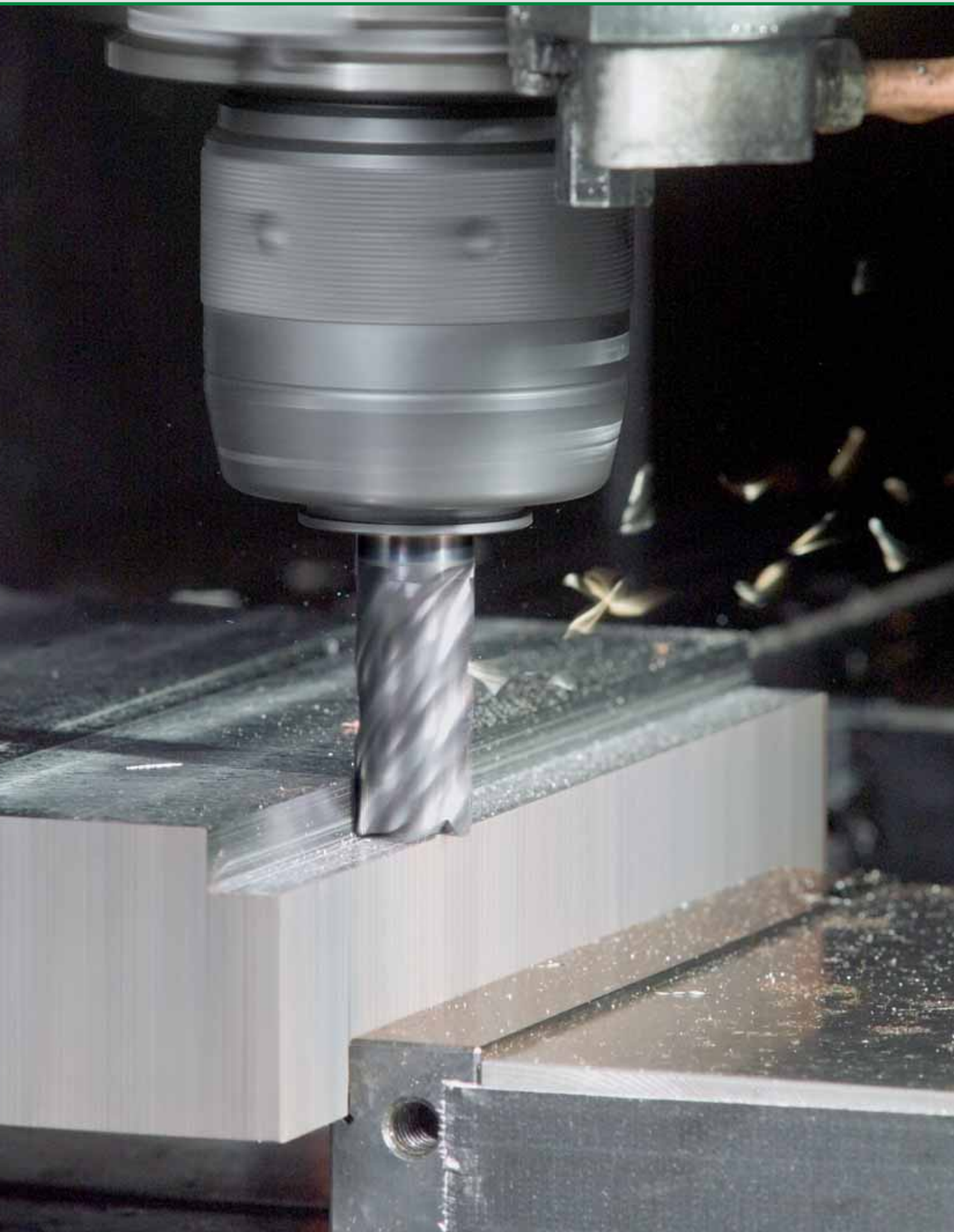
Laydown Threading System

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

- Low-profile design enables unrestricted chip flow.
- Precision-ground thread forms for precise cuts.
- Ideal choice for fine-pitch threads, high-helix/multi-start threads, and single-point threading in small diameter bores.

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

WIDIA 



Solid End Milling

Tool Selector **B2-B9**

High-Performance Solid Carbide End Mills **B10-B46**




















 VariMill I B10-B26

 VariMill II B28-B36
















 VariMill II Long B38-B41

 VariMill II ER B42-B46












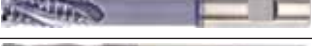

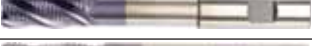





High-Performance HSS-E ER End Mills **B48-B51**

	Series	Range of Diameter Ø min–Ø max inch	Number of Flutes	Cutting Center	Uncoated	TiCN	ALTiN	TiAlN
● First Choice ○ Alternate Choice								
High-Performance Solid Carbide End Mills • VariMill™								
VariMill I™								
	4V05	1/8"–1-1/4"	4	Yes			X	
	4V05	1/8"–1-1/4"	4	Yes		X		
	4V0T	1/2"–1-1/4"	4	Yes		X		
	4VP5	1/4"–1"	4	Yes			X	
	4VPT	1/2"–1"	4	Yes		X		
	4VN5	1/4"–1"	4	Yes			X	
	4VPO	1/4"–1"	4	Yes			X	
	4V00	1/8"–1-1/4"	4	Yes			X	
VariMill II™								
	5V0S	3/16"–1"	5	No		X		
	5V0T	1/4"–1"	5	No		X		
	5VNS	1/4"–1"	5	No		X		
VariMill II™ Long								
	5W1S	1/4"–1"	5	No		X		
VariMill II™ ER								
	5V0E	3/8"–1"	5	Yes		X		
	5VNE	3/8"–1"	5	Yes		X		
High-Performance Solid Carbide End Mills • Hard Materials								
VisionPlus™								
	7S05	1/4"–1"	4/5/6	Yes		X		
	7S5F	1/8"–3/4"	4	Yes		X		
	7S7R	5/32"–1"	3/4/6	Yes		X		
VisionPlus™ X-Feed™								
	7FN6	1/4"–3/4"	6	No		X		
	7FN7	1/4"–3/4"	6	No		X		

														Page References																				
P			M			K			N				S				H				WIDIA Advances 2014 Catalog (A-13-03144EN_in)		WIDIA Solid End Mills & Holmaking Catalog (A-09-02077EN_in)											
1	2	3	4	5	6	1	2	3	1	2	3	4	5	6	1	2	3	4	1	2	3	4	1	2	Product Information	Cutting Data	Product Information	Cutting Data						
High-Performance Solid Carbide End Mills • VariMill™ (continued)																																		
VariMill I™ (continued)																																		
●	●	○	○	●	○					●	○	○	○	●																B12–B15	B22–B23	A14–A18	A30–A31	
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VariMill II™ (continued)																																		
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VariMill II™ Long (continued)																																		
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VariMill II™ ER (continued)																																		
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High-Performance Solid Carbide End Mills • Hard Materials (continued)																																		
VisionPlus™ (continued)																																		
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VisionPlus™ X-Feed™ (continued)																																		
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	Series	Range of Diameter Ø min–Ø max inch	Number of Flutes	Cutting Center				
					Uncoated	TiCN	AlTiN	TiAlN
<ul style="list-style-type: none"> ● First Choice ○ Alternate Choice 								
High-Performance Solid Carbide End Mills • Aluminum								
	4AN2	1/8"–1"	2	Yes	X			
	4AN3	3/8"–1"	3	Yes	X			
	4AP2	1/8"–1"	2	Yes	X			
	4AP3	3/8"–1"	3	Yes	X			
	4B02	1/4"–1"	2	Yes	X			
	4A01	1/8"–1"	2	Yes	X			
	4AN1	1/4"–1"	2	Yes	X			
	4A0R	1/4"–1"	3	Yes	X			
	4A0B	1/4"–3/4"	3	Yes	X			
ArCut™								
	4K02	1/8–1"	2	Yes	X			
	4K03	1/4–1"	3	Yes	X			
AluSurf™								
	5A02	1/4–1"	2	Yes	X			
	5A03	1/4–1"	3	Yes	X			
	5AN2	1/8–1"	2	Yes	X			
	5AN3	1/8–1"	3	Yes	X			

1	2	3	P		M			K		N				S				H				Page References																								
			4	5	6	1	2	3	1	2	3	4	5	6	1	2	3	4	1	2	3	4	WIDIA Advances 2014 Catalog (A-13-03144EN_in)		WIDIA Solid End Mills & Horemaking Catalog (A-09-02077EN_in)																					
Steel <35 HRC	Steel 36-48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Cast Iron	Non-Ferrous	Graphite	Iron Based	Nickel Based	Pure Titanium	Titanium Alloys	Hardened Steels H1 = <48 HRC H2 = 48 ~ 55 H3 = 56 ~ 60 HRC H4 = >60 HRC	Product Information	Cutting Data	Product Information	Cutting Data																														
High-Performance Solid Carbide End Mills • Aluminum (continued)																										●															—	—	A66-A67	A79		
							●																	—	—	A68	A79																			
							●																	—	—	A70	A79																			
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ArCut™ (continued)																										●																—	—	A60-A61	A79	
							●																		—	—	A63-A65	A79																		
AluSurf™ (continued)																										●																	—	—	A54	A78
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							●																		—	—	A56-A57	A78																		
							●																		—	—	A58-A59	A78																		

	Series	Range of Diameter Ø min–Ø max inch	Number of Flutes	Cutting Center	Uncoated	TiCN	ALTiN	TiAlN
<ul style="list-style-type: none"> ● First Choice ○ Alternate Choice 								
High-Performance Solid Carbide End Mills • Finishing								
	4C03	1/8"–1"	3	Yes		X		X
	4C05	1/8"–1"	5	Yes		X		X
	4S05/4S07	3/16"–1"	4/6	Yes		X		X
	4S0F	1/4"–1"	6/8/10	Yes				X
High-Performance Solid Carbide End Mills • Roughing								
	4Q03/4Q05	3/16–1"	3/4	Yes				X
	4QN3	1/4–3/4"	3	Yes				X
	4M0R	1/4–1"	3/4/6	Yes			X	
High-Performance HSS-E-PM End Mills • Finishing								
	3K03	3/8"–2"	3	Yes	X			
	3405/3407	3/8"–2"	4/6	Yes	X			X
	3K05/3K07	1/2"–2"	4/6	Yes				X
High-Performance HSS-E-PM End Mills • Roughing								
	6A0R	1/2"–1 1/4"	3	Yes		X		
	6ANR	1/2"–1-1/4"	3	Yes		X		
	6T0R	1/2"–1-1/4"	4/5/6	Yes				X
	6TNR	5/8"–1-1/4"	4/5/6	Yes				X
	6K06	3/8"–1 1/4"	4/5/6	Yes				X
	6K04	1/4"–1 1/4"	4/5/6	Yes				X
WavCut™								
	620W	3/4"–2"	4/6	Yes	X			
	620V	3/4"–2"	4/6/8	Yes	X			X
HSS-E ER Rougher								
	620E/621E/623E/625E	1-1/4–2"	6	Yes	X			

														Page References																																						
P				M			K			N				S				H				WIDIA Advances 2014 Catalog (A-13-03144EN_in)		WIDIA Solid End Mills & Holmaking Catalog (A-09-02077EN_in)																												
1	2	3	4	1	2	3	1	2	3	1	2	3	4	1	2	3	4	1	2	3	4	Product Information	Cutting Data	Product Information	Cutting Data																											
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							
High-Performance Solid Carbide End Mills • Finishing (continued)																																																				
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High-Performance Solid Carbide End Mills • Roughing (continued)																																																				
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High-Performance HSS-E-PM End Mills • Finishing (continued)																																																				
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														○	●					—	—	A108	A114																													
														○	●					—	—	A110-A111	A115																													
High-Performance HSS-E-PM End Mills • Roughing (continued)																																																				
								●												—	—	A124	A133																													
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WavCut™ (continued)																																																				
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			○		○									○						—	—	A122-A123	A132																													
HSS-E ER Rougher (continued)																																																				
					○									●						B50	B51	—	—																													

	Series	Range of Diameter Ø min–Ø max inch	Number of Flutes	Cutting Center	Uncoated	TiCN	ALTiN	TiAlN
<ul style="list-style-type: none"> ● First Choice ○ Alternate Choice 								
General Purpose+ Solid Carbide End Mills • Roughing/Finishing								
	4202	1/32"-1"	2	Yes	X			X
	4201	1/16"-3/4"	2	Yes	X	X		X
	4203	1/16"-1"	3	Yes		X		
	4205	3/64"-1"	4	Yes	X	X		X
	4200	1/16"-1/2"	4	Yes	X	X		X
	4207	1/4"-1"	6	Yes		X		
	4S0B	1/4"-1"	3/4	Yes				X
	4S0R	1/4"-1"	3/4/5	Yes		X		X
General Purpose + HSS-E End Mills • Roughing/Finishing								
	1205/1207	1/8"-2"	4/6	Yes	X	X		
	1200	1/4"-1 1/4"	4/6	Yes	X			
	6209	1/4"-2"	3	Yes	X	X		
	6206	3/16"-2"	4/5/6	Yes	X	X		X
	6205	5/8"-2"	4/5/6/8	No	X	X		X
	6208	5/32"-2"	4/5/6	Yes	X	X		X
	6207	5/8"-2"	4/5/6/8	No	X	X		
	6306	3/8"-2"	4/5/6	Yes				X
	6308	3/8"-1 1/4"	4/5/6	Yes		X		

	P				M			K			N				S				H				Page References				
	1	2	3	4	1	2	3	1	2	3	1	2	3	4	1	2	3	4	1	2	3	4	WIDIA Advances 2014 Catalog (A-13-03144EN_in)		WIDIA Solid End Mills & Holmaking Catalog (A-09-02077EN_in)		
	Steel <35 HRC	Steel 36-48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Cast Iron	Non-Ferrous	Graphite	Iron Based	Nickel Based	Pure Titanium	Titanium Alloys	Hardened Steels H1 = <48 HRC H2 = 48 ~ 55 H3 = 56 ~ 60 HRC H4 = >60 HRC									Product Information	Cutting Data	Product Information	Cutting Data		
General Purpose+ Solid Carbide End Mills • Roughing/Finishing (continued)																											
	○	○			○	○	○	○														—	—	A140-A141	A151		
	○	○			○	○	○	○														—	—	A142	A151		
	○	○			○	○	○	○														—	—	A143	A152		
	○	○			○	○		○														—	—	A144-A145	A152		
	○	○			○	○	○	○														—	—	A146	A153		
	○	○			○	○																—	—	A148	A153		
	○	○	○		○	○			○		○		○									—	—	A149	A154		
	○	○	○		○	○			○		○		○									—	—	A150	A155		
General Purpose HSS-E End Mills • Roughing/Finishing (continued)																											
	○		○		○	○	○		○	○	○	○										—	—	A164-A167	A186		
																						—	—	A168	A187		
						○																—	—	A170-A171	A187		
	○		○		○	○			○	○	○	○										—	—	A172-A173	A188		
	○		○		○	○			○	○	○	○										—	—	A174-A175	A189		
	○		○		○	○	○		○	○	○	○										—	—	A176-A177	A188		
	○		○		○	○	○		○	○	○	○										—	—	A178-A179	A189		
	○		○		○	○			○	○	○	○										—	—	A180	A190		
	○		○		○	○	○		○	○	○	○										—	—	A181	A190		

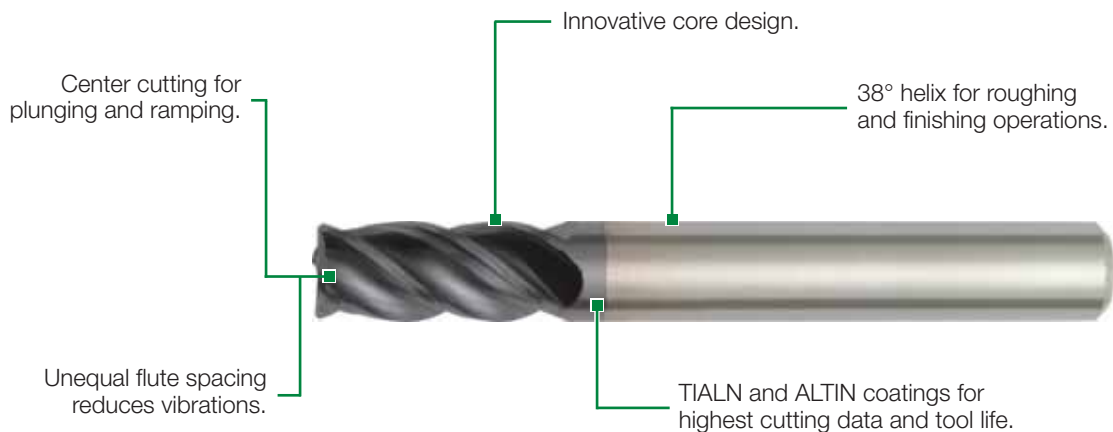
High-Performance Solid Carbide End Mills • **VariMill I™**

VariMill I offers plunging, slotting, and profiling at the highest possible feed rates for a wide range of materials. They are designed to provide maximum Metal Removal Rates (MRR) and to achieve superior surface conditions. A wide range of diameters and corner configurations, such as chamfer, radii, and sharp edges, are available from stock.



VariMill I

- High-performance universal tools for almost all cutting materials.
- Roughing and finishing with one tool.
- Various length of cut, long reach and necked versions, ball nose, corner chamfer, and corner radius available.



VariMill I™ Series

- Increase your output with less tool changes and increased Metal Removal Rates (MRR).
- No specific tools for roughing and finishing necessary.
- Less passes due to 1 x D slotting capability.

4V05 Series

- High metal removal rates and tool life in:
 - Stainless steels, steels, and alloyed steels
 - High-temperature alloys and titanium
- Radii, sharp, and corner chamfer configuration.



4V0T

- Titanium geometry design.
- Sharp and corner chamfer configuration.



4VP5 Series

- Stainless steel and steel geometry design.
- Sharp and corner chamfer configuration.
- Benefit from long reach design for deep cavities.



4VPT Series

- Titanium geometry design.
- Sharp and corner chamfer configuration.
- Benefit from long reach design for deep cavities.



4VN5 Series

- Stainless steel and steel geometry design.
- Sharp and corner chamfer configuration.
- Benefit from long reach and neck design for deep cavities.



4VP0 Series

- Center cutting ball nose series.
- Benefit from long reach design for deep cavities.



4V00 Series

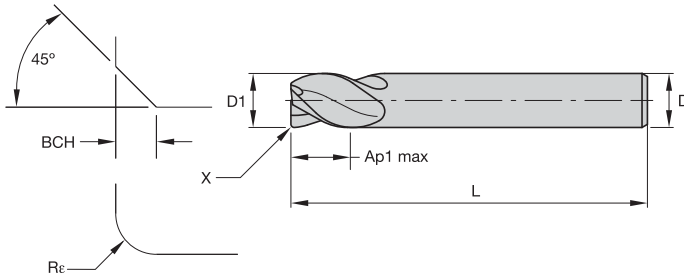
- Center cutting ball nose series.
- Benefit from long length of cut.



- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



Solid End Milling



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.00/-0.002	≤ 1/8"	0/0.0024
		> 1/8"-1/4"	0/0.0031
		> 1/4"-3/8"	0/0.0035
		> 3/8"-23/32"	0/0.0043
		> 23/32"-1 3/16"	0/0.0051

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

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

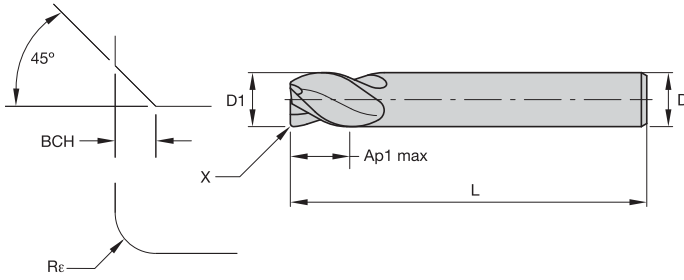
For application data, see page B22–B23.

Series 4V05 • VariMill I™ • Lists 4V05 4V15 4V25 4V45 4V65

					D1	D	length of cut Ap1 max	length L	Re	BCH
TF4V4503001	—	—	—	—	1/8	1/8	1/4	1 1/2	—	.010
TF4V4503001S	—	—	—	—	1/8	1/8	1/4	1 1/2	—	—
TF4V0503001A	—	—	—	—	1/8	1/8	1/2	2	.015	—
TF4V0503001	—	—	—	—	1/8	1/8	1/2	2	—	.010
TF4V0503001S	—	—	—	—	1/8	1/8	1/2	2	—	—
TF4V4505000	—	—	—	—	3/16	3/16	5/16	1 1/2	—	.010
TF4V4505000S	—	—	—	—	3/16	3/16	5/16	1 1/2	—	—
TF4V0505000A	—	—	—	—	3/16	3/16	5/8	2 1/4	.015	—
TF4V0505000B	—	—	—	—	3/16	3/16	5/8	2 1/4	.030	—
TF4V0505000	—	—	—	—	3/16	3/16	5/8	2 1/4	—	.010
TF4V0505000S	—	—	—	—	3/16	3/16	5/8	2 1/4	—	—
TF4V4507002B	—	—	—	—	1/4	1/4	3/8	2	.030	—
TF4V4507002	—	TM4V4507002	—	—	1/4	1/4	3/8	2	—	.016
TF4V4507002S	—	TM4V4507002S	—	—	1/4	1/4	3/8	2	—	—
TF4V0507002A	—	—	—	—	1/4	1/4	3/4	2 1/2	.015	—
TF4V0507002B	—	—	—	—	1/4	1/4	3/4	2 1/2	.030	—
TF4V0507002C	—	—	—	—	1/4	1/4	3/4	2 1/2	.060	—
TF4V0507002	—	TM4V0507002	—	—	1/4	1/4	3/4	2 1/2	—	.016
TF4V0507002S	—	TM4V0507002S	—	—	1/4	1/4	3/4	2 1/2	—	—
TF4V1507002A	—	—	—	—	1/4	1/4	1 1/4	3 1/4	.015	—
TF4V1507002B	—	—	—	—	1/4	1/4	1 1/4	3 1/4	.030	—
TF4V1507002S	—	—	—	—	1/4	1/4	1 1/4	3 1/4	—	—
TF4V2507002A	—	—	—	—	1/4	1/4	1 3/4	4	.015	—
TF4V2507002B	—	—	—	—	1/4	1/4	1 3/4	4	.030	—
TF4V2507002S	—	—	—	—	1/4	1/4	1 3/4	4	—	—
TF4V4508003B	—	—	—	—	5/16	5/16	1/2	2	.030	—
TF4V4508003	—	—	—	—	5/16	5/16	1/2	2	—	.016
TF4V4508003S	—	—	—	—	5/16	5/16	1/2	2	—	—
TF4V0508003A	—	—	—	—	5/16	5/16	3/4	2 1/2	.015	—
TF4V0508003B	—	—	—	—	5/16	5/16	3/4	2 1/2	.030	—

(continued)





(Series 4V05 • VariMill I continued)



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

P — Steels K — Cast Iron S — High-Temp Alloys
M — Stainless Steels N — Non-Ferrous H — Hard Materials
For application data, see page B22–B23.

Solid End Milling

					D1	D	length of cut Ap1 max	length L	Re	BCH
TF4V0508003C	—	—	—	—	5/16	5/16	3/4	2 1/2	.060	—
TF4V0508003	—	—	—	—	5/16	5/16	3/4	2 1/2	—	.016
TF4V0508003S	—	—	—	—	5/16	5/16	3/4	2 1/2	—	—
TF4V1508003B	—	—	—	—	5/16	5/16	1 1/4	3 1/4	.030	—
TF4V1508003S	—	—	—	—	5/16	5/16	1 1/4	3 1/4	—	—
TF4V2508003S	—	—	—	—	5/16	5/16	1 5/8	4	—	—
TF4V4510004B	—	—	—	—	3/8	3/8	1/2	2	.030	—
TF4V4510004	—	TM4V4510004	—	—	3/8	3/8	1/2	2	—	.020
TF4V4510004S	—	TM4V4510004S	—	—	3/8	3/8	1/2	2	—	—
TF4V0510004A	—	—	—	—	3/8	3/8	7/8	2 1/2	.015	—
TF4V0510004B	—	TM4V0510004B	—	—	3/8	3/8	7/8	2 1/2	.030	—
TF4V0510004C	—	—	—	—	3/8	3/8	7/8	2 1/2	.060	—
TF4V0510004D	—	—	—	—	3/8	3/8	7/8	2 1/2	.090	—
TF4V0510004	—	TM4V0510004	—	—	3/8	3/8	7/8	2 1/2	—	.020
TF4V0510004S	—	TM4V0510004S	—	—	3/8	3/8	7/8	2 1/2	—	—
TF4V1510004B	—	—	—	—	3/8	3/8	1 1/2	4	.030	—
TF4V1510004C	—	—	—	—	3/8	3/8	1 1/2	4	.060	—
TF4V1510004S	—	TM4V1510004S	—	—	3/8	3/8	1 1/2	4	—	—
TF4V2510004B	—	—	—	—	3/8	3/8	2 1/2	4	.030	—
TF4V2510004C	—	—	—	—	3/8	3/8	2 1/2	4	.060	—
TF4V2510004	—	—	—	—	3/8	3/8	2 1/2	4	—	—
TF4V2510004S	—	—	—	—	3/8	3/8	2 1/2	4	—	—
TF4V451101A	—	—	—	—	7/16	7/16	5/8	2 1/2	—	.020
TF4V451101AS	—	—	—	—	7/16	7/16	5/8	2 1/2	—	—
TF4V051101A	—	—	—	—	7/16	7/16	7/8	2 1/2	—	.020
TF4V051101AS	—	—	—	—	7/16	7/16	7/8	2 1/2	—	—
TF4V151100AS	—	—	—	—	7/16	7/16	2	4	—	—
TF4V251100AS	—	—	—	—	7/16	7/16	3	5	—	—
—	—	—	TF4V4513005B	—	1/2	1/2	5/8	2 1/2	.030	—
—	—	—	TF4V4513005C	—	1/2	1/2	5/8	2 1/2	.060	—
—	—	—	TF4V4513005	TM4V4513005	1/2	1/2	5/8	2 1/2	—	.020
—	—	—	TF4V4513005S	TM4V4513005S	1/2	1/2	5/8	2 1/2	—	—
—	—	—	TF4V0513005	TM4V0513005	1/2	1/2	1	3	—	.020
—	—	—	TF4V0513005S	TM4V0513005S	1/2	1/2	1	3	—	—
—	—	—	TF4V0513015A	—	1/2	1/2	1 1/4	3	.015	—
—	—	—	TF4V0513015B	TM4V0513015B	1/2	1/2	1 1/4	3	.030	—
—	—	—	TF4V0513015C	—	1/2	1/2	1 1/4	3	.060	—
—	—	—	TF4V0513015D	—	1/2	1/2	1 1/4	3	.090	—
—	—	—	TF4V0513015E	—	1/2	1/2	1 1/4	3	.120	—
—	—	—	TF4V0513015	TM4V0513015	1/2	1/2	1 1/4	3	—	.020
—	—	—	TF4V0513015S	TM4V0513015S	1/2	1/2	1 1/4	3	—	—
—	—	—	TF4V6513015B	—	1/2	1/2	1 1/2	4	.030	—
—	—	—	TF4V6513015C	TM4V6513015S	1/2	1/2	1 1/2	4	.060	—

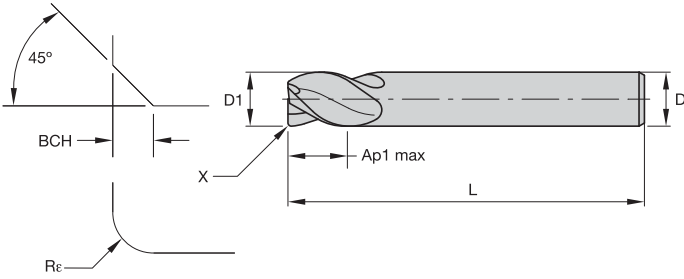
(continued)

High-Performance Solid Carbide End Mills • VariMill™

Series 4V05 • VariMill I™ • Lists 4V05 4V15 4V25 4V45 4V65



(Series 4V05 • VariMill I continued)



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

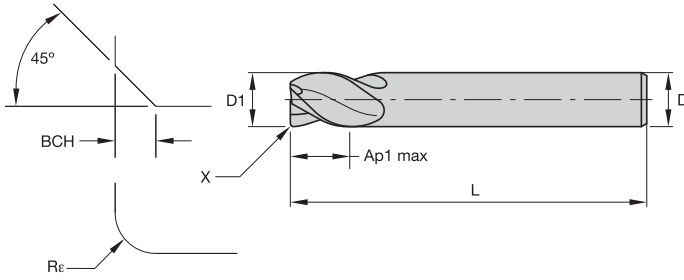
P — Steels K — Cast Iron S — High-Temp Alloys
M — Stainless Steels N — Non-Ferrous H — Hard Materials
For application data, see page B22–B23.

Solid End Milling

TIALN-LT	ALTIN-MT	TIALN-LW	ALTIN-MW	D1	D	length of cut Ap1 max	length L	Re	BCH
—	—	TF4V6513015	TM4V6513015	1/2	1/2	1 1/2	4	—	.020
—	—	TF4V6513015S	—	1/2	1/2	1 1/2	4	—	—
—	—	TF4V1513005B	—	1/2	1/2	2	4	.030	—
—	—	TF4V1513005C	—	1/2	1/2	2	4	.060	—
—	—	TF4V1513005S	TM4V1513005S	1/2	1/2	2	4	—	—
—	—	TF4V6513025B	—	1/2	1/2	2 1/2	4 1/2	.030	—
—	—	TF4V6513025C	—	1/2	1/2	2 1/2	4 1/2	.060	—
—	—	TF4V6513025S	—	1/2	1/2	2 1/2	4 1/2	—	—
—	—	TF4V2513005B	—	1/2	1/2	3	5	.030	—
—	—	TF4V2513005C	—	1/2	1/2	3	5	.060	—
—	—	TF4V2513005S	—	1/2	1/2	3	5	—	—
—	—	TF4V4516006C	—	5/8	5/8	3/4	3	.060	—
—	—	TF4V4516006E	—	5/8	5/8	3/4	3	.120	—
—	—	TF4V4516006	—	5/8	5/8	3/4	3	—	.020
—	—	TF4V4516006S	—	5/8	5/8	3/4	3	—	—
—	—	TF4V0516006B	TM4V0516006B	5/8	5/8	1 1/4	3 1/2	.030	—
—	—	TF4V0516006C	—	5/8	5/8	1 1/4	3 1/2	.060	—
—	—	TF4V0516006D	—	5/8	5/8	1 1/4	3 1/2	.090	—
—	—	TF4V0516006E	—	5/8	5/8	1 1/4	3 1/2	.120	—
—	—	TF4V0516006	TM4V0516006	5/8	5/8	1 1/4	3 1/2	—	.020
—	—	TF4V0516006S	—	5/8	5/8	1 1/4	3 1/2	—	—
—	—	TF4V6516016C	—	5/8	5/8	1 5/8	4 1/8	.060	—
—	—	TF4V6516016	—	5/8	5/8	1 5/8	4 1/8	—	.020
—	—	TF4V6516016S	—	5/8	5/8	1 5/8	4 1/8	—	—
—	—	TF4V1516006C	—	5/8	5/8	2 1/4	5	.060	—
—	—	TF4V1516006S	—	5/8	5/8	2 1/4	5	—	—
—	—	TF4V2516006S	—	5/8	5/8	3	5 1/4	—	—
—	—	TF4V4519007B	—	3/4	3/4	7/8	3 1/2	.030	—
—	—	TF4V4519007C	—	3/4	3/4	7/8	3 1/2	.060	—
—	—	TF4V4519007E	—	3/4	3/4	7/8	3 1/2	.120	—
—	—	TF4V4519007	TM4V4519007	3/4	3/4	7/8	3 1/2	—	.020
—	—	TF4V4519007S	TM4V4519007S	3/4	3/4	7/8	3 1/2	—	—
—	—	TF4V0519007B	TM4V0519007B	3/4	3/4	1 1/2	4	.030	—
—	—	TF4V0519007C	TM4V0519007C	3/4	3/4	1 1/2	4	.060	—
—	—	TF4V0519007D	TM4V0519007D	3/4	3/4	1 1/2	4	.090	—
—	—	TF4V0519007E	TM4V0519007E	3/4	3/4	1 1/2	4	.120	—
—	—	TF4V0519007	TM4V0519007	3/4	3/4	1 1/2	4	—	.020
—	—	TF4V0519007S	TM4V0519007S	3/4	3/4	1 1/2	4	—	—

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(Series 4V05 • VariMill I continued)



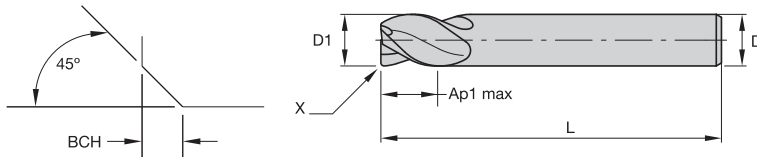
	P						M			K			S				H
	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	1
TIALN	●	●	●	●	○	○	●	●	●	○	○	○	○	○	○	○	○
ALTiN	○	○	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○

P — Steels K — Cast Iron S — High-Temp Alloys
M — Stainless Steels N — Non-Ferrous H — Hard Materials
For application data, see page B22–B23.

Solid End Milling

					D1	D	length of cut Ap1 max	length L	Re	BCH
—	—	—	TF4V6519017	—	3/4	3/4	1 5/8	4	—	.020
—	—	—	TF4V6519017S	—	3/4	3/4	1 5/8	4	—	—
—	—	—	TF4V1519007B	—	3/4	3/4	2 1/4	5	.030	—
—	—	—	TF4V1519007C	—	3/4	3/4	2 1/4	5	.060	—
—	—	—	TF4V1519007	TM4V1519007	3/4	3/4	2 1/4	5	—	.020
—	—	—	TF4V1519007S	TM4V1519007S	3/4	3/4	2 1/4	5	—	—
—	—	—	TF4V6519007B	—	3/4	3/4	3	6	.030	—
—	—	—	TF4V6519007C	—	3/4	3/4	3	6	.060	—
—	—	—	TF4V6519007	—	3/4	3/4	3	6	—	.020
—	—	—	TF4V6519007S	TM4V6519007S	3/4	3/4	3	6	—	—
—	—	—	TF4V2519007B	—	3/4	3/4	4	6 1/4	.030	—
—	—	—	TF4V2519007C	—	3/4	3/4	4	6 1/4	.060	—
—	—	—	TF4V2519007S	—	3/4	3/4	4	6 1/4	—	—
—	—	—	TF4V0525008B	TM4V0525008B	1	1	1 1/2	4	.030	—
—	—	—	TF4V0525008C	TM4V0525008C	1	1	1 1/2	4	.060	—
—	—	—	TF4V0525008D	TM4V0525008D	1	1	1 1/2	4	.090	—
—	—	—	TF4V0525008E	TM4V0525008E	1	1	1 1/2	4	.120	—
—	—	—	TF4V0525008F	—	1	1	1 1/2	4	.250	—
—	—	—	TF4V0525008	TM4V0525008	1	1	1 1/2	4	—	.020
—	—	—	TF4V0525008S	TM4V0525008S	1	1	1 1/2	4	—	—
—	—	—	TF4V6525018	—	1	1	2	5	—	.020
—	—	—	TF4V6525018S	—	1	1	2	5	—	—
—	—	—	TF4V1525008B	—	1	1	2 1/4	5	.030	—
—	—	—	TF4V1525008C	—	1	1	2 1/4	5	.060	—
—	—	—	TF4V1525008	—	1	1	2 1/4	5	—	.020
—	—	—	TF4V1525008S	TM4V1525008S	1	1	2 1/4	5	—	—
—	—	—	TF4V2525008B	—	1	1	3	6	.030	—
—	—	—	TF4V2525008C	—	1	1	3	6	.060	—
—	—	—	TF4V2525008	—	1	1	3	6	—	.020
—	—	—	TF4V2525008S	—	1	1	3	6	—	—
—	—	—	TF4V6525028B	—	1	1	4	7	.030	—
—	—	—	TF4V6525028C	—	1	1	4	7	.060	—
—	—	—	TF4V6525028	—	1	1	4	7	—	.020
—	—	—	TF4V6525028S	TM4V6525028S	1	1	4	7	—	—
—	—	—	TF4V0532009B	—	1 1/4	1 1/4	2 1/4	5	.030	—
—	—	—	TF4V0532009E	—	1 1/4	1 1/4	2 1/4	5	.120	—
—	—	—	TF4V0532009	—	1 1/4	1 1/4	2 1/4	5	—	.020
—	—	—	TF4V0532009S	—	1 1/4	1 1/4	2 1/4	5	—	—

- Unequal flute spacing.
- Center cutting.
- Optimized geometry for titanium machining.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002	≤ 1/8"	0/0.00024
		> 1/8"-1/4"	0/0.00031
		> 1/4"-3/8"	0/0.00035
		> 3/8"-23/32"	0/0.00043
		> 23/32"-1 3/16"	0/0.00051

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

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

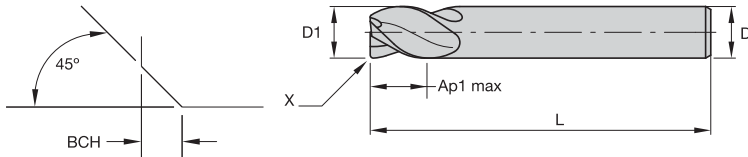
For application data, see page B23.

Series 4V0T • VariMill I



ALTIN-MW	D1	D	length of cut Ap1 max	length L	BCH
TM4V4T13005	1/2	1/2	5/8	2 1/2	.020
TM4V4T13005S	1/2	1/2	5/8	2 1/2	—
TM4V0T13015	1/2	1/2	1 1/4	3	.020
TM4V0T13015S	1/2	1/2	1 1/4	3	—
TM4V4T16006	5/8	5/8	3/4	3	.020
TM4V4T16006S	5/8	5/8	3/4	3	—
TM4V0T16006	5/8	5/8	1 1/4	3 1/2	.020
TM4V0T16006S	5/8	5/8	1 1/4	3 1/2	—
TM4V4T19007	3/4	3/4	7/8	3 1/2	.020
TM4V4T19007S	3/4	3/4	7/8	3 1/2	—
TM4V0T19007	3/4	3/4	1 1/2	4	.020
TM4V0T19007S	3/4	3/4	1 1/2	4	—
TM4V0T25008	1	1	1 1/2	4	.020
TM4V0T25008S	1	1	1 1/2	4	—
TM4V0T32009	1 1/4	1 1/4	2 1/4	5	.020
TM4V0T32009S	1 1/4	1 1/4	2 1/4	5	—

- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+ .000 / - .002	≤ 1/8"	0 / .00024
		> 1/8" - 1/4"	0 / .00031
		> 1/4" - 3/8"	0 / .00035
		> 3/8" - 23/32"	0 / .00043
		> 23/32" - 1 3/16"	0 / .00051

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

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

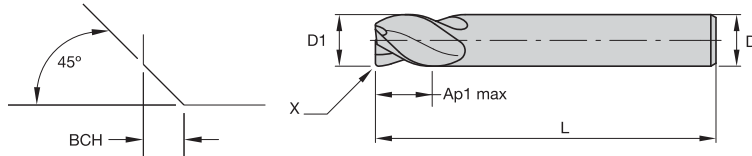
For application data, see page B24.

Series 4VP5 • VariMill I • Extended Reach



TIALN-LT	D1	D	length of cut Ap1 max	length L	BCH
TF4VP507012S	1/4	1/4	3/8	4	—
TF4VP507012	1/4	1/4	3/8	4	.016
TF4VP510014S	3/8	3/8	1/2	4	—
TF4VP510014	3/8	3/8	1/2	4	.020
TF4VP513005S	1/2	1/2	5/8	5	—
TF4VP513005	1/2	1/2	5/8	5	.020
TF4VP513015S	1/2	1/2	5/8	6	—
TF4VP513015	1/2	1/2	5/8	6	.020
TF4VP516006S	5/8	5/8	3/4	5	—
TF4VP516006	5/8	5/8	3/4	5	.020
TF4VP516016S	5/8	5/8	3/4	6	—
TF4VP516016	5/8	5/8	3/4	6	.020
TF4VP516026S	5/8	5/8	3/4	7	—
TF4VP516026	5/8	5/8	3/4	7	.020
TF4VP519007S	3/4	3/4	1	5	—
TF4VP519007	3/4	3/4	1	5	.020
TF4VP519017S	3/4	3/4	1	6	—
TF4VP519017	3/4	3/4	1	6	.020
TF4VP519027S	3/4	3/4	1	7	—
TF4VP519027	3/4	3/4	1	7	.020
TF4VP525008S	1	1	1 1/8	5	—
TF4VP525008	1	1	1 1/8	5	.020
TF4VP525018S	1	1	1 1/8	6	—
TF4VP525018	1	1	1 1/8	6	.020
TF4VP525028S	1	1	1 1/8	7	—
TF4VP525028	1	1	1 1/8	7	.020

- Unequal flute spacing.
- Center cutting.
- Optimized geometry for titanium machining.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002	≤ 1/8"	0/0.00024
		> 1/8"-1/4"	0/0.00031
		> 1/4"-3/8"	0/0.00035
		> 3/8"-23/32"	0/0.00043
		> 23/32"-1 3/16"	0/0.00051

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

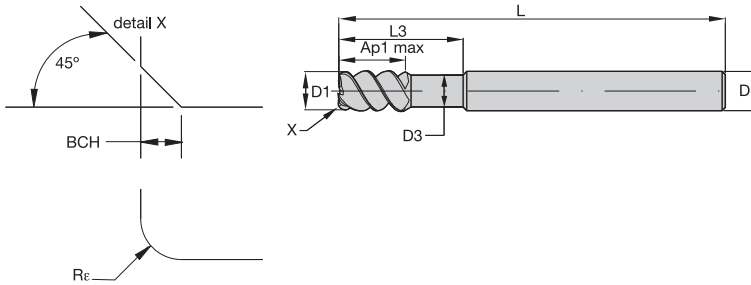
P — Steels K — Cast Iron S — High-Temp Alloys
M — Stainless Steels N — Non-Ferrous H — Hard Materials
For application data, see page B24.

Series 4VPT • VariMill I • Extended Reach



ALTIN-MT	D1	D	length of cut Ap1 max	length L	BCH
TM4VPT13005	1/2	1/2	5/8	5	.020
TM4VPT13005S	1/2	1/2	5/8	5	—
TM4VPT13015	1/2	1/2	5/8	6	.020
TM4VPT13015S	1/2	1/2	5/8	6	—
TM4VPT16006	5/8	5/8	3/4	5	.020
TM4VPT16006S	5/8	5/8	3/4	5	—
TM4VPT16016	5/8	5/8	3/4	6	.020
TM4VPT16016S	5/8	5/8	3/4	6	—
TM4VPT16026	5/8	5/8	3/4	7	.020
TM4VPT16026S	5/8	5/8	3/4	7	—
TM4VPT19007	3/4	3/4	1	5	.020
TM4VPT19007S	3/4	3/4	1	5	—
TM4VPT19017	3/4	3/4	1	6	.020
TM4VPT19017S	3/4	3/4	1	6	—
TM4VPT19027	3/4	3/4	1	7	.020
TM4VPT19027S	3/4	3/4	1	7	—
TM4VPT25008	1	1	1 1/8	5	.020
TM4VPT25008S	1	1	1 1/8	5	—
TM4VPT25018	1	1	1 1/8	6	.020
TM4VPT25018S	1	1	1 1/8	6	—
TM4VPT25028	1	1	1 1/8	7	.020
TM4VPT25028S	1	1	1 1/8	7	—

- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances			
D1	tolerance	D	tolerance h6 + / -
All	+ .000 / - .002	≤ 1/8"	0 / .00024
		> 1/8" - 1/4"	0 / .00031
		> 1/4" - 3/8"	0 / .00035
		> 3/8" - 23/32"	0 / .00043
		> 23/32" - 1 3/16"	0 / .00051

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

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

For application data, see page B25.

Series 4VN5 • VariMill I • Extended Reach and Neck

TIALN-LT	TIALN-LW	D1	D	D3	length of cut Ap1 max	L3	length L	Re	BCH
TF4VN507012	—	1/4	1/4	.235	3/8	1 1/4	4	—	.016
TF4VN507012A	—	1/4	1/4	.235	3/8	1 1/4	4	.015	—
TF4VN507012B	—	1/4	1/4	.235	3/8	1 1/4	4	.030	—
TF4VN510014	—	3/8	3/8	.353	1/2	1 7/8	4	—	.020
TF4VN510014B	—	3/8	3/8	.353	1/2	1 7/8	4	.030	—
TF4VN510014C	—	3/8	3/8	.353	1/2	1 7/8	4	.060	—
—	TF4VN513005	1/2	1/2	.470	5/8	2 1/4	4	—	.020
—	TF4VN513005B	1/2	1/2	.470	5/8	2 1/4	4	.030	—
—	TF4VN513005C	1/2	1/2	.470	5/8	2 1/4	4	.060	—
—	TF4VN513005E	1/2	1/2	.470	5/8	2 1/4	4	.120	—
—	TF4VN516006	5/8	5/8	.588	3/4	2 1/4	4 1/8	—	.020
—	TF4VN516006C	5/8	5/8	.588	3/4	2 1/4	4 1/8	.060	—
—	TF4VN516006E	5/8	5/8	.588	3/4	2 1/4	4 1/8	.120	—
—	TF4VN516016	5/8	5/8	.588	3/4	3 1/8	5	—	.020
—	TF4VN519007	3/4	3/4	.705	1	2 1/4	4 1/4	—	.020
—	TF4VN519017	3/4	3/4	.705	1	3 1/4	5 1/4	—	.020
—	TF4VN519017B	3/4	3/4	.705	1	3 1/4	5 1/4	.030	—
—	TF4VN519017C	3/4	3/4	.705	1	3 1/4	5 1/4	.060	—
—	TF4VN519017E	3/4	3/4	.705	1	3 1/4	5 1/4	.120	—
—	TF4VN525008	1	1	.940	1 1/8	2 1/4	4 1/2	—	.020
—	TF4VN525018	1	1	.940	1 1/8	3 1/4	5 1/2	—	.020
—	TF4VN525018B	1	1	.940	1 1/8	3 1/4	5 1/2	.030	—
—	TF4VN525018C	1	1	.940	1 1/8	3 1/4	5 1/2	.060	—
—	TF4VN525018E	1	1	.940	1 1/8	3 1/4	5 1/2	.120	—
—	TF4VN525028	1	1	.940	1 1/8	4 1/4	6 1/2	—	.020

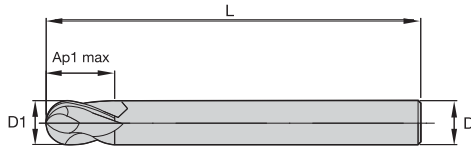
High-Performance Solid Carbide End Mills • VariMill™

Series 4VP0 • VariMill I™ • Extended Reach • Ball Nose



Solid End Milling

- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002	≤ 1/8"	0/0.00024
		> 1/8"-1/4"	0/0.00031
		> 1/4"-3/8"	0/0.00035
		> 3/8"-23/32"	0/0.00043
		> 23/32"-1 3/16"	0/0.00051

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

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

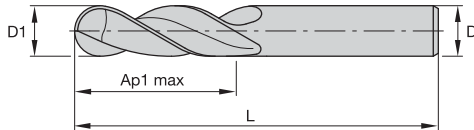
For application data, see page B25.

Series 4VP0 • VariMill I • Extended Reach • Ball Nose



TIALN-LT	D1	D	length of cut Ap1 max	length L
TF4VP007012	1/4	1/4	3/8	4
TF4VP010014	3/8	3/8	1/2	4
TF4VP013005	1/2	1/2	5/8	5
TF4VP016016	5/8	5/8	3/4	6
TF4VP019017	3/4	3/4	1	6
TF4VP025018	1	1	1 1/8	6

- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002	≤ 1/8"	0/0.00024
		> 1/8"–1/4"	0/0.00031
		> 1/4"–3/8"	0/0.00035
		> 3/8"–23/32"	0/0.00043
		> 23/32"–1 3/16"	0/0.00051


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

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


For application data, see page B26.

Series 4V00 • VariMill I • Extended Length of Cut • Ball Nose

		D1	D	length of cut Ap1 max	length L
TF4V0003001	—	1/8	1/8	1/2	2
TF4V0005000	—	3/16	3/16	5/8	2 1/4
TF4V0007002	—	1/4	1/4	3/4	2 1/2
TF4V0008003	—	5/16	5/16	3/4	2 1/2
TF4V0010004	—	3/8	3/8	7/8	2 1/2
TF4V001101A	—	7/16	7/16	7/8	2 1/2
—	TF4V0013005	1/2	1/2	1	3
—	TF4V0013015	1/2	1/2	1 1/4	3
—	TF4V0016006	5/8	5/8	1 1/4	3 1/2
—	TF4V0019007	3/4	3/4	1 1/2	4
—	TF4V0025008	1	1	1 1/2	4
—	TF4V0032009	1 1/4	1 1/4	2 1/4	5

Series 4V05 • Lists 4V05 4V45																				
Material Group	A		B																	
	ap	ae	ap	TIALN		ALTIN		Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.												
				Cutting Speed – vc SFM		Cutting Speed – vc SFM		D1 – Diameter												
					min	max	min	max	frac. dec.	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1	1-1/4
P	1	1.25 x D	0.5 x D	1 x D	490	660	490	660	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	2	1.25 x D	0.5 x D	1 x D	460	620	460	620	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	3	1.25 x D	0.5 x D	1 x D	390	520	390	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	4	1.25 x D	0.5 x D	0.75 x D	300	490	300	490	IPT	.0007	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039	.0049
	5	1.25 x D	0.5 x D	1 x D	200	330	200	330	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	6	1.25 x D	0.5 x D	0.75 x D	160	250	160	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028	.0036
M	1	1.25 x D	0.5 x D	1 x D	260	330	260	330	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	2	1.25 x D	0.5 x D	1 x D	200	260	200	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	3	1.25 x D	0.5 x D	1 x D	200	260	200	260	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028	.0036
K	1	1.25 x D	0.5 x D	1 x D	390	520	390	520	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	2	1.25 x D	0.5 x D	1 x D	360	460	360	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	3	1.25 x D	0.5 x D	1 x D	330	430	330	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
S	1	1.0 x D	0.3 x D	0.3 x D	160	300	160	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	2	1.0 x D	0.3 x D	0.3 x D	70	130	70	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0018	.0020	.0025	.0031
	3	1.25 x D	0.5 x D	1 x D	160	260	160	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	4	1.25 x D	0.5 x D	1 x D	150	210	150	210	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0022	.0025	.0028	.0033	.0042
H	1	1.25 x D	0.5 x D	0.75 x D	260	460	260	460	IPT	.0007	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039	.0049

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 4V05 • Lists 4V15 4V65																				
Material Group	A		B																	
	ap	ae	ap	TIALN		ALTIN		Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.												
				Cutting Speed – vc SFM		Cutting Speed – vc SFM		D1 – Diameter												
					min	max	min	max	frac. dec.	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1	1-1/4
P	1	2 x D	0.25 x D	0.5 x D	490	660	490	660	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	2	2 x D	0.25 x D	0.5 x D	460	620	460	620	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	3	2 x D	0.25 x D	0.5 x D	390	520	390	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	4	2 x D	0.25 x D	0.4 x D	300	490	300	490	IPT	.0007	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039	.0049
	5	2 x D	0.25 x D	0.5 x D	200	330	200	330	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	6	2 x D	0.25 x D	0.4 x D	160	250	160	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028	.0036
M	1	2 x D	0.25 x D	0.5 x D	260	330	260	330	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	2	2 x D	0.25 x D	0.5 x D	200	260	200	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	3	2 x D	0.25 x D	0.5 x D	200	260	200	260	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028	.0036
K	1	2 x D	0.25 x D	0.5 x D	390	520	390	520	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	2	2 x D	0.25 x D	0.5 x D	360	460	360	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	3	2 x D	0.25 x D	0.5 x D	330	430	330	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
S	1	2 x D	0.15 x D	0.2 x D	160	300	160	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	2	2 x D	0.15 x D	0.2 x D	70	130	70	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0018	.0020	.0025	.0031
	3	2 x D	0.25 x D	0.5 x D	160	260	160	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	4	2 x D	0.25 x D	0.5 x D	150	210	150	210	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0022	.0025	.0028	.0033	.0042
H	1	2 x D	0.25 x D	0.4 x D	260	460	260	460	IPT	.0007	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039	.0049

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 4V05 • Lists 4V25 4V65																			
Material Group	A		TIALN		ALTIN		Recommended feed per tooth (IPT=inch/th) for side milling (A).												
	ap	ae	Cutting Speed – vc SFM		Cutting Speed – vc SFM		D1 – Diameter												
			min	max	min	max	frac.	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1	1-1/4	
			dec.	.1250	.1880	.2500	.3130	.3750	.4380	.5000	.6250	.7500	1.000	1.250					
P	1	2.5 x D	0.1 x D	490	660	490	660	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	2	2.5 x D	0.1 x D	460	620	460	620	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	3	2.5 x D	0.1 x D	390	520	390	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	4	2.5 x D	0.1 x D	300	490	300	490	IPT	.0007	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039	.0049
	5	2.5 x D	0.1 x D	200	330	200	330	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	6	2.5 x D	0.1 x D	160	250	160	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028	.0036
M	1	2.5 x D	0.1 x D	260	330	260	330	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	2	2.5 x D	0.1 x D	200	260	200	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	3	2.5 x D	0.1 x D	200	260	200	260	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028	.0036
K	1	2.5 x D	0.1 x D	390	520	390	520	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062
	2	2.5 x D	0.1 x D	360	460	360	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	3	2.5 x D	0.1 x D	330	430	330	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
S	1	2.5 x D	0.06 x D	160	300	160	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057
	2	2.5 x D	0.06 x D	70	130	70	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0018	.0020	.0025	.0031
	3	2.5 x D	0.1 x D	160	260	160	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046
	4	2.5 x D	0.1 x D	150	210	150	210	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0022	.0025	.0028	.0033	.0042
H	1	2.5 x D	0.1 x D	260	460	260	460	IPT	.0007	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039	.0049

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group. Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group. Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 4V0T														
Material Group	A		B		ALTIN		Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.							
	ap	ae	ap	Cutting Speed – vc SFM		D1 – Diameter								
				min	max	frac.	1/2	5/8	3/4	1	1-1/4			
					dec.	.5000	.6250	.7500	1.000	1.250				
P	1	1.25 x D	0.5 x D	1 x D	490	660	IPT	.0035	.0039	.0043	.0050	.0062		
	2	1.25 x D	0.5 x D	1 x D	460	620	IPT	.0035	.0039	.0043	.0050	.0062		
	3	1.25 x D	0.5 x D	1 x D	390	520	IPT	.0029	.0034	.0038	.0046	.0057		
	4	1.25 x D	0.5 x D	0.75 x D	300	490	IPT	.0026	.0030	.0033	.0039	.0049		
	5	1.25 x D	0.5 x D	1 x D	200	330	IPT	.0023	.0027	.0030	.0036	.0046		
	6	1.25 x D	0.5 x D	0.75 x D	160	250	IPT	.0019	.0022	.0024	.0028	.0036		
M	1	1.25 x D	0.5 x D	1 x D	260	330	IPT	.0029	.0034	.0038	.0046	.0057		
	2	1.25 x D	0.5 x D	1 x D	200	260	IPT	.0023	.0027	.0030	.0036	.0046		
	3	1.25 x D	0.5 x D	1 x D	200	260	IPT	.0019	.0022	.0024	.0028	.0036		
K	1	1.25 x D	0.5 x D	1 x D	390	520	IPT	.0035	.0039	.0043	.0050	.0062		
	2	1.25 x D	0.5 x D	1 x D	360	460	IPT	.0029	.0034	.0038	.0046	.0057		
	3	1.25 x D	0.5 x D	1 x D	330	430	IPT	.0023	.0027	.0030	.0036	.0046		
S	1	1.0 x D	0.3 x D	0.3 x D	160	300	IPT	.0029	.0034	.0038	.0046	.0057		
	2	1.0 x D	0.3 x D	0.3 x D	70	130	IPT	.0016	.0018	.0020	.0025	.0031		
	3	1.25 x D	0.5 x D	1 x D	160	260	IPT	.0023	.0027	.0030	.0036	.0046		
	4	1.25 x D	0.5 x D	1 x D	150	210	IPT	.0022	.0025	.0028	.0033	.0042		
H	1	1.25 x D	0.5 x D	0.75 x D	260	460	IPT	.0026	.0030	.0033	.0039	.0049		

NOTE: Side milling applications – for longest reach (L3) tools, reduce ae by 30%. Slot milling applications – for longest reach (L3) tools, reduce ap by 30%. Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group. Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group. Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 4VP5 • Lists 4V15 4V65														
Material Group	A		B	TIALN			Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.							
	ap	ae	ap	Cutting Speed — vc SFM			D1 — Diameter							
				min		max	frac.	1/4	3/8	1/2	5/8	3/4	1	
							dec.	.2500	.3750	.5000	.6250	.7500	1.000	
P	1	0.75 x D	0.5 x D	0.75 x D	500	—	650	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	450	—	625	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	3	0.75 x D	0.5 x D	0.75 x D	400	—	525	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	4	0.75 x D	0.5 x D	0.5 x D	300	—	475	IPT	.0014	.0020	.0026	.0030	.0033	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	—	325	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	6	0.75 x D	0.5 x D	0.5 x D	150	—	225	IPT	.0010	.0015	.0019	.0022	.0024	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	260	—	330	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.5 x D	0.75 x D	200	—	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	—	260	IPT	.0010	.0015	.0019	.0022	.0024	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	—	520	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	360	—	460	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	3	0.75 x D	0.5 x D	0.75 x D	330	—	430	IPT	.0012	.0018	.0023	.0027	.0030	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	150	—	275	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.3 x D	0.3 x D	70	—	130	IPT	.0008	.0012	.0016	.0018	.0020	.0025
	3	0.75 x D	0.5 x D	0.75 x D	160	—	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
H	4	0.75 x D	0.5 x D	0.75 x D	150	—	210	IPT	.0011	.0017	.0022	.0025	.0028	.0033
	1	0.75 x D	0.5 x D	0.5 x D	260	—	450	IPT	.0014	.0020	.0026	.0030	.0033	.0039

NOTE: Side milling applications — for longest reach (L3) tools, reduce ae by 30%.
 Slot milling applications — for longest reach (L3) tools, reduce ap by 30%.
 Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 4VPT														
Material Group	A		B	ALTiN			Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.							
	ap	ae	ap	Cutting Speed — vc SFM			D1 — Diameter							
				min		max	frac.	1/2	5/8	3/4	1			
							dec.	.5000	.6250	.7500	1.000			
P	1	0.75 x D	0.5 x D	0.75 x D	500	—	650	IPT	.0035	.0039	.0043	.0050		
	2	0.75 x D	0.5 x D	0.75 x D	450	—	625	IPT	.0035	.0039	.0043	.0050		
	3	0.75 x D	0.5 x D	0.75 x D	400	—	525	IPT	.0029	.0034	.0038	.0046		
	4	0.75 x D	0.5 x D	0.5 x D	300	—	475	IPT	.0026	.0030	.0033	.0039		
	5	0.75 x D	0.5 x D	0.75 x D	200	—	325	IPT	.0023	.0027	.0030	.0036		
	6	0.75 x D	0.5 x D	0.5 x D	150	—	225	IPT	.0019	.0022	.0024	.0028		
M	1	0.75 x D	0.5 x D	0.75 x D	260	—	330	IPT	.0029	.0034	.0038	.0046		
	2	0.75 x D	0.5 x D	0.75 x D	200	—	260	IPT	.0023	.0027	.0030	.0036		
	3	0.75 x D	0.5 x D	0.75 x D	200	—	260	IPT	.0019	.0022	.0024	.0028		
K	1	0.75 x D	0.5 x D	0.75 x D	390	—	520	IPT	.0035	.0039	.0043	.0050		
	2	0.75 x D	0.5 x D	0.75 x D	360	—	460	IPT	.0029	.0034	.0038	.0046		
	3	0.75 x D	0.5 x D	0.75 x D	330	—	430	IPT	.0023	.0027	.0030	.0036		
S	1	0.75 x D	0.3 x D	0.3 x D	150	—	275	IPT	.0029	.0034	.0038	.0046		
	2	0.75 x D	0.3 x D	0.3 x D	70	—	130	IPT	.0016	.0018	.0020	.0025		
	3	0.75 x D	0.5 x D	0.75 x D	160	—	260	IPT	.0023	.0027	.0030	.0036		
H	4	0.75 x D	0.5 x D	0.75 x D	150	—	210	IPT	.0022	.0025	.0028	.0033		
	1	0.75 x D	0.5 x D	0.5 x D	260	—	450	IPT	.0026	.0030	.0033	.0039		

NOTE: Side milling applications — for longest reach (L3) tools, reduce ae by 30%.
 Slot milling applications — for longest reach (L3) tools, reduce ap by 30%.
 Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.


Series 4VN5 • Lists 4V15 4V65														
Material Group	A		B	TIALN			Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.							
	ap	ae	ap	Cutting Speed — vc			D1 — Diameter							
				SFM			frac.	1/4	3/8	1/2	5/8	3/4	1	
				min		max	dec.	.2500	.3750	.5000	.6250	.7500	1.000	
P	1	0.75 x D	0.5 x D	0.75 x D	500	—	650	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	450	—	625	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	3	0.75 x D	0.5 x D	0.75 x D	400	—	525	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	4	0.75 x D	0.5 x D	0.5 x D	300	—	475	IPT	.0014	.0020	.0026	.0030	.0033	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	—	325	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	6	0.75 x D	0.5 x D	0.5 x D	150	—	225	IPT	.0010	.0015	.0019	.0022	.0024	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	260	—	330	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.5 x D	0.75 x D	200	—	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	—	260	IPT	.0010	.0015	.0019	.0022	.0024	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	—	520	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	360	—	460	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	3	0.75 x D	0.5 x D	0.75 x D	330	—	430	IPT	.0012	.0018	.0023	.0027	.0030	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	150	—	275	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.3 x D	0.3 x D	70	—	130	IPT	.0008	.0012	.0016	.0018	.0020	.0025
	3	0.75 x D	0.5 x D	0.75 x D	160	—	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	4	0.75 x D	0.5 x D	0.75 x D	150	—	210	IPT	.0011	.0017	.0022	.0025	.0028	.0033
H	1	0.75 x D	0.5 x D	0.5 x D	260	—	450	IPT	.0014	.0020	.0026	.0030	.0033	.0039

NOTE: Side milling applications — for longest reach (L3) tools, reduce ae by 30%.
 Slot milling applications — for longest reach (L3) tools, reduce ap by 30%.
 Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 4VP0														
Material Group	A		B	TIALN			Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.							
	ap	ae	ap	Cutting Speed — vc			D1 — Diameter							
				SFM			frac.	1/4	3/8	1/2	5/8	3/4	1	
				min		max	dec.	.2500	.3750	.5000	.6250	.7500	1.000	
P	1	0.75 x D	0.5 x D	0.75 x D	490	—	660	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	460	—	620	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	3	0.75 x D	0.5 x D	0.75 x D	390	—	520	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	4	0.75 x D	0.5 x D	0.5 x D	300	—	490	IPT	.0014	.0020	.0026	.0030	.0033	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	—	330	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	6	0.75 x D	0.5 x D	0.5 x D	160	—	250	IPT	.0010	.0015	.0019	.0022	.0024	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	260	—	330	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.5 x D	0.75 x D	200	—	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	—	260	IPT	.0010	.0015	.0019	.0022	.0024	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	—	520	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	360	—	460	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	3	0.75 x D	0.5 x D	0.75 x D	330	—	430	IPT	.0012	.0018	.0023	.0027	.0030	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	160	—	300	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.3 x D	0.3 x D	70	—	130	IPT	.0008	.0012	.0016	.0018	.0020	.0025
	3	0.75 x D	0.5 x D	0.75 x D	160	—	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	4	0.75 x D	0.5 x D	0.75 x D	150	—	210	IPT	.0011	.0017	.0022	.0025	.0028	.0033
H	1	0.75 x D	0.5 x D	0.5 x D	260	—	460	IPT	.0014	.0020	.0026	.0030	.0033	.0039

NOTE: Side milling applications — for longest reach (L3) tools, reduce ae by 30%.
 Slot milling applications — for longest reach (L3) tools, reduce ap by 30%.
 Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Solid End Milling

Series 4V00																				
Material Group	A		B																	
				Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.																
				D1 – Diameter																
	ap	ae	ap	Cutting Speed — vc		frac.	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1	1-1/4			
			min	max	dec.	.1250	.1880	.2500	.3130	.3750	.4380	.5000	.6250	.7500	1.000	1.250				
P	1	1.25 x D	0.5 x D	1 x D	490	–	660	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062	
	2	1.25 x D	0.5 x D	1 x D	460	–	620	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062	
	3	1.25 x D	0.5 x D	1 x D	390	–	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057	
	4	1.25 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0007	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039	.0049	
	5	1.25 x D	0.5 x D	1 x D	200	–	330	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046	
	6	1.25 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028	.0036	
M	1	1.25 x D	0.5 x D	1 x D	260	–	330	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057	
	2	1.25 x D	0.5 x D	1 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046	
	3	1.25 x D	0.5 x D	1 x D	200	–	260	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028	.0036	
K	1	1.25 x D	0.5 x D	1 x D	390	–	520	IPT	.0009	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050	.0062	
	2	1.25 x D	0.5 x D	1 x D	360	–	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057	
	3	1.25 x D	0.5 x D	1 x D	330	–	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046	
S	1	1.0 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046	.0057	
	2	1.0 x D	0.3 x D	0.3 x D	70	–	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0018	.0020	.0025	.0031	
	3	1.25 x D	0.5 x D	1 x D	160	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036	.0046	
	4	1.25 x D	0.5 x D	1 x D	150	–	210	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0022	.0025	.0028	.0033	.0042	
H	1	1.25 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0007	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039	.0049	

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Our complete portfolio. Your complete satisfaction.



From turning, holemaking, and indexable milling to solid carbide end milling, solid carbide drilling, and tapping, the most powerful tools in the business now proudly wear WIDIA™ brands. When you buy WIDIA products, you're not just purchasing speed, power, and precision, you're investing in quality and complete satisfaction.

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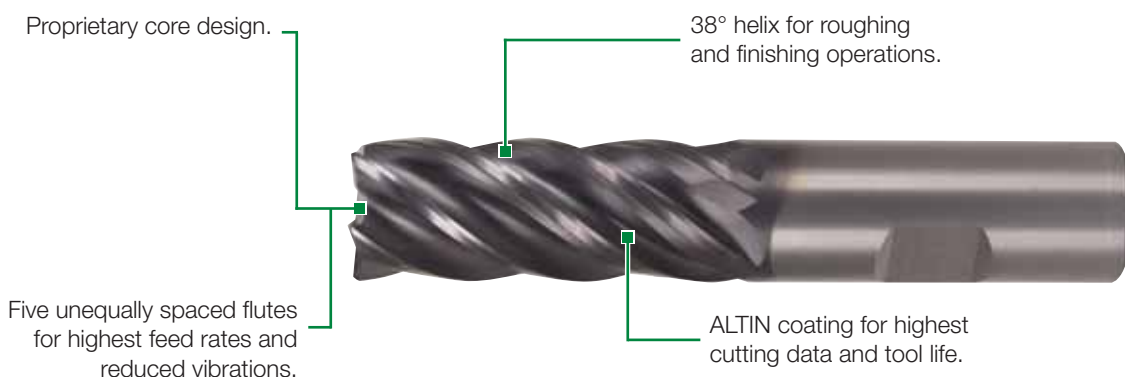
High-Performance Solid Carbide End Mills • **VariMill II™**

VariMill II end mills are the proven leader in the field of high-performance, chatter-free machining. They are designed to provide maximum metal removal rates and to achieve supreme surface conditions. Utilizing an innovative and proprietary design with unequal flute spacing, VariMill II carbide end mills provide users with the most versatile technology available, capable of outperforming most other high-performance tools.



VariMill II

- 1 x D slotting in titanium and stainless steels with five unequally spaced flutes.
- Roughing and finishing with one tool.
- Various lengths of cut; necked and corner radius versions available.



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

VariMill II™ Series

- Five unequally spaced flutes boost your output with higher feed rates.
- Roughing and finishing with one tool.
- Less passes due to 1 x D slotting capability on almost all materials, including titanium.
- Ramping up to 3°.

5V0S Series

- Highest Metal Removal Rates and tool life in:
 - Stainless steels, steels, and alloyed steels
 - Cast iron
 - High-temperature alloys and titanium
- Corner radii and sharp edges.



5V0T Series

- Titanium and stainless steel geometry design.
- Corner radii and sharp edges.

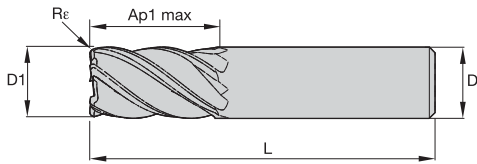
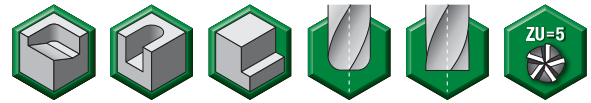


5VNS Series

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



- Unequal flute spacing.
- Non-center cutting.
- Maximum ramp angle = 3°.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Slotting up to 1 x D.



End Mill Tolerances

D1	tolerance	D	tolerance h6
			+ / -
All	+.000/- .002	≤ 1/8"	0/.00024
		> 1/8" - 1/4"	0/.00031
		> 1/4" - 3/8"	0/.00035
		> 3/8" - 23/32"	0/.00043
		> 23/32" - 1 3/16"	0/.00051

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

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

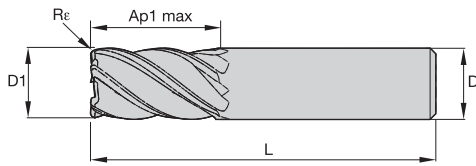
For application data, see page B35.

■ Series 5V0S • VariMill II

		D1	D	length of cut		length	Re
ALTIN-MT	ALTIN-MW			Ap1 max	L		
TM5V0S05000A	—	3/16	3/16	5/8	2 1/4	.015	
TM5V0S05000B	—	3/16	3/16	5/8	2 1/4	.030	
TM5V0S05000S	—	3/16	3/16	5/8	2 1/4	—	
TM5V0S07002A	—	1/4	1/4	3/4	2 1/2	.015	
TM5V0S07002B	—	1/4	1/4	3/4	2 1/2	.030	
TM5V0S07002C	—	1/4	1/4	3/4	2 1/2	.060	
TM5V0S07002S	—	1/4	1/4	3/4	2 1/2	—	
TM5V0S08003A	—	5/16	5/16	3/4	2 1/2	.015	
TM5V0S08003B	—	5/16	5/16	3/4	2 1/2	.030	
TM5V0S08003C	—	5/16	5/16	3/4	2 1/2	.060	
TM5V0S08003S	—	5/16	5/16	3/4	2 1/2	—	
TM5V0S10004A	—	3/8	3/8	7/8	2 1/2	.015	
TM5V0S10004B	—	3/8	3/8	7/8	2 1/2	.030	
TM5V0S10004C	—	3/8	3/8	7/8	2 1/2	.060	
TM5V0S10004S	—	3/8	3/8	7/8	2 1/2	—	
TM5V0S13015A	TM5V0S13015AW	1/2	1/2	1 1/4	3	.015	
TM5V0S13015B	TM5V0S13015BW	1/2	1/2	1 1/4	3	.030	
TM5V0S13015C	TM5V0S13015CW	1/2	1/2	1 1/4	3	.060	
TM5V0S13015D	TM5V0S13015DW	1/2	1/2	1 1/4	3	.090	
TM5V0S13015E	TM5V0S13015EW	1/2	1/2	1 1/4	3	.120	
TM5V0S13015S	TM5V0S13015SW	1/2	1/2	1 1/4	3	—	
TM5V0S16006B	TM5V0S16006BW	5/8	5/8	1 1/4	3 1/2	.030	

(continued)



(Series 5V0S • VariMill II continued)



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

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

For application data, see page B35.

 ALTIN-MT		 ALTIN-MW		D1	D	length of cut Ap1 max	length L	Re
TM5V0S16006C	TM5V0S16006CW	5/8	5/8	5/8	5/8	1 1/4	3 1/2	.060
TM5V0S16006D	TM5V0S16006DW	5/8	5/8	5/8	5/8	1 1/4	3 1/2	.090
TM5V0S16006S	TM5V0S16006SW	5/8	5/8	5/8	5/8	1 1/4	3 1/2	—
TM5V0S19007B	TM5V0S19007BW	3/4	3/4	3/4	3/4	1 1/2	4	.030
TM5V0S19007C	TM5V0S19007CW	3/4	3/4	3/4	3/4	1 1/2	4	.060
TM5V0S19007D	TM5V0S19007DW	3/4	3/4	3/4	3/4	1 1/2	4	.090
TM5V0S19007E	TM5V0S19007EW	3/4	3/4	3/4	3/4	1 1/2	4	.120
TM5V0S19007S	TM5V0S19007SW	3/4	3/4	3/4	3/4	1 1/2	4	—
TM5V0S25008B	TM5V0S25008BW	1	1	1	1	1 3/4	4 1/2	.030
TM5V0S25008C	TM5V0S25008CW	1	1	1	1	1 3/4	4 1/2	.060
TM5V0S25008D	TM5V0S25008DW	1	1	1	1	1 3/4	4 1/2	.090
TM5V0S25008E	TM5V0S25008EW	1	1	1	1	1 3/4	4 1/2	.120
TM5V0S25008S	TM5V0S25008SW	1	1	1	1	1 3/4	4 1/2	—

Solid End Milling

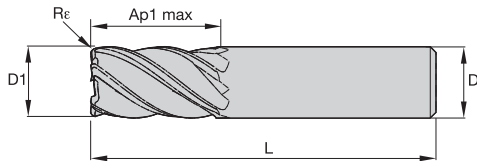
High-Performance Solid Carbide End Mills • VariMill™

Series 5V0T for Titanium • VariMill II™



Solid End Milling

- Unequal flute spacing.
- Non-center cutting.
- Maximum ramp angle = 3°.
- Optimized geometry for titanium machining.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Slotting up to 1 x D.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002	≤ 1/8"	0/0.00024
		> 1/8"-1/4"	0/0.00031
		> 1/4"-3/8"	0/0.00035
		> 3/8"-23/32"	0/0.00043
		> 23/32"-1 3/16"	0/0.00051

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

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

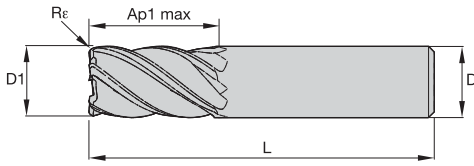
For application data, see page B35.

Series 5V0T • VariMill II

		ALTIN-MT	ALTIN-MW	D1	D	length of cut Ap1 max	length L	Re
		TM5V0T07002A	—	1/4	1/4	3/4	2 1/2	.015
		TM5V0T07002B	—	1/4	1/4	3/4	2 1/2	.030
		TM5V0T07002C	—	1/4	1/4	3/4	2 1/2	.060
		TM5V0T07002S	—	1/4	1/4	3/4	2 1/2	—
		TM5V0T08003A	—	5/16	5/16	3/4	2 1/2	.015
		TM5V0T08003B	—	5/16	5/16	3/4	2 1/2	.030
		TM5V0T08003C	—	5/16	5/16	3/4	2 1/2	.060
		TM5V0T08003S	—	5/16	5/16	3/4	2 1/2	—
		TM5V0T10004A	—	3/8	3/8	7/8	2 1/2	.015
		TM5V0T10004B	—	3/8	3/8	7/8	2 1/2	.030
		TM5V0T10004C	—	3/8	3/8	7/8	2 1/2	.060
		TM5V0T10004S	—	3/8	3/8	7/8	2 1/2	—
		TM5V0T13015A	TM5V0T13015AW	1/2	1/2	1 1/4	3	.015
		TM5V0T13015B	TM5V0T13015BW	1/2	1/2	1 1/4	3	.030
		TM5V0T13015C	TM5V0T13015CW	1/2	1/2	1 1/4	3	.060
		TM5V0T13015D	TM5V0T13015DW	1/2	1/2	1 1/4	3	.090
		TM5V0T13015E	TM5V0T13015EW	1/2	1/2	1 1/4	3	.120
		TM5V0T13015S	TM5V0T13015SW	1/2	1/2	1 1/4	3	—

(continued)



(Series 5V0T • VariMill II continued)



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

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

For application data, see page B35.

 ALTIN-MT		 ALTIN-MW		D1	D	length of cut Ap1 max	length L	Re
TM5V0T16006B	TM5V0T16006BW	5/8	5/8	1 1/4	3 1/2	.030		
TM5V0T16006C	TM5V0T16006CW	5/8	5/8	1 1/4	3 1/2	.060		
TM5V0T16006D	TM5V0T16006DW	5/8	5/8	1 1/4	3 1/2	.090		
TM5V0T16006S	TM5V0T16006SW	5/8	5/8	1 1/4	3 1/2	—		
TM5V0T19007B	TM5V0T19007BW	3/4	3/4	1 1/2	4	.030		
TM5V0T19007C	TM5V0T19007CW	3/4	3/4	1 1/2	4	.060		
TM5V0T19007D	TM5V0T19007DW	3/4	3/4	1 1/2	4	.090		
TM5V0T19007E	TM5V0T19007EW	3/4	3/4	1 1/2	4	.120		
TM5V0T19007S	TM5V0T19007SW	3/4	3/4	1 1/2	4	—		
TM5V0T25008B	TM5V0T25008BW	1	1	1 3/4	4 1/2	.030		
TM5V0T25008C	TM5V0T25008CW	1	1	1 3/4	4 1/2	.060		
TM5V0T25008D	TM5V0T25008DW	1	1	1 3/4	4 1/2	.090		
TM5V0T25008E	TM5V0T25008EW	1	1	1 3/4	4 1/2	.120		
TM5V0T25008S	TM5V0T25008SW	1	1	1 3/4	4 1/2	—		

Solid End Milling

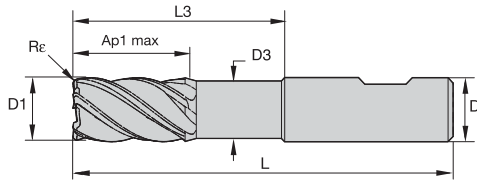
High-Performance Solid Carbide End Mills • VariMill™

Series 5VNS • VariMill II™ • With Neck



Solid End Milling

- Unequal flute spacing.
- Non-center cutting.
- Maximum ramp angle = 3°.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Slotting up to 1 x D.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+ .000 / - .002	≤ 1/8"	0 / .00024
		> 1/8" - 1/4"	0 / .00031
		> 1/4" - 3/8"	0 / .00035
		> 3/8" - 23/32"	0 / .00043
		> 23/32" - 1 3/16"	0 / .00051


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

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


For application data, see page B36.

Series 5VNS • VariMill II • With Neck

				D1	D	D3	length of cut		length		
							Ap1 max	L3	L	Re	
	ALTIN-MT		ALTIN-MW								
	TM5VNS07012A		—	1/4	1/4	.235	1/2	1 1/4	4	.015	
	TM5VNS10014A		—	3/8	3/8	.353	7/8	1 7/8	4	.015	
	TM5VNS13005B		TM5VNS13005BW	1/2	1/2	.470	1 1/4	2 1/4	4	.030	
	TM5VNS16006B		TM5VNS16006BW	5/8	5/8	.590	1 1/4	2 1/4	4	.030	
	TM5VNS19017B		TM5VNS19017BW	3/4	3/4	.705	1 1/2	3 1/4	5 1/2	.030	
	TM5VNS25018B		TM5VNS25018BW	1	1	.940	1 3/4	3 1/4	5 1/2	.030	

Series 5VOS																	
Material Group	A		B														
	ap	ae	ap	ALTIN			Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.										
				Cutting Speed — vc SFM		D1 — Diameter											
					min	max	frac.	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1	
						dec.	.1880	.2500	.3130	.3750	.4380	.5000	.6250	.7500	1.000		
P	1	1.25 x D	0.5 x D	1 x D	490	—	660	IPT	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050
	2	1.25 x D	0.5 x D	1 x D	460	—	620	IPT	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050
	3	1.25 x D	0.5 x D	1 x D	390	—	520	IPT	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	4	1.25 x D	0.5 x D	0.75 x D	300	—	490	IPT	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039
	5	1.25 x D	0.5 x D	1 x D	200	—	330	IPT	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
	6	1.25 x D	0.5 x D	0.75 x D	160	—	250	IPT	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028
M	1	1.25 x D	0.5 x D	1 x D	260	—	330	IPT	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	2	1.25 x D	0.5 x D	1 x D	200	—	260	IPT	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
	3	1.25 x D	0.5 x D	1 x D	200	—	260	IPT	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028
K	1	1.25 x D	0.5 x D	1 x D	390	—	520	IPT	.0014	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050
	2	1.25 x D	0.5 x D	1 x D	360	—	460	IPT	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	3	1.25 x D	0.5 x D	1 x D	330	—	430	IPT	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
S	1	1.0 x D	0.3 x D	0.3 x D	160	—	300	IPT	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	2	1.0 x D	0.3 x D	0.3 x D	70	—	130	IPT	.0006	.0008	.0010	.0012	.0014	.0016	.0018	.0020	.0025
	3	1.25 x D	0.5 x D	1 x D	160	—	260	IPT	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
	4	1.25 x D	0.5 x D	1 x D	150	—	210	IPT	.0008	.0011	.0014	.0017	.0019	.0022	.0025	.0028	.0033
H	1	1.25 x D	0.5 x D	0.75 x D	260	—	460	IPT	.0010	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 5VOT																
Material Group	A		B													
	ap	ae	ap	ALTIN			Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.									
				Cutting Speed — vc SFM		D1 — Diameter										
					min	max	frac.	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1	
						dec.	.2500	.3130	.3750	.4380	.5000	.6250	.7500	1.000		
P	1	1.25 x D	0.5 x D	1 x D	490	—	660	IPT	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050
	2	1.25 x D	0.5 x D	1 x D	460	—	620	IPT	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050
	3	1.25 x D	0.5 x D	1 x D	390	—	520	IPT	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	4	1.25 x D	0.5 x D	0.75 x D	300	—	490	IPT	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039
	5	1.25 x D	0.5 x D	1 x D	200	—	330	IPT	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
	6	1.25 x D	0.5 x D	0.75 x D	160	—	250	IPT	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028
M	1	1.25 x D	0.5 x D	1 x D	260	—	330	IPT	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	2	1.25 x D	0.5 x D	1 x D	200	—	260	IPT	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
	3	1.25 x D	0.5 x D	1 x D	200	—	260	IPT	.0010	.0013	.0015	.0017	.0019	.0022	.0024	.0028
K	1	1.25 x D	0.5 x D	1 x D	390	—	520	IPT	.0018	.0023	.0027	.0031	.0035	.0039	.0043	.0050
	2	1.25 x D	0.5 x D	1 x D	360	—	460	IPT	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	3	1.25 x D	0.5 x D	1 x D	330	—	430	IPT	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
S	1	1.0 x D	0.3 x D	0.3 x D	160	—	300	IPT	.0015	.0020	.0023	.0026	.0029	.0034	.0038	.0046
	2	1.0 x D	0.3 x D	0.3 x D	70	—	130	IPT	.0008	.0010	.0012	.0014	.0016	.0018	.0020	.0025
	3	1.25 x D	0.5 x D	1 x D	160	—	260	IPT	.0012	.0016	.0018	.0021	.0023	.0027	.0030	.0036
	4	1.25 x D	0.5 x D	1 x D	150	—	210	IPT	.0011	.0014	.0017	.0019	.0022	.0025	.0028	.0033
H	1	1.25 x D	0.5 x D	0.75 x D	260	—	460	IPT	.0014	.0018	.0020	.0023	.0026	.0030	.0033	.0039

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 5VNS														
		A		B		ALTIN		Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.						
Material Group		ap	ae	ap	Cutting Speed — vc			D1 — Diameter						
					min		max	frac.	1/4	3/8	1/2	5/8	3/4	1
					SFM		dec.	.2500	.3750	.5000	.6250	.7500	1.000	
P	1	0.75 x D	0.5 x D	0.75 x D	490	-	660	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	460	-	620	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	3	0.75 x D	0.5 x D	0.75 x D	390	-	520	IPT	0.0015	.0023	.0029	.0034	.0038	.0046
	4	0.75 x D	0.5 x D	0.5 x D	300	-	490	IPT	0.0014	.0020	.0026	.0030	.0033	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	-	330	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	6	0.75 x D	0.5 x D	0.5 x D	160	-	250	IPT	.0010	.0015	.0019	.0022	.0024	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	260	-	330	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.5 x D	0.75 x D	200	-	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	-	260	IPT	.0010	.0015	.0019	.0022	.0024	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	-	520	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	360	-	460	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	3	0.75 x D	0.5 x D	0.75 x D	330	-	430	IPT	.0012	.0018	.0023	.0027	.0030	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	160	-	300	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.3 x D	0.3 x D	70	-	130	IPT	.0008	.0012	.0016	.0018	.0020	.0025
	3	0.75 x D	0.5 x D	0.75 x D	160	-	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	4	0.75 x D	0.5 x D	0.75 x D	150	-	210	IPT	.0011	.0017	.0022	.0025	.0028	.0033
H	1	0.75 x D	0.5 x D	0.5 x D	260	-	460	IPT	.0014	.0020	.0026	.0030	.0033	.0039

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust accordingly on >1/2" diameter.

WIN WITH WIDIA™



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

Designed to significantly reduce machining time in aluminum!

- Use only one tool for roughing and finishing operations.
- Slotting is effective up to full, 1 x D axial depth; side milling (profiling) is effective up to 0.5 x D, radial by 1.5 x D axial depth.
- Three-flute series uses unequal flute spacing for chatter-free performance.
- Effective in a full range of machine speeds.
- Multiple corner radii and extended neck configurations are available as standard.

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

WIDIA 

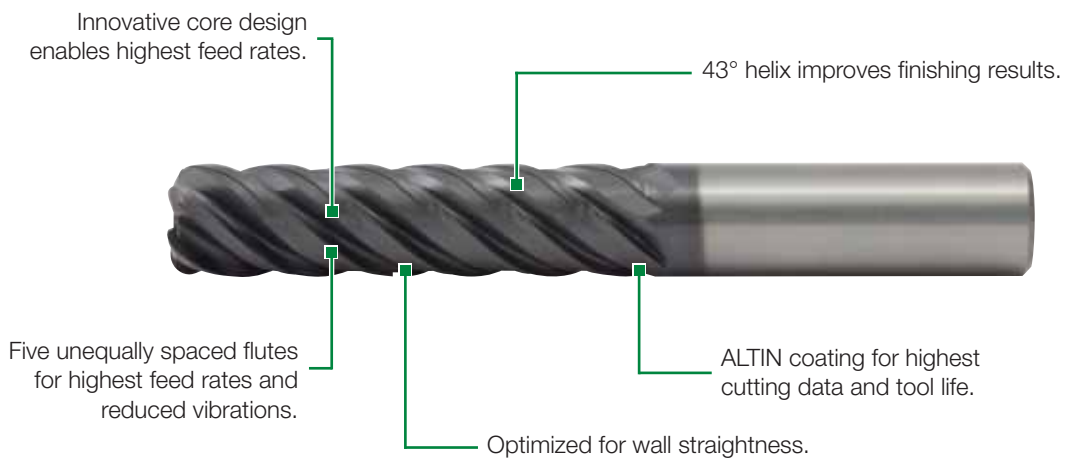
High-Performance Solid Carbide End Mills • **VariMill II™ Long**

Designed to achieve highest surface quality and tool life in titanium, stainless steels, and steels. Innovative core and tool geometry design enable chatter-free corner machining in one pass. VariMill II Long covers 4 x D lengths of cut and semi-finishing and fine finishing operations with radii and sharp corner versions from stock.



VariMill II Long

- Tailored 43° helix improves surface finish.
- Less passes in side milling with 4 x D length of cut capability.
- One tool for semi-finishing and fine-finishing operations.
- No need for feed rate reduction when machining corners.



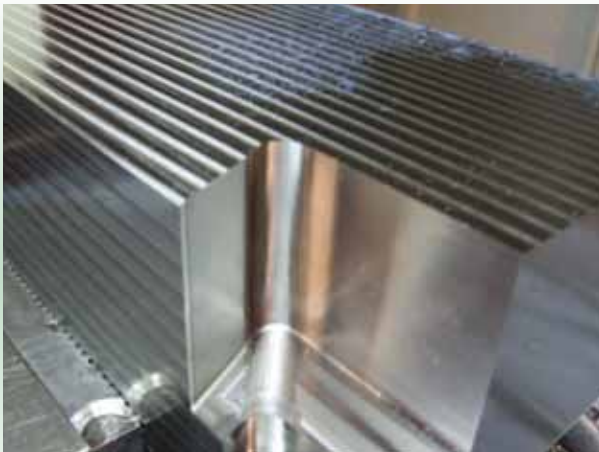
To learn more, **scan here**.
For instructions on how to scan,
please see page xvii.

VariMill II™ Long Series

- Achieve excellent surface finish and outstanding wall straightness.
- Benefit from high accuracy even with thin wall machining.
- Simplify your programming of cavities by keeping the feed rate and radial engagement constant.

5W1S Series

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



Application Example

Side milling 60° angled corner with constant feed rate.

Workpiece material: Titanium 6Al-4V
Tool: D = 5/8"
Cutting data: $a_p = 2.5''$
 $a_e = .02''$
 $vc = 328 \text{ SFM}$
 $fz = .0023 \text{ IPT}$
Result: Surface finish 16 RMS

High-Performance Solid Carbide End Mills • VariMill™

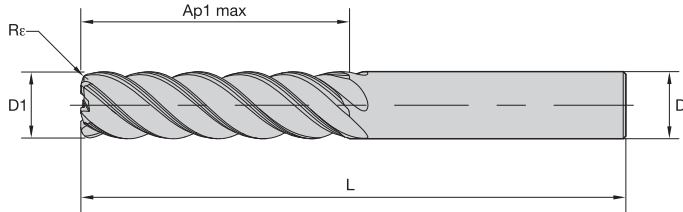
Series 5W1S • VariMill II™ Long • 4 x D Length of Cut



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



Solid End Milling



End Mill Tolerances

D1	Tolerance	D	Tolerance h6 + / -
All	+0.00/- .002"	≤1/8"	+0/- .00024"
		>1/8-1/4"	+0/- .00031"
		>1/4-3/8"	+0/- .00035"
		>3/8-23/32"	+0/- .00043"
		>23/32-1-3/16"	0/.00051"

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

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



Series 5W1S • VariMill II Long • 4 x D Length of Cut



ALTIN-MT	D1	D	length of cut Ap1 max	length L	Re
TM5W1S07002A	1/4	1/4	1	3	.015
TM5W1S07002B	1/4	1/4	1	3	.030
TM5W1S07002S	1/4	1/4	1	3	—
TM5W1S08003A	5/16	5/16	1 1/4	3	.015
TM5W1S08003B	5/16	5/16	1 1/4	3	.030
TM5W1S08003S	5/16	5/16	1 1/4	3	—
TM5W1S10004A	3/8	3/8	1 1/2	4	.015
TM5W1S10004B	3/8	3/8	1 1/2	4	.030
TM5W1S10004C	3/8	3/8	1 1/2	4	.060
TM5W1S10004S	3/8	3/8	1 1/2	4	—
TM5W1S13005A	1/2	1/2	2	5	.015
TM5W1S13005B	1/2	1/2	2	5	.030
TM5W1S13005C	1/2	1/2	2	5	.060
TM5W1S13005S	1/2	1/2	2	5	—
TM5W1S16006A	5/8	5/8	2 1/2	5 1/4	.015
TM5W1S16006B	5/8	5/8	2 1/2	5 1/4	.030
TM5W1S16006C	5/8	5/8	2 1/2	5 1/4	.060
TM5W1S16006D	5/8	5/8	2 1/2	5 1/4	.090
TM5W1S16006E	5/8	5/8	2 1/2	5 1/4	.120
TM5W1S16006S	5/8	5/8	2 1/2	5 1/4	—
TM5W6S19007A	3/4	3/4	3	6	.015
TM5W6S19007B	3/4	3/4	3	6	.030
TM5W6S19007C	3/4	3/4	3	6	.060
TM5W6S19007D	3/4	3/4	3	6	.090
TM5W6S19007E	3/4	3/4	3	6	.120
TM5W6S19007S	3/4	3/4	3	6	—
TM5W6S25028A	1	1	4	7	.015
TM5W6S25028B	1	1	4	7	.030
TM5W6S25028C	1	1	4	7	.060
TM5W6S25028D	1	1	4	7	.090
TM5W6S25028E	1	1	4	7	.120
TM5W6S25028S	1	1	4	7	—

Series 5W1S													
Material Group													
	A		ALTIN-MT		Recommended feed per tooth (IPT=inch/th) for side milling (A).								
	ap ae		Cutting Speed – vc SFM		D1 – Diameter								
					frac.	1/4	5/16	3/8	1/2	5/8	3/4	1	
				dec.	.2500	.3125	.3750	.5000	.6250	.7500	1000		
P	1	Ap1 max	0.05 x D*	990	1320	IPT	.0018	.0023	.0027	.0035	.0039	.0043	.0050
	2	Ap1 max	0.05 x D*	924	1254	IPT	.0018	.0023	.0027	.0035	.0039	.0043	.0050
	3	Ap1 max	0.05 x D*	792	1056	IPT	.0015	.0020	.0023	.0029	.0034	.0038	.0046
	4	Ap1 max	0.05 x D*	594	990	IPT	.0014	.0018	.0020	.0026	.0030	.0033	.0039
	5	Ap1 max	0.05 x D*	396	660	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	6	Ap1 max	0.05 x D*	330	495	IPT	.0010	.0013	.0015	.0019	.0022	.0024	.0028
M	1	Ap1 max	0.05 x D*	594	759	IPT	.0015	.0020	.0023	.0029	.0034	.0038	.0046
	2	Ap1 max	0.05 x D*	396	528	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	3	Ap1 max	0.05 x D*	396	462	IPT	.0010	.0013	.0015	.0019	.0022	.0024	.0028
K	1	Ap1 max	0.05 x D*	792	990	IPT	.0018	.0023	.0027	.0035	.0039	.0043	.0050
	2	Ap1 max	0.05 x D*	726	858	IPT	.0015	.0020	.0028	.0029	.0034	.0038	.0046
	3	Ap1 max	0.05 x D*	660	858	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
S	1	Ap1 max	0.05 x D*	330	594	IPT	.0015	.0020	.0028	.0029	.0034	.0038	.0046
	2	Ap1 max	0.05 x D*	165	264	IPT	.0008	.0010	.0012	.0016	.0018	.0020	.0025
	3	Ap1 max	0.05 x D*	396	528	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	4	Ap1 max	0.05 x D*	330	396	IPT	.0011	.0014	.0017	.0022	.0025	.0028	.0033
H	1	Ap1 max	0.05 x D*	462	528	IPT	.0014	.0018	.0020	.0026	.0030	.0033	.0039

*For the above cutting data, do not exceed an overall ae of .032".

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Solid End Milling

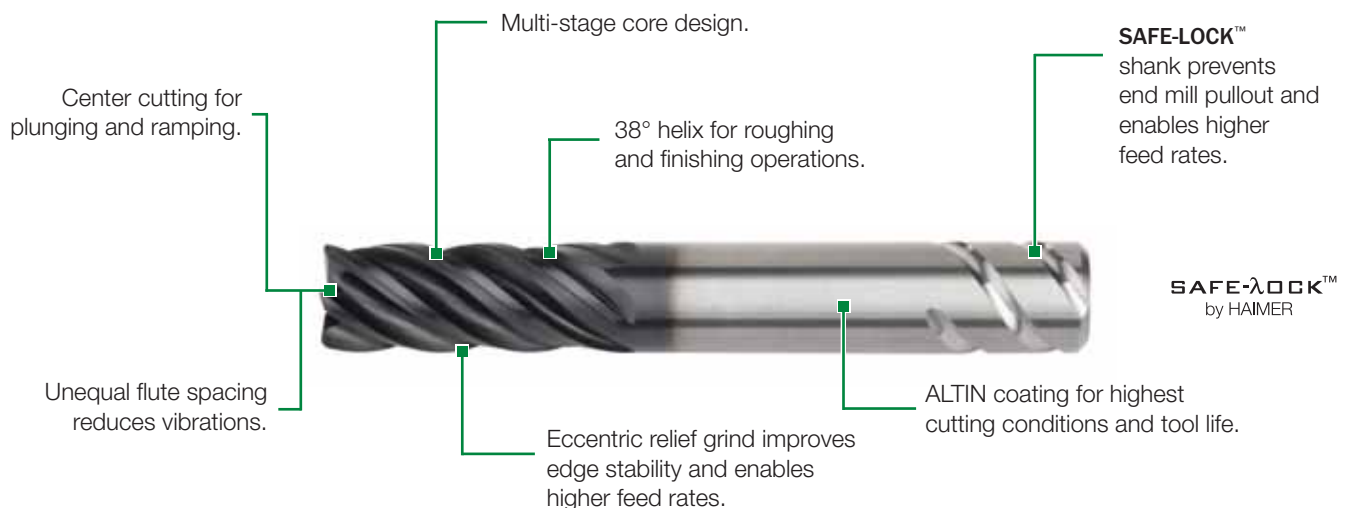
High-Performance Solid Carbide End Mills • **VariMill II™ ER**

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.

5VOE Inch Series

- Extensive radii corner offering.



5VNE Inch Series

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



Application Example

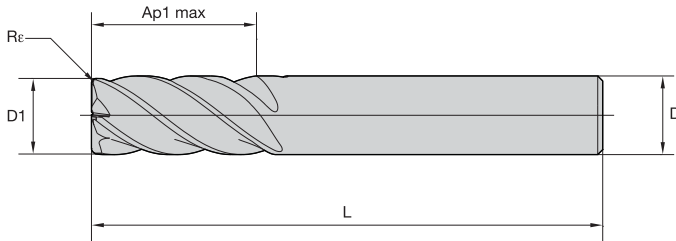
Side milling of INCONEL® 718 component.

Workpiece material: INCONEL 718
 Tool: D = 5/8"
 Cutting data: ap = 1.08"
 ae = .05"
 vc = 65 SFM
 fz = .0019 in/z
 Result: Increased tool life from 2 workpieces to 5

- Unequal flute spacing.
- Center cutting.
- Optimized geometry for titanium machining.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



Solid End Milling



End Mill Tolerances

D1	tolerance	D	tolerance h6 +/-
All	+0.000/-0.002	≤1/8"	0/0.00024
		>1/8-1/4"	0/0.00031
		>1/4-3/8"	0/0.00035
		>3/8-23/32"	0/0.00043
		>23/32-1-3/16"	0/0.00051

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

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

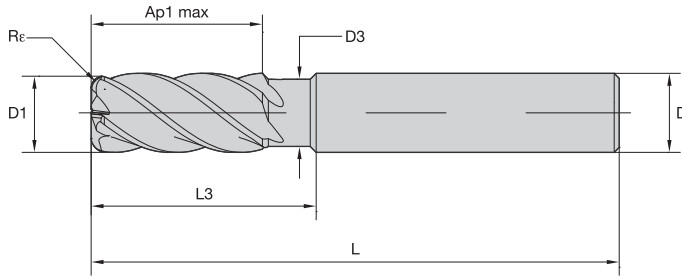
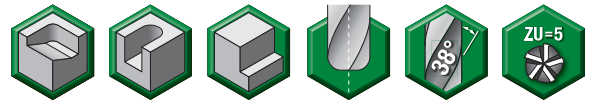
For application data, see page B46.



Series 5V0E • VariMill II ER

ALTIN-MT	ALTIN-MV	ALTIN-MW	D1	D	Ap1 max	L	Re
TM5V0E10004A	–	–	3/8	3/8	7/8	2 1/2	.015
TM5V0E10004B	–	–	3/8	3/8	7/8	2 1/2	.030
TM5V0E10004S	–	–	3/8	3/8	7/8	2 1/2	–
TM5V1E10004A	–	–	3/8	3/8	1	3	.015
TM5V1E10004B	–	–	3/8	3/8	1	3	.030
TM5V1E10004S	–	–	3/8	3/8	1	3	–
–	TM5V0E13015AV	TM5V0E13015AW	1/2	1/2	1 1/4	3	.015
–	TM5V0E13015BV	TM5V0E13015BW	1/2	1/2	1 1/4	3	.030
–	TM5V0E13015CV	TM5V0E13015CW	1/2	1/2	1 1/4	3	.060
–	TM5V0E13015DV	TM5V0E13015DW	1/2	1/2	1 1/4	3	.090
–	TM5V0E13015EV	TM5V0E13015EW	1/2	1/2	1 1/4	3	.120
–	TM5V0E13015SV	TM5V0E13015SW	1/2	1/2	1 1/4	3	–
–	TM5V0E16006BV	TM5V0E16006BW	5/8	5/8	1 1/4	3 1/2	.030
–	TM5V0E16006CV	TM5V0E16006CW	5/8	5/8	1 1/4	3 1/2	.060
–	TM5V0E16006SV	TM5V0E16006SW	5/8	5/8	1 1/4	3 1/2	–
–	TM5V0E19007BV	TM5V0E19007BW	3/4	3/4	1 1/2	4	.030
–	TM5V0E19007CV	TM5V0E19007CW	3/4	3/4	1 1/2	4	.060
–	TM5V0E19007DV	TM5V0E19007DW	3/4	3/4	1 1/2	4	.090
–	TM5V0E19007EV	TM5V0E19007EW	3/4	3/4	1 1/2	4	.120
–	TM5V0E19007SV	TM5V0E19007SW	3/4	3/4	1 1/2	4	–
–	TM5V0E25008BV	TM5V0E25008BW	1	1	1 3/4	4 1/2	.030
–	TM5V0E25008CV	TM5V0E25008CW	1	1	1 3/4	4 1/2	.060
–	TM5V0E25008EV	TM5V0E25008EW	1	1	1 3/4	4 1/2	.120
–	TM5V0E25008FV	TM5V0E25008FW	1	1	1 3/4	4 1/2	.250
–	TM5V0E25008SV	TM5V0E25008SW	1	1	1 3/4	4 1/2	–

- Unequal flute spacing.
- Center cutting.
- Optimized geometry for titanium machining.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 +/-
All	+.000/- .002	≤1/8"	0/.00024
		>1/8-1/4"	0/.00031
		>1/4-3/8"	0/.00035
		>3/8-23/32"	0/.00043
		>23/32-1-3/16"	0/.00051

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

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

For application data, see page B46.



Series 5VNE • VariMill II ER • With Neck

ALTIN-MT	ALTIN-MV	ALTIN-MW	D1	D	D3	Ap1 max	L3	L	R _e
TM5VNE10014A	—	—	3/8	3/8	.353	7/8	1 7/8	4	.015
—	TM5VNE13005BV	TM5VNE13005BW	1/2	1/2	.470	1 1/4	2 1/4	4	.030
—	TM5VNE16006BV	TM5VNE16006BW	5/8	5/8	.588	1 1/4	2 1/4	4	.030
—	TM5VNE19017BV	TM5VNE19017BW	3/4	3/4	.705	1 1/2	3 1/4	5 1/2	.030
—	TM5VNE25018BV	TM5VNE25018BW	1	1	.940	1 3/4	3 1/4	5 1/2	.030

Series 5V0E • VariMill II ER													
Material Group	A		B		ALTIN			Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.					
	ap	ae	ap	min	Cutting Speed — vc SFM		frac. dec.	D1 — Diameter					
						max		3/8	1/2	5/8	3/4	1	
P	1	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0027	.0035	.0039	.0043	.0050
	2	1.5 x D	0.5 x D	1 x D	460	–	620	IPT	.0027	.0035	.0039	.0043	.0050
	3	1.5 x D	0.5 x D	1 x D	390	–	520	IPT	.0023	.0029	.0034	.0038	.0046
	4	1.5 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0020	.0026	.0030	.0033	.0039
	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	.0018	.0023	.0027	.0030	.0036
	6	1.5 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0015	.0019	.0022	.0024	.0028
M	1	1.5 x D	0.5 x D	1 x D	260	–	330	IPT	.0023	.0029	.0034	.0038	.0046
	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0018	.0023	.0027	.0030	.0036
	3	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0015	.0019	.0022	.0024	.0028
K	1	1.5 x D	0.5 x D	1 x D	390	–	520	IPT	.0027	.0035	.0039	.0043	.0050
	2	1.5 x D	0.5 x D	1 x D	360	–	460	IPT	.0023	.0029	.0034	.0038	.0046
	3	1.5 x D	0.5 x D	1 x D	330	–	430	IPT	.0018	.0023	.0027	.0030	.0036
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0023	.0029	.0034	.0038	.0046
	2	1.5 x D	0.3 x D	0.3 x D	70	–	130	IPT	.0012	.0016	.0018	.0020	.0025
	3	1.5 x D	0.5 x D	1 x D	160	–	260	IPT	.0018	.0023	.0027	.0030	.0036
	4	1.5 x D	0.5 x D	1 x D	150	–	210	IPT	.0017	.0022	.0025	.0028	.0033
H	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0020	.0026	.0030	.0033	.0039

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Series 5VNE • VariMill II ER													
Material Group	A		B		ALTIN			Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.					
	ap	ae	ap	min	Cutting Speed — vc SFM		frac. dec.	D1 — Diameter					
						max		3/8	1/2	5/8	3/4	1	
P	1	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0027	.0035	.0039	.0043	.0050
	2	1.5 x D	0.5 x D	1 x D	460	–	620	IPT	.0027	.0035	.0039	.0043	.0050
	3	1.5 x D	0.5 x D	1 x D	390	–	520	IPT	.0023	.0029	.0034	.0038	.0046
	4	1.5 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0020	.0026	.0030	.0033	.0039
	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	.0018	.0023	.0027	.0030	.0036
	6	1.5 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0015	.0019	.0022	.0024	.0028
M	1	1.5 x D	0.5 x D	1 x D	260	–	330	IPT	.0023	.0029	.0034	.0038	.0046
	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0018	.0023	.0027	.0030	.0036
	3	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0015	.0019	.0022	.0024	.0028
K	1	1.5 x D	0.5 x D	1 x D	390	–	520	IPT	.0027	.0035	.0039	.0043	.0050
	2	1.5 x D	0.5 x D	1 x D	360	–	460	IPT	.0023	.0029	.0034	.0038	.0046
	3	1.5 x D	0.5 x D	1 x D	330	–	430	IPT	.0018	.0023	.0027	.0030	.0036
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0023	.0029	.0034	.0038	.0046
	2	1.5 x D	0.3 x D	0.3 x D	70	–	130	IPT	.0012	.0016	.0018	.0020	.0025
	3	1.5 x D	0.5 x D	1 x D	160	–	260	IPT	.0018	.0023	.0027	.0030	.0036
	4	1.5 x D	0.5 x D	1 x D	150	–	210	IPT	.0017	.0022	.0025	.0028	.0033
H	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0020	.0026	.0030	.0033	.0039

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

WIN WITH WIDIA™



X-Feed™ End Mills for High-Feed Milling

Specifically engineered to machine hardened steel up to 67 HRC at extreme speeds and feeds.

- Unique tool with new 6-flute style for high productivity.
- Necked shanks provide extended reach in deep cavities.
- High feed rates, up to .024" per tooth on a 3/4" tool.
- Machine hardened materials at 2–3x the metal removal rate of competitive end mills.
- Wide range of cutting diameters: down to 6mm for small and medium pocket work.
- Innovative new geometry maximizes metal removal rates.
- High metal removal rates lower manufacturing costs.

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

WIDIA 

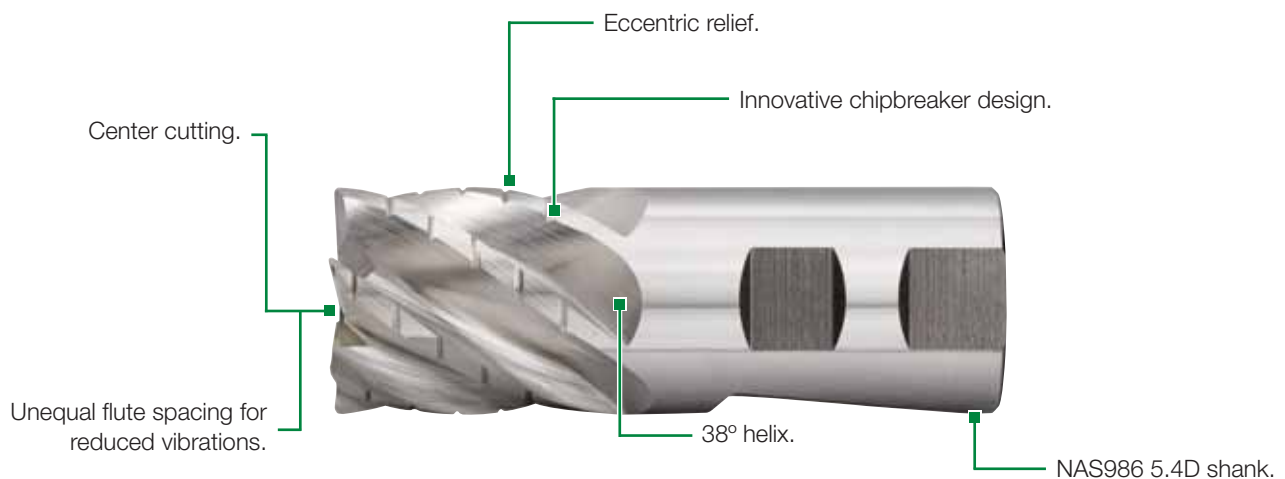
High-Speed Steel ER Rougher

The next generation of premium cobalt HSS Roughers are designed specifically for titanium and stainless steels. They are engineered with an Eccentric Relief (ER) grind to provide a stronger cutting edge that requires less torque to operate. The unique proprietary chipbreaker geometry will break and control the chip, enabling higher metal removal rates and greater productivity. The HSS Rougher offers the best-in-class performance for difficult-to-machine workpiece materials.



HSS ER ROUGHER

- Six-flute design with proprietary chipbreaker providing superior chip control.
- Eccentric relief geometry provides a stronger cutting edge resulting in longer tool life.
- NAS986 5.4D shank adds the flexibility of dual clamping.
- Higher metal removal rates enable productivity with lower tool costs.



High-Speed Steel ER Rougher

- Achieve outstanding tool life results due to unequal flute spacing and eccentric relief reinforcing the cutting edge.
- Benefit from proprietary chipbreaker pattern for improved chip formation.
- Apply at highest feed rates in full slotting, ramping, and side milling due to proprietary core design.

620E Series

- Highest metal removal rates and tool life in:
 - Titanium
 - Stainless steels
- Corner radii.
- Various length of cut.



Application example

Roughing a forged landing gear link.
Gantry-type vertical milling machine.

Workpiece material: Titanium 6Al-4V

Tool: D = 1 1/2"

Cutting data: ap = 3"
ae = 1/4"
vc = 60 SFM
fz = .006 IPT

Result: 20% higher cutting speed
and more than 70% higher feed
per tooth. 110% higher tool
life compared to previous
competitive tool.

High-Performance HSS-E End Mills • Roughing

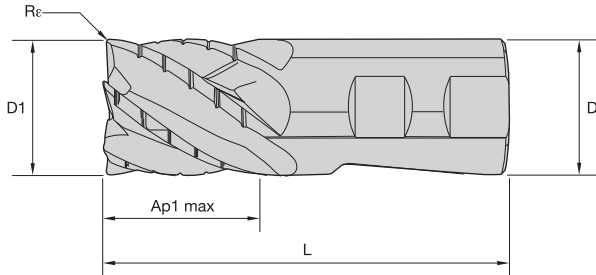
Series 620E • HSS-E ER Rougher • Lists 620E 621E 623E 625E



- Center cutting.
- Premium cobalt HSS.
- Eccentric relief grind with chipbreaker.
- Optimized geometry for titanium machining.



Solid End Milling



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.002/-0.0	All	h6

	M	S
uncoated	●	●

P – Steels

K – Cast Iron

S – High-Temp Alloys

M – Stainless Steels

N – Non-Ferrous

H – Hard Materials

Series 620E • HSS-E ER Rougher • Lists 620E 621E 623E 625E



UNCOATED-W	D1	D	length of cut Ap1 max	length L	Re
620E32009CW	1 1/4	1 1/4	2	4 1/2	.060
620E38009CW	1 1/2	1 1/4	2	4 1/2	.060
620E3800ACW	1 1/2	1 1/2	2	5 1/4	.060
621E32009CW	1 1/4	1 1/4	4	6 1/2	.060
621E38009CW	1 1/2	1 1/4	4	6 1/2	.060
621E3800ACW	1 1/2	1 1/2	4	7 1/4	.060
623E32009CW	1 1/4	1 1/4	3	5 1/2	.060
623E38009CW	1 1/2	1 1/4	3	5 1/2	.060
623E3800ACW	1 1/2	1 1/2	3	6 1/4	.060
625E51022CW	2	2	2	5 3/4	.060
625E51032CW	2	2	3	6 3/4	.060
625E51042CW	2	2	4	7 3/4	.060
625E51062CW	2	2	6	9 3/4	.060

Series 620E • HSS-E ER Rougher • Lists 620E 621E 623E 625E											
Material Group	A		B		Cutting Speed — vc SFM			Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.			
	ap	ae	ap	min	-	max	Uncoated	D1 — Diameter			
								frac.	1 1/4	1 1/2	2
								dec.	1.2500	1.5000	2.0000
M	1	1.5 x D	0.5 x D	1 x D	40	-	60	IPT	0.0052	0.0053	0.0053
	2	1.5 x D	0.5 x D	1 x D	40	-	60	IPT	0.0042	0.0042	0.0043
S	4	1.5 x D	0.5 x D	1 x D	16	-	50	IPT	0.0038	0.0039	0.0039

NOTE: Side milling applications — for longest length tools, reduce ae by 30%.
 Slot milling applications — for longest length tools, reduce ap by 30%.
 Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

Solid End Milling



Indexable Milling

M370 Series • High-Feed Double-Sided Platform	C2–C15
WO.J08	C4–C9
WO.J12	C10–C15
M200 Series • Double-Sided Round Inserts	C16–C33
RN.J10	C18–C23
RN.J12	C24–C29
RN.J16	C30–C32
M100 Series • Positive iC 12 Round Inserts	C34–C39
RD..1204	C36–C39

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.

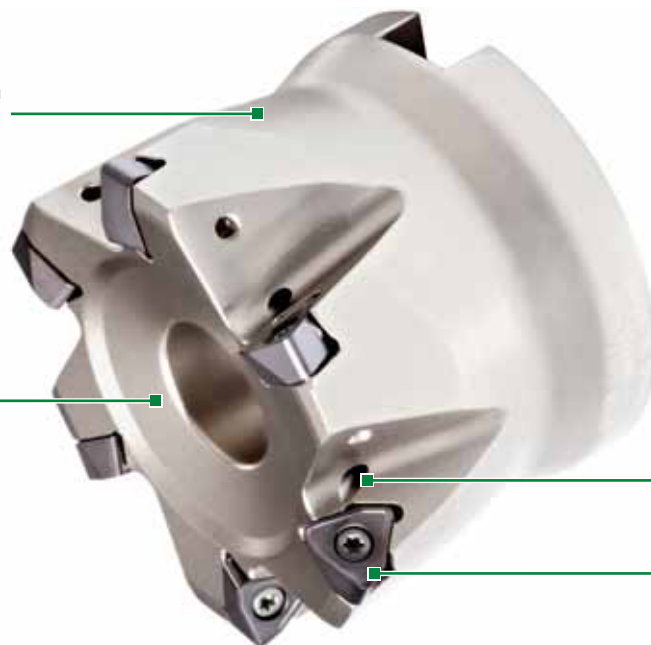
M370

Profiled tool for maximum chip evacuation.

High-strength tool body design.

Through tool coolant.

Six cutting edges per insert.





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



8mm iC Insert WOEJ0804
Up to .049" Ap max
Diameter range 1–3"



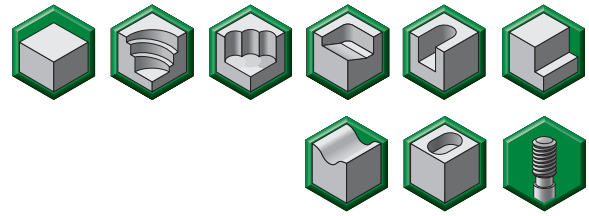
12mm iC Insert WOEJ1207
Up to .078" Ap max
Diameter range 1.5–5"

M370™ Series • Copy Mills

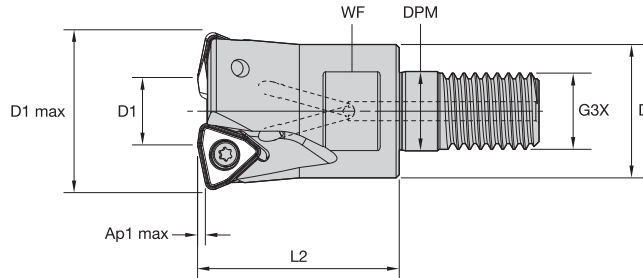
Medium iC • Screw-On End Mills



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



Indexable Milling



■ Screw-On End Mills

order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	lbs
4047591	M370D100Z02M12WO08	1.000	.460	.827	.492	M12	1.250	.669	.049	2	45500	Yes	.19
4171164	M370D100Z03M12WO08	1.000	.460	.827	.492	M12	1.377	.667	.049	3	46000	Yes	.19
4171165	M370D125Z02M16WO08	1.250	.700	1.132	.669	M16	1.500	.940	.049	2	38900	Yes	.41
4047592	M370D125Z03M16WO08	1.250	.700	1.132	.669	M16	1.500	.945	.049	3	38900	Yes	.41
4047653	M370D150Z03M16WO08	1.500	.950	1.142	.669	M16	1.500	.866	.049	3	34500	Yes	.49
4171166	M370D150Z04M16WO08	1.500	.950	1.142	.669	M16	1.500	.945	.049	4	34500	Yes	.48

■ Spare Parts



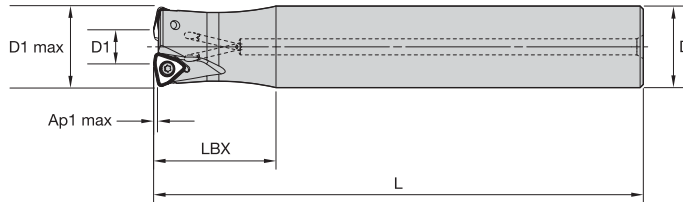
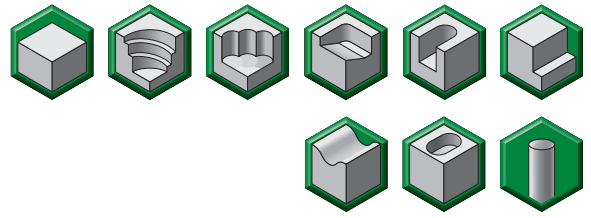
insert screw



Torx Plus driver

D1 max	insert screw	in. lbs.	Torx Plus driver
1.000	MS2219	16	DT9IP
1.250	MS2219	16	DT9IP
1.500	MS2219	16	DT9IP

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



Indexable Milling

■ Cylindrical End Mills

order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
4047654	M370D100Z02C100WO08L600	1.000	.460	1.000	6.000	1.500	.049	2	45500	Yes	1.17
4047655	M370D100Z02C100WO08L800	1.000	.460	1.000	8.000	1.500	.049	2	45500	Yes	1.60
4047656	M370D100Z03C100WO08L600	1.000	.460	1.000	6.000	1.500	.049	3	45500	Yes	1.16
4047657	M370D125Z03C125WO08L600	1.250	.700	1.250	6.000	1.500	.049	3	38900	Yes	1.87
4047658	M370D125Z03C125WO08L800	1.250	.700	1.250	8.000	1.500	.049	3	38900	Yes	2.55
4047659	M370D150Z03C125WO08L600	1.500	.950	1.250	6.000	1.500	.049	3	34500	Yes	1.97
4171167	M370D150Z03C125WO08L800	1.500	.950	1.250	7.686	1.500	.049	3	34500	Yes	5.11
4171168	M370D150Z04C150WO08L600	1.500	.950	1.500	6.000	1.500	.049	4	34500	Yes	2.70

■ Spare Parts



insert
screw
MS2219
MS2219
MS2219



wrench
DT9IP
DT9IP
DT9IP

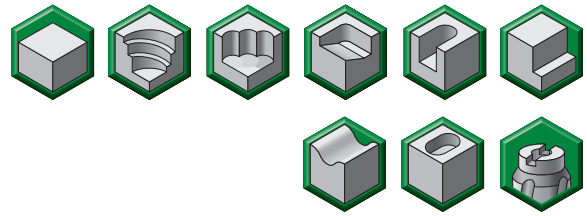
D1 max	in. lbs.
1.000	16
1.250	16
1.500	16

M370™ Series • Copy Mills

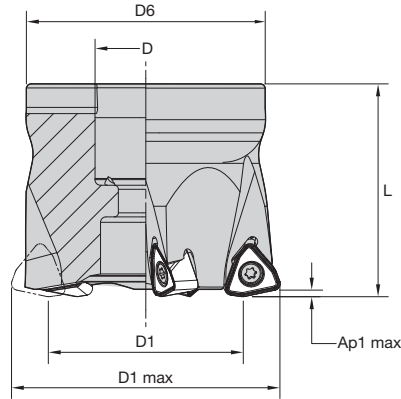
Medium iC • Shell Mills



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



Indexable Milling

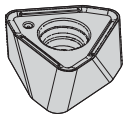


■ Shell Mills

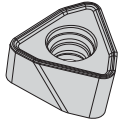
order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4047660	M370D150Z04S050W008	1.500	.950	.500	1.417	1.575	.049	4	34500	Yes	.41
4047661	M370D200Z05S075W008	2.000	1.450	.750	1.732	1.575	.049	5	29000	Yes	.82
4047662	M370D200Z07S075W008	2.000	1.450	.750	1.732	1.575	.049	7	29000	Yes	.83
4171169	M370D250Z07S075W008	2.500	1.950	.750	1.732	1.575	.049	7	29000	Yes	1.42
4171170	M370D300Z08S100W008	3.000	2.270	1.000	2.362	1.968	.049	8	22900	Yes	4.82

■ Spare Parts

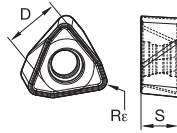
D1 max	insert screw	in. lbs.	Torx Plus driver	socket-head cap screw
1.500	MS2219	16	DT9IP	S424
2.000	MS2219	16	DT9IP	S445
2.500	MS2219	16	DT9IP	S445
3.000	MS2219	16	DT9IP	MS2038



WOEJ-MM



WOEJ-MH



● first choice
○ alternate choice

P	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- -MM geometry provides lower cutting forces. First choice for steel, stainless steel, and high-temp alloys.
- -MH geometry is the first choice for high-strength steel and cast iron.

■ WOEJ-MM

catalog number	cutting edges	D	S	Re	TN5515	TN6520	TN6525	TN6540	TN7535
WOEJ080412SRMM	6	.307	.185	.048	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

■ WOEJ-MH

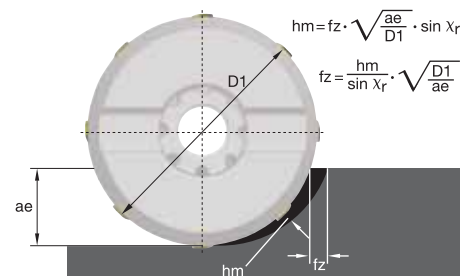
catalog number	cutting edges	D	S	Re	TN5515	TN6520	TN6525	TN6540	TN7535
WOEJ080412SRMH	6	.307	.187	.048	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



		TN5515			TN6520			TN6525			TN6540			TN7535		
Edge Geometry		feed per tooth fz (inch)														
..-MM	..-MH	.014	.031	.059	.014	.031	.059	.014	.031	.059	.014	.035	.063	.014	.035	.063
		.014	.045	.070	.014	.040	.065	.014	.040	.065	.014	.045	.070	.014	.045	.070
Material Group		vc (ft/min)														
P	1	—	—	—	—	—	—	1150	890	750	950	720	620	1180	920	790
	2	—	—	—	—	—	—	790	590	520	660	490	430	820	620	540
	3	—	—	—	—	—	—	660	490	430	560	430	360	690	520	460
	4	—	—	—	—	—	—	690	520	430	560	430	360	710	540	460
	5	—	—	—	—	—	—	560	430	360	460	330	300	590	430	360
	6	—	—	—	750	560	460	750	560	460	620	460	390	790	590	490
	7	—	—	—	560	430	390	560	430	390	460	360	330	590	460	390
	8	—	—	—	490	390	330	490	390	330	430	330	260	520	390	330
	9	—	—	—	430	330	260	430	330	260	360	260	200	460	330	260
	10	—	—	—	560	460	430	560	460	430	460	390	330	590	480	430
	11	—	—	—	390	300	230	390	300	230	330	230	200	390	300	230
	12	—	—	—	—	—	—	720	560	460	590	460	390	750	570	490
	13.1	—	—	—	—	—	—	620	460	390	520	390	330	660	480	390
13.2	—	—	—	—	—	—	310	230	200	260	200	160	330	250	200	
M	14.1	—	—	—	—	—	620	390	300	520	330	230	660	390	300	
	14.2	—	—	—	—	—	490	300	230	430	260	200	520	310	230	
	14.3	—	—	—	—	—	390	230	160	330	200	130	390	230	180	
	14.4	—	—	—	—	—	330	200	130	260	160	130	330	200	150	
K	15	1740	1280	920	1250	920	660	—	—	—	—	—	—	—	—	
	16	1350	1020	750	980	720	560	—	—	—	—	—	—	—	—	
	17	1510	1020	750	1120	720	560	790	590	520	660	490	430	820	620	540
	18	980	720	560	720	520	390	660	490	430	560	430	360	690	520	460
	19	1210	950	720	890	690	520	—	—	—	—	—	—	—	—	—
	20	1020	750	590	720	560	430	—	—	—	—	—	—	—	—	—
N	21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	23	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	29	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S	31	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	36	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	37	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
H	38.1	—	—	—	—	—	—	390	300	230	—	—	—	—	—	—
	38.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	39.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	39.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTE: First choice starting feed (fz) is in **bold** type.
Use corresponding speed (vc).
fz and vc are valid for ae ≥ 0.4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

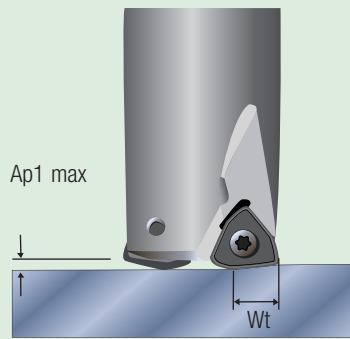
ae/D1 =	0.2	0.3	0.4
fz-Factor	1.5	1.3	1.0
vc-Factor	1.3	1.2	1.1



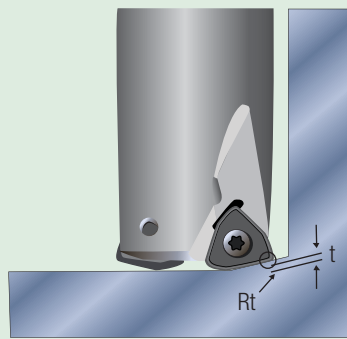


Applying High-Feed Tools

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



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



For CAM programming, the tools can be programmed as a toroidal tool type by using the Rt value as the insert radius.



Recommended when long overhang is necessary due to lower radial forces. Maximum L/D ratio of 10 x D.

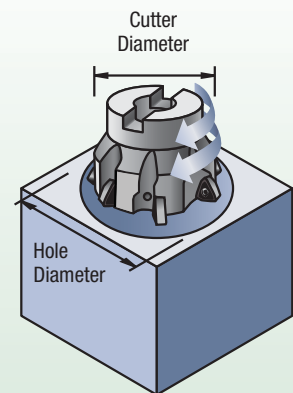
General Programming Information for Applying M370

L/D ratio	starting Ap1	starting fz range
<3	.035"	.04-.051"
>3-<5	.024"	.04-.051"
>5-<7	.016"	.024-.04"

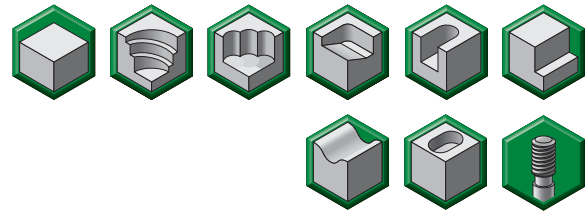
Rt	t	Wt
.10"	.04"	.30"

■ Maximum Linear Ramping and Helical Interpolation from Solid

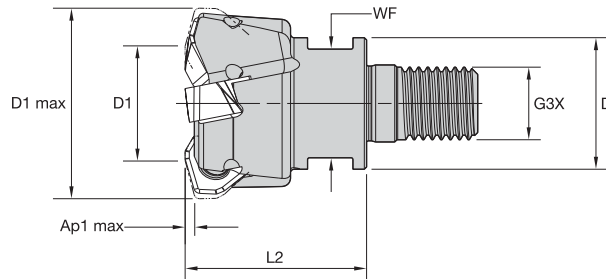
cutter diameter	max linear ramp angle (straight line)	min hole diameter	max hole diameter	Ap1 max per revolution
1.00"	3.1°	1.41"	1.98"	.049"
1.25"	2.2°	1.91"	2.48"	.049"
1.50"	1.8°	2.41"	2.98"	.049"
2.00"	1.3°	3.40"	3.98"	.049"
2.50"	1.0°	4.66"	4.98"	.049"
3.00"	0.8°	5.22"	5.98"	.049"



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



Indexable Milling



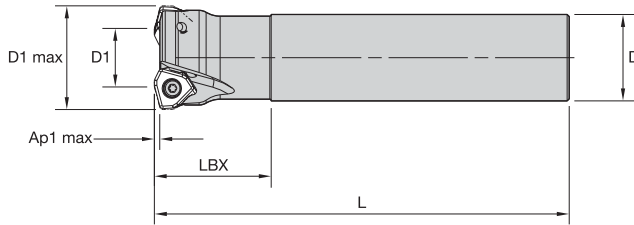
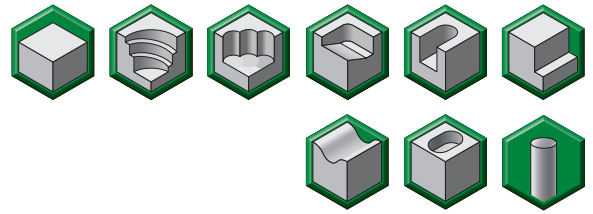
■ Screw-On End Mills

order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	lbs
5352393	M370D150Z02M16WO12	1.500	.837	1.142	.670	M16	1.690	.943	.078	2	22380	Yes	.49

■ Spare Parts

D1 max	insert screw	in. lbs.	Torx Plus driver
1.500	MS2085	35.000	DT15IP

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





Indexable Milling

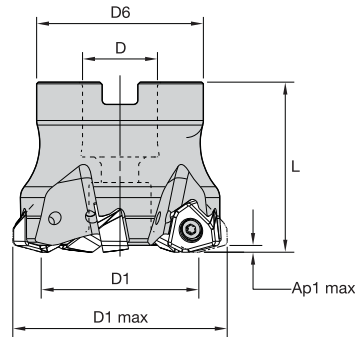
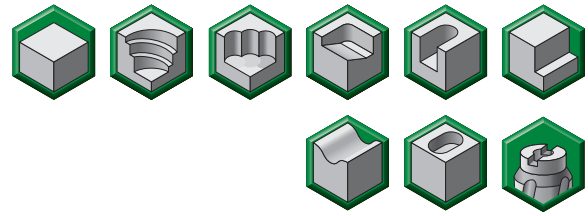
■ Cylindrical End Mills

order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
5352394	M370D150Z02C125WO12L600	1.500	.837	1.250	6.000	1.690	.078	2	22380	Yes	1.92
5352395	M370D150Z02C150WO12L1000	1.500	.837	1.500	10.000	2.500	.078	2	22380	Yes	4.50

■ Spare Parts

D1 max	insert screw	in. lbs.	Torx Plus driver
1.500	 MS2085	35.000	 DT151P

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



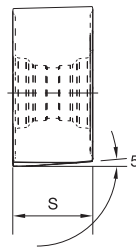
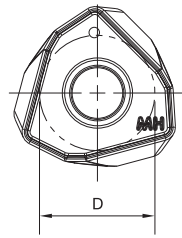
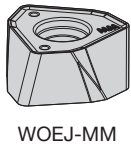
■ Shell Mills

order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
5352396	M370D200Z03S075WO12	2.000	1.335	.750	1.750	1.575	.078	3	19380	Yes	.70
5352397	M370D200Z04S075WO12	2.000	1.335	.750	1.750	1.575	.078	4	19380	Yes	.69
5352398	M370D250Z05S075WO12	2.500	1.834	.750	1.750	1.750	.078	5	17330	Yes	1.06
5352399	M370D250Z05S100WO12	2.500	1.834	1.000	2.190	1.750	.078	5	17330	Yes	1.27
5352420	M370D300Z06S100WO12	3.000	2.333	1.000	2.750	1.750	.078	6	15820	Yes	2.08
5352421	M370D300Z05S125WO12	3.000	2.333	1.250	2.750	2.000	.078	5	15820	Yes	2.30
5352422	M370D300Z06S125WO12	3.000	2.333	1.250	2.750	2.000	.078	6	15820	Yes	2.32
5352423	M370D400Z06S150WO12	4.000	3.333	1.500	3.625	2.000	.078	6	13700	Yes	3.81
5352424	M370D400Z08S150WO12	4.000	3.333	1.500	3.625	2.000	.078	8	13700	Yes	3.85
5352425	M370D500Z07S150WO12	5.000	4.333	1.500	3.810	2.375	.078	7	12260	Yes	6.62
5352426	M370D500Z09S150WO12	5.000	4.333	1.500	3.810	2.375	.078	9	12260	Yes	6.68

■ Spare Parts



D1 max	insert screw	in. lbs.	Torx Plus driver	socket-head cap screw	coolant lock screw assembly
2.000	MS2085	35.000	DT15IP	S445	—
2.500	MS2085	35.000	DT15IP	S445	—
2.500	MS2085	35.000	DT15IP	S458	—
3.000	MS2085	35.000	DT15IP	S458	—
3.000	MS2085	35.000	DT15IP	S467	—
4.000	MS2085	35.000	DT15IP	—	—
5.000	MS2085	35.000	DT15IP	—	S2163C



- 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	○	○	○	○	○

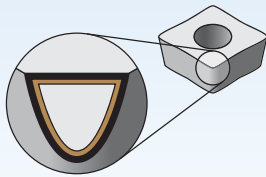
■ WOEJ-MM

catalog number	cutting edges	D	S	Re	W0.J120712SRMM	WK15CM	WP20CM	WP25PM	WP35CM	WU35PM
WOEJ120712SRMM	6	12,00	7,30	1,27	●	●	●	●	●	●

■ WOEJ-MH

catalog number	cutting edges	D	S	Re	W0.J120712SRMH	WK15CM	WP20CM	WP25PM	WP35CM	WU35PM
WOEJ120712SRMH	6	.472	.287	.050	●	●	●	●	●	●

Indexable Milling



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

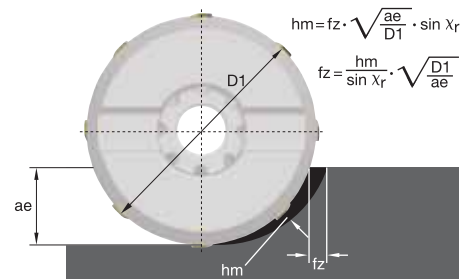
wear resistance ← → toughness

Coating		Grade Description	05 10 15 20 25 30 35 40 45																			
Grade	WK15CM	A multilayered TiN-MT-TiCN-Al ₂ O 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.																				
	WP20CM	WP20CM is a multilayered TiN-MT-TiCN-Al ₂ O 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.																				
	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.																				
	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.																				
	WP35CM	A multilayered TiN-TiCN-Al ₂ O 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.																				

		WK15CM			WP20CM			WP25PM			WU35PM			WP35CM		
Edge Geometry		feed per tooth fz (inch)														
...MM		—	—	—	.015	.030	.069	.015	.031	.069	.015	.035	.069	.015	.035	.069
...MH		.015	.030	.079	.015	.031	.079	.015	.033	.079	.015	.039	.079	.015	.039	.079
Material Group		vc (ft/min)														
P	1	—	—	—	1755	1560	1790	1065	1130	1295	835	900	1035	1790	1560	1445
	2	—	—	—	1755	1560	1790	1065	1130	1295	835	900	1035	1790	1560	1445
	3	—	—	—	1755	1560	1790	1065	1130	1295	835	900	1035	1790	1560	1445
	4	—	—	—	1755	1560	1790	1065	1130	1295	835	900	1035	1790	1560	1445
	5	—	—	—	1755	1560	1790	1065	1130	1295	835	900	1035	1790	1560	1445
	6	—	—	—	1080	1215	1345	785	950	1080	640	755	855	900	1000	1100
	7	—	—	—	1080	1215	1345	785	950	1080	640	755	855	900	1000	1100
	8	—	—	—	1000	1080	1215	705	835	1000	560	670	785	820	900	1000
	9	—	—	—	1000	1080	1215	705	835	1000	560	670	785	820	900	1000
	10	—	—	—	755	835	900	590	740	885	475	590	690	625	690	740
	11	—	—	—	755	835	900	590	740	885	475	590	690	625	690	740
	12	—	—	—	900	985	1080	590	655	740	475	525	590	835	900	1015
	13.1	—	—	—	575	655	755	395	490	655	310	395	525	—	540	625
13.2	—	—	—	575	655	755	395	490	655	310	395	525	—	540	625	
M	14.1	—	—	—	670	785	885	655	705	805	540	590	670	625	720	820
	14.2	—	—	—	490	575	640	375	475	560	310	395	460	460	525	575
	14.3	—	—	—	670	785	885	655	705	805	540	590	670	625	720	820
	14.4	—	—	—	625	705	805	525	625	740	425	525	605	560	640	740
K	15	1345	1510	1655	1425	1280	1150	720	820	900	—	—	—	935	1050	1165
	16	1345	1510	1655	1425	1280	1150	720	820	900	—	—	—	935	1050	1165
	17	1080	1165	1310	1130	1015	920	590	640	705	—	—	—	755	835	920
	18	1080	1165	1310	1130	1015	920	590	640	705	—	—	—	755	835	920
	19	900	985	1100	950	835	785	475	525	590	—	—	—	640	690	770
	20	900	985	1100	950	835	785	475	525	590	—	—	—	640	690	770
N	21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	23	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	29	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S	31	—	—	—	—	—	—	115	150	165	100	115	150	—	—	—
	32	—	—	—	—	—	—	115	150	165	100	115	150	—	—	—
	33	—	—	—	—	—	—	115	150	165	100	115	150	—	—	—
	34	—	—	—	—	—	—	115	165	195	100	150	180	—	—	—
	35	—	—	—	—	—	—	115	165	195	100	150	180	—	—	—
	36	—	—	—	—	—	—	150	195	280	115	180	245	—	—	—
	37	—	—	—	—	—	—	150	195	280	115	180	245	—	—	—
H	38.1	—	—	—	375	460	560	280	360	475	—	—	—	—	—	—
	38.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	39.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	39.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

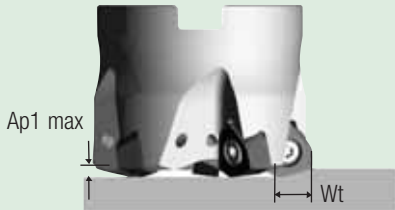
NOTE: First choice starting feed (fz) is in bold type.
 Use corresponding speed (vc).
 fz and vc are valid for ae ≥ 0.4 D1.
 For smaller ae, fz and vc should be multiplied by the factor given below:

ae/D1 =	0.2	0.3	0.4
fz-Factor	1.5	1.3	1.0
vc-Factor	1.3	1.2	1.1

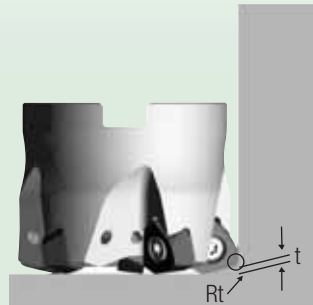


Applying High-Feed Tools

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



Small A_{p1} 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 R_t value as the insert radius.



Recommended when long overhang is necessary due to lower radial forces. Maximum L/D ratio of 10 x D.

Indexable Milling

General Programming Information for Applying M370

	CAM programming information		
	R_t	W_t	t
inch value	0.13	0.37	0.06

■ Maximum Linear Ramping and Helical Interpolation from Solid • Inch

diameter	max ramp angle	max ramp angle for 360° helical interpolation	max plunge depth	min hole diameter (DH min)	max flat-bottom hole diameter (DH1 max)	max diameter (no flat bottom)
1.50	6.4°	1.70°	0.837	1.96	2.26	3.00
2.00	3.6°	1.06°	1.335	2.94	3.26	4.00
2.50	2.5°	0.78°	1.834	3.93	4.26	5.00
3.00	1.9°	0.61°	2.333	4.93	5.26	6.00
4.00	1.3°	0.43°	3.333	6.93	7.26	8.00
5.00	1.0°	0.33°	4.333	8.92	9.26	10.00

Double-Sided Round Insert • M200™ Series

Revolutionary double-sided round insert, capable of running in multiple types of milling operations and workpiece materials, increases customer's productivity with the most efficient cost per edge.

M200

Higher clearance in bodies to permit pocketing, profiling, and 5-axis machining.

Screw-On, end mill, and shell mill cutters with internal coolant.

Three different insert sizes and three insert topography styles with the new WIDIA™ Victory™ milling grades cover any type of component and application.

Easy-to-use and unique anti-rotation feature for excellent stability for higher feed rates and cutting forces.



- 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



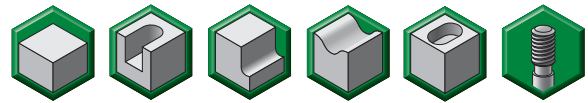
M200 iC 16
16mm iC insert
12 cutting edges

M200™ Series

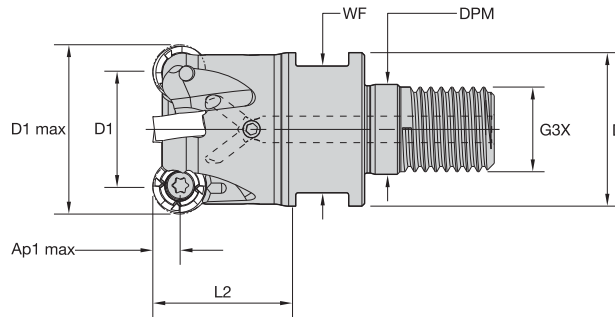
M200 iC 10 • Screw-On End Mills



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



Indexable Milling



■ Screw-On End Mills

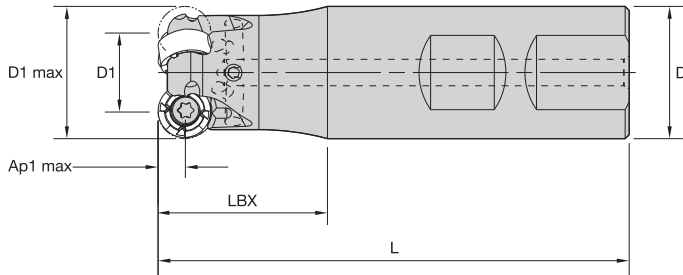
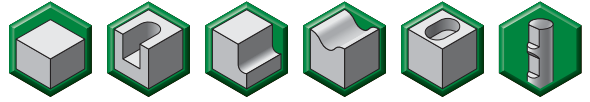
order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	lbs
5283432	M200D100Z03M12RN10	1.000	.606	.827	.490	M12	1.250	.667	.200	3	54200	Yes	.16
5283433	M200D125Z03M16RN10	1.250	.856	1.142	.670	M16	1.500	.943	.200	3	48500	Yes	.37
5283434	M200D125Z04M16RN10	1.250	.856	1.142	.670	M16	1.500	.943	.200	4	48500	Yes	.38
5283435	M200D150Z05M16RN10	1.500	1.106	1.142	.670	M16	1.500	.943	.200	5	44300	Yes	.45

■ Spare Parts



D1 max	insert screw	in. lbs.	Torx driver
1.000	191.848	18	170.025
1.250	191.848	18	170.025
1.500	191.848	18	170.025

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



Indexable Milling

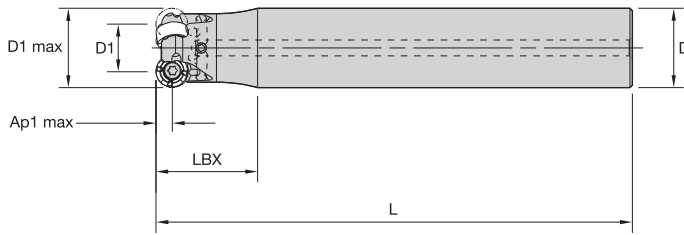
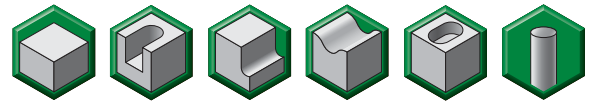
■ **Weldon End Mills**

order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
5283436	M200D100Z03W100RN10	1.000	.606	1.000	4.280	2.000	.200	3	54200.0	Yes	.74
5283437	M200D125Z03W125RN10	1.250	.856	1.250	4.280	2.000	.200	3	48500.0	Yes	1.20

■ **Spare Parts**

D1 max	 insert screw	in. lbs.	 Torx driver
1.000	191.848	18	170.025
1.250	191.848	18	170.025

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



Indexable Milling

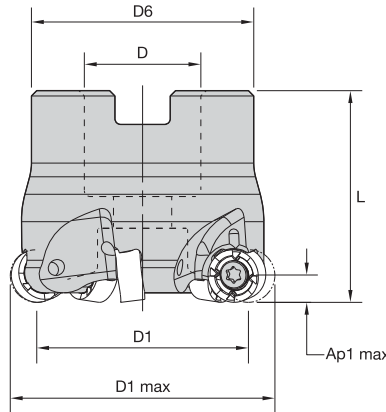
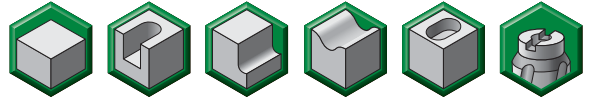
■ Cylindrical End Mills

order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
5283438	M200D100Z03C100RN10L600	1.000	.606	1.000	6.000	1.500	.200	3	54200	Yes	1.15
5283439	M200D100Z03C100RN10L800	1.000	.606	1.000	8.000	1.500	.200	3	54200	Yes	1.58
5283480	M200D125Z03C125RN10L900	1.250	.856	1.250	9.000	1.500	.200	3	48500	Yes	2.85

■ Spare Parts

D1 max	insert screw	in. lbs.	Torx driver
1.000	191.848	18	170.025
1.250	191.848	18	170.025

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






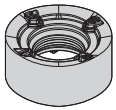
Indexable Milling

■ Shell Mills

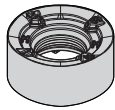
order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
5283481	M200D150Z03S050RN10	1.500	1.106	.500	1.300	1.570	.200	3	44300	Yes	.46
5283482	M200D150Z05S050RN10	1.500	1.106	.500	1.300	1.570	.200	5	44300	Yes	.43
5283483	M200D200Z04S075RN10	2.000	1.606	.750	1.654	2.000	.200	4	38300	Yes	1.04
5283484	M200D200Z06S075RN10	2.000	1.606	.750	1.654	2.000	.200	6	38300	Yes	1.02

■ Spare Parts

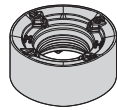
D1 max	 insert screw	in. lbs.	 Torx driver	 socket-head cap screw
1.500	191.848	18	170.025	S422
2.000	191.848	18	170.025	S445



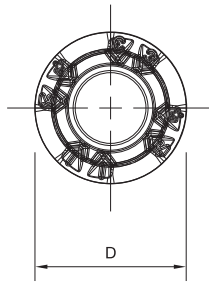
RNGJ-ML



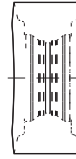
RNGJ-MM
RNPJ-MM



RNPJ-MH



D



S

- -ML geometry is the first choice for stainless steel and high-temp alloys.
- -MM geometry is for general purpose, especially for steel.
- -MH geometry is the first choice for heavy applications, cast iron, and high-strength steel.

● first choice

○ alternate choice

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

■ RNGJ-ML

catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNGJ10T3M0EML	8	.394	.188	○	○	●	●	●

■ RNGJ-MM

catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNGJ10T3M0SMM	8	.394	.188	○	○	●	●	○

■ RNPJ-MM

catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNPJ10T3M0SMM	8	.394	.188	○	○	●	○	●

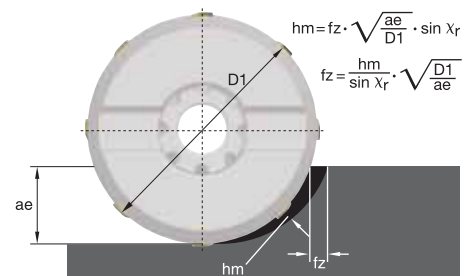
■ RNPJ-MH

catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNPJ10T3M0SMH	8	.394	.187	●	●	●	●	○

Edge Geometry		WK15CM			WP20CM			WP25PM			WU35PM			WP35CM		
		feed per tooth fz (inch)														
..-ML		0.002	0.007	0.007	0.002	0.007	0.008	0.002	0.007	0.008	0.002	0.007	0.008	0.002	0.007	0.008
..-MM		0.005	0.010	0.015	0.005	0.010	0.016	0.005	0.010	0.016	0.005	0.010	0.016	0.005	0.010	0.016
..-MH		0.008	0.011	0.017	0.008	0.011	0.018	0.008	0.011	0.018	0.008	0.011	0.018	0.008	0.011	0.018
Material Group		vc (ft/min)														
P	1	—	—	—	1755	1560	1790	1065	1130	1295	835	900	1035	1790	1560	1445
	2	—	—	—	1755	1560	1790	1065	1130	1295	835	900	1035	1790	1560	1445
	3	—	—	—	1755	1560	1790	1065	1130	1295	835	900	1035	1790	1560	1445
	4	—	—	—	1755	1560	1790	1065	1130	1295	835	900	1035	1790	1560	1445
	5	—	—	—	1755	1560	1790	1065	1130	1295	835	900	1035	1790	1560	1445
	6	—	—	—	1080	1215	1345	785	950	1080	640	755	855	900	1000	1100
	7	—	—	—	1080	1215	1345	785	950	1080	640	755	855	900	1000	1100
	8	—	—	—	1000	1080	1215	705	835	1000	560	670	785	820	900	1000
	9	—	—	—	1000	1080	1215	705	835	1000	560	670	785	820	900	1000
	10	—	—	—	755	835	900	590	740	885	475	590	690	625	690	740
	11	—	—	—	755	835	900	590	740	885	475	590	690	625	690	740
	12	—	—	—	900	985	1080	590	655	740	475	525	590	835	900	1015
	13.1	—	—	—	575	655	755	395	490	655	310	395	525	—	540	625
13.2	—	—	—	575	655	755	395	490	655	310	395	525	—	540	625	
M	14.1	—	—	—	670	785	885	655	705	805	540	590	670	625	720	820
	14.2	—	—	—	490	575	640	375	475	560	310	395	460	460	525	575
	14.3	—	—	—	670	785	885	655	705	805	540	590	670	625	720	820
	14.4	—	—	—	625	705	805	525	625	740	425	525	605	560	640	740
K	15	1345	1510	1655	1425	1280	1150	720	820	900	—	—	—	935	1050	1165
	16	1345	1510	1655	1425	1280	1150	720	820	900	—	—	—	935	1050	1165
	17	1080	1165	1310	1130	1015	920	590	640	705	—	—	—	755	835	920
	18	1080	1165	1310	1130	1015	920	590	640	705	—	—	—	755	835	920
	19	900	985	1100	950	835	785	475	525	590	—	—	—	640	690	770
	20	900	985	1100	950	835	785	475	525	590	—	—	—	640	690	770
N	21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	23	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	29	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S	31	—	—	—	—	—	—	115	150	165	100	115	150	—	—	—
	32	—	—	—	—	—	—	115	150	165	100	115	150	—	—	—
	33	—	—	—	—	—	—	115	150	165	100	115	150	—	—	—
	34	—	—	—	—	—	—	115	165	195	100	150	180	—	—	—
	35	—	—	—	—	—	—	115	165	195	100	150	180	—	—	—
	36	—	—	—	—	—	—	150	195	280	115	180	245	—	—	—
	37	—	—	—	—	—	—	150	195	280	115	180	245	—	—	—
H	38.1	—	—	—	375	460	560	280	360	475	—	—	—	—	—	—
	38.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	39.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	39.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTE: First choice starting feed (fz) is in **bold** type.
Use corresponding speed (vc).
fz and vc are valid for ae ≥ 0.4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

ae/D1 =	0.2	0.3	0.4
fz-Factor	1.5	1.3	1.0
vc-Factor	1.3	1.2	1.1



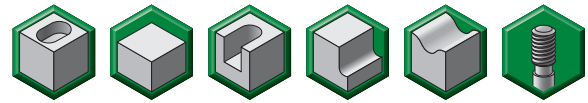
Indexable Milling

M200™ Series • Copy Mills

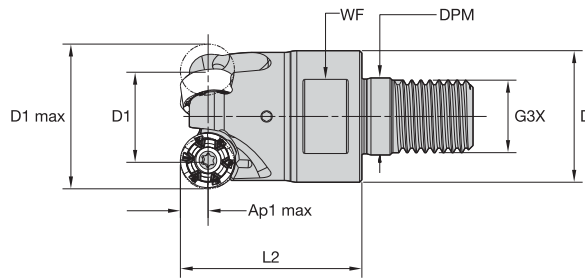
M200 iC 12 • Screw-On End Mills



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



Indexable Milling



■ M200 • Screw-On End Mills

order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	lbs
5068352	M200D125Z03M16RN12	1.250	.778	1.142	.670	M16	1.500	.943	.117	3	39160	Yes	.37
5068370	M200D150Z03M16RN12	1.500	1.028	1.142	.670	M16	1.500	.943	.117	3	35890	Yes	.44
5068371	M200D150Z04M16RN12	1.500	1.028	1.142	.670	M16	1.500	.943	.117	4	35890	Yes	.44

■ Spare Parts



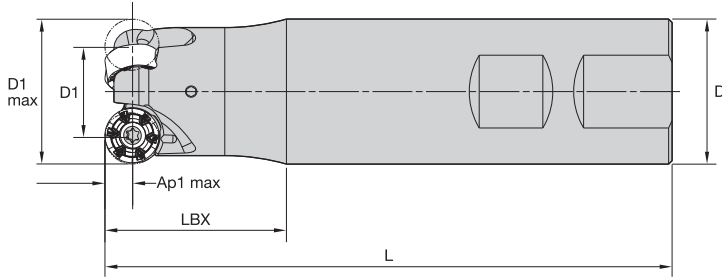
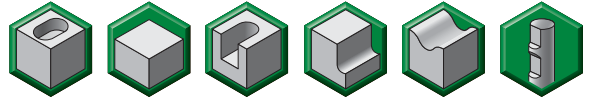
insert
screw



Torx
driver

D1 max	insert screw	in. lbs.	Torx driver
1.250	193.492	35	170.025
1.500	193.492	35	170.025

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



Indexable Milling

■ **M200 • Weldon End Mills**

order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
5068372	M200D125Z02W125RN12	1.250	.778	1.250	3.530	1.250	.117	2	39160.0	Yes	.98

■ **Spare Parts**

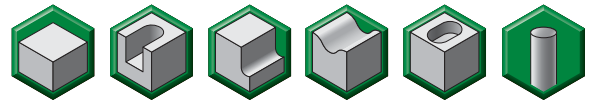
		
D1 max	insert screw	Torx driver
1.250	193.492	170.025
		in. lbs.
		35

M200™ Series • Copy Mills

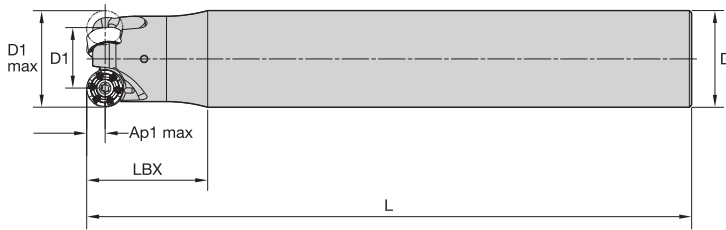
M200 iC 12 • Cylindrical End Mills



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



Indexable Milling



M200 • Cylindrical End Mills

order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
5068374	M200D125Z02C125RN12L900	1.250	.778	1.500	9.000	1.250	.117	2	39160	Yes	2.85
5068400	M200D150Z03C150RN12L900	1.500	1.028	1.500	9.250	1.500	.117	3	35890	Yes	4.21

Spare Parts



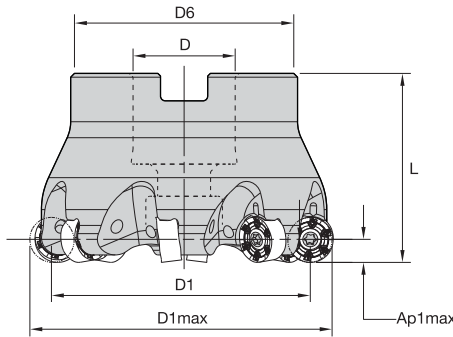
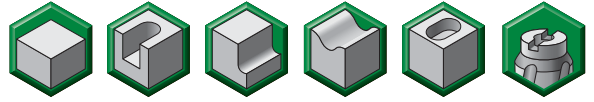
insert screw



Torx driver

D1 max	insert screw	in. lbs.	Torx driver
1.250	193.492	35	170.025
1.500	193.492	35	170.025

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



Indexable Milling

■ **M200 • Shell Mills**

order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
5068401	M200D150Z04S050RN12	1.500	1.028	.500	1.300	1.570	.117	4	35890	Yes	.41
5068402	M200D200Z04S075RN12	2.000	1.528	.750	1.750	2.000	.117	4	31080	Yes	1.02
5068403	M200D200Z05S075RN12	2.000	1.528	.750	1.750	2.000	.117	5	31080	Yes	1.03
5068404	M200D250Z07S075RN12	2.500	2.028	.750	1.750	2.000	.117	7	27800	Yes	1.53
5068405	M200D300Z08S100RN12	3.000	2.528	1.000	2.189	2.000	.117	8	25370	Yes	2.08
5068406	M200D400Z09S150RN12	4.000	3.528	1.500	3.380	2.000	.117	9	21970	Yes	3.95

■ **Spare Parts**



insert screw



wrench

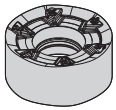


socket-head cap screw

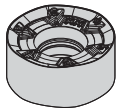
D1 max	insert screw	in. lbs.	wrench	socket-head cap screw
1.500	193.492	35	170.025	S422
2.000	193.492	35	170.025	S445
2.500	193.492	35	170.025	S445
3.000	193.492	35	170.025	S448
4.000	193.492	35	170.025	—

M200™ Series • Copy Mills

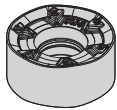
M200 iC 12 • Indexable Inserts • RN.J12..



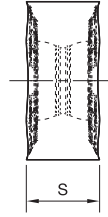
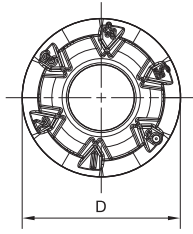
RNGJ-ML



RNGJ-MM
RNPJ-MM



RNGJ-MH
RNPJ-MH



Indexable Milling

- -ML geometry is the first choice for stainless steel and high-temp alloys.
- -MM geometry is for general purpose, especially for steel.
- -MH geometry is the first choice for heavy applications, cast iron, and high-strength steels.

● first choice
○ alternate choice

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

■ RNGJ-ML

catalog number	cutting edges	D	S	WK15PM	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNGJ1204M0EML	12	.472	.187	●	○	○	○	○	○

■ RNGJ-MM

catalog number	cutting edges	D	S	WK15PM	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNGJ1204M0SMM	12	.472	.187	○	○	○	○	○	○

■ RNGJ-MH

catalog number	cutting edges	D	S	WK15PM	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNGJ1204M0SMH	12	.472	.187	○	○	○	○	○	○

■ RNPJ-MM

catalog number	cutting edges	D	S	WK15PM	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNPJ1204M0SMM	12	.472	.187	○	○	○	○	○	○

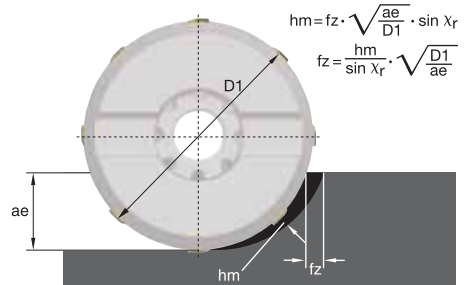
■ RNPJ-MH

catalog number	cutting edges	D	S	WK15PM	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNPJ1204M0SMH	12	.472	.187	○	○	○	○	○	○

Edge Geometry		WK15PM			WK15CM			WP20CM			WP25PM			WU35PM			WP35CM		
		feed per tooth fz (inch)																	
..-ML		0.05	0.09	0.15	0.05	0.09	0.15	0.05	0.09	0.16	0.05	0.09	0.16	0.05	0.09	0.16	0.05	0.09	0.16
..-MM		0.12	0.21	0.35	0.12	0.21	0.33	0.12	0.21	0.35	0.12	0.21	0.35	0.12	0.21	0.35	0.12	0.21	0.35
..-MH		0.20	0.30	0.42	0.20	0.30	0.42	0.20	0.30	0.45	0.20	0.30	0.45	0.20	0.30	0.45	0.20	0.30	0.45
Material Group		vc (ft/min)																	
P	1	—	—	—	—	—	—	535	475	545	325	345	395	255	275	315	545	475	440
	2	—	—	—	—	—	—	535	475	545	325	345	395	255	275	315	545	475	440
	3	—	—	—	—	—	—	535	475	545	325	345	395	255	275	315	545	475	440
	4	—	—	—	—	—	—	535	475	545	325	345	395	255	275	315	545	475	440
	5	—	—	—	—	—	—	535	475	545	325	345	395	255	275	315	545	475	440
	6	—	—	—	—	—	—	330	370	410	240	290	330	195	230	260	275	305	335
	7	—	—	—	—	—	—	330	370	410	240	290	330	195	230	260	275	305	335
	8	—	—	—	—	—	—	305	330	370	215	255	305	170	205	240	250	275	305
	9	—	—	—	—	—	—	305	330	370	215	255	305	170	205	240	250	275	305
	10	—	—	—	—	—	—	230	255	275	180	225	270	145	180	210	190	210	225
	11	—	—	—	—	—	—	230	255	275	180	225	270	145	180	210	190	210	225
	12	—	—	—	—	—	—	275	300	330	180	200	225	145	160	180	255	275	310
	13.1	—	—	—	—	—	—	175	200	230	120	150	200	95	120	160	-	165	190
13.2	—	—	—	—	—	—	175	200	230	120	150	200	95	120	160	-	165	190	
M	14.1	—	—	—	—	—	205	240	270	200	215	245	165	180	205	190	220	250	
	14.2	—	—	—	—	—	150	175	195	115	145	170	95	120	140	140	160	175	
	14.3	—	—	—	—	—	205	240	270	200	215	245	165	180	205	190	220	250	
	14.4	—	—	—	—	—	190	215	245	160	190	225	130	160	185	170	195	225	
K	15	260	295	325	410	460	505	435	390	350	220	250	275	—	—	—	285	320	355
	16	260	295	325	410	460	505	435	390	350	220	250	275	—	—	—	285	320	355
	17	215	225	255	330	355	400	345	310	280	180	195	215	—	—	—	230	255	280
	18	215	225	255	330	355	400	345	310	280	180	195	215	—	—	—	230	255	280
	19	170	190	215	275	300	335	290	255	240	145	160	180	—	—	—	195	210	235
20	170	190	215	275	300	335	290	255	240	145	160	180	—	—	—	195	210	235	
N	21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	23	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	29	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S	31	—	—	—	—	—	—	—	—	—	35	45	50	30	35	45	—	—	—
	32	—	—	—	—	—	—	—	—	—	35	45	50	30	35	45	—	—	—
	33	—	—	—	—	—	—	—	—	—	35	45	50	30	35	45	—	—	—
	34	—	—	—	—	—	—	—	—	—	35	50	60	30	45	55	—	—	—
	35	—	—	—	—	—	—	—	—	—	35	50	60	30	45	55	—	—	—
	36	—	—	—	—	—	—	—	—	—	45	60	85	35	55	75	—	—	—
	37	—	—	—	—	—	—	—	—	—	45	60	85	35	55	75	—	—	—
H	38.1	—	—	—	—	—	—	115	140	170	85	110	145	—	—	—	—	—	—
	38.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	39.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	39.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

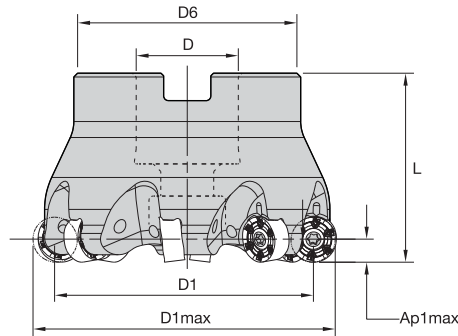
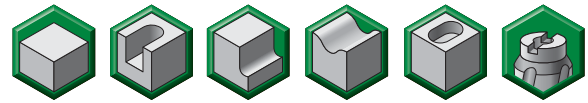
NOTE: First choice starting feed (fz) is in **bold type**.
 Use corresponding speed (vc).
 fz and vc are valid for ae ≥ 0.4 D1.
 For smaller ae, fz and vc should be multiplied by the factor given below:

ae/D1 =	0.2	0.3	0.4
fz-Factor	1.5	1.3	1.0
vc-Factor	1.3	1.2	1.1



Indexable Milling

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



Indexable Milling

■ Shell Mills

order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
5283521	M200D200Z04S075RN16	2.000	1.370	.750	1.752	2.000	.156	4	26400	Yes	.91
5283522	M200D250Z05S100RN16	2.500	1.870	1.000	2.189	2.000	.156	5	22600	Yes	1.51
5283523	M200D300Z05S100RN16	3.000	2.370	1.000	2.189	2.000	.156	5	20100	Yes	2.01
5283524	M200D300Z07S100RN16	3.000	2.370	1.000	2.189	2.000	.156	7	20100	Yes	1.91
5283525	M200D400Z06S150RN16	4.000	3.370	1.500	3.812	2.000	.156	6	16800	Yes	3.96
5283526	M200D400Z08S150RN16	4.000	3.370	1.500	3.812	2.000	.156	8	16800	Yes	4.04

■ Spare Parts



insert screw

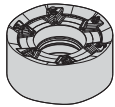


Torx driver

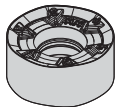


socket-head cap screw

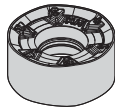
D1 max	insert screw	in. lbs.	Torx driver	socket-head cap screw
2.000	193.343	35	170.025	S445
2.500	193.343	35	170.025	S459
3.000	193.343	35	170.025	S459
4.000	193.343	35	170.025	—



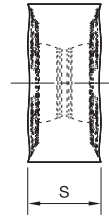
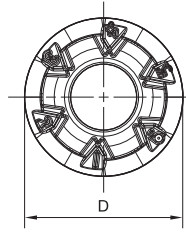
RNGJ-ML



RNPJ-MM



RNPJ-MH



- -ML geometry is the first choice for stainless steel and high-temp alloys.
- -MM geometry is for general purpose, especially for steel.
- -MH geometry is the first choice for heavy applications, cast iron, and high-strength steels.

● first choice
○ alternate choice

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

■ RNGJ-ML

catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNGJ1605M0EML	12	.630	.250	○	○	●	●	●

■ RNPJ-MM

catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNPJ1605M0SMM	12	.630	.250	○	●	●	●	●

■ RNPJ-MH

catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM
RNPJ1605M0SMH	12	.630	.250	●	●	●	●	●

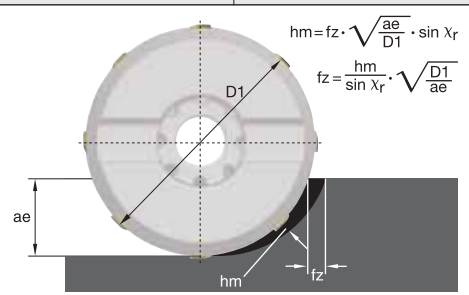
Indexable Milling

Indexable Milling

		WK15CM			WP20CM			WP25PM			WU35PM			WP35CM		
Edge Geometry		feed per tooth fz (inch)														
Material Group		vc (ft/min)														
..-ML	..-ML	0.002	0.007	0.008	0.002	0.007	0.009	0.002	0.007	0.009	0.002	0.007	0.009	0.002	0.007	0.009
	..-MM	0.005	0.010	0.013	0.005	0.010	0.014	0.005	0.010	0.014	0.005	0.010	0.014	0.005	0.010	0.014
	..-MH	0.009	0.012	0.017	0.009	0.012	0.019	0.009	0.012	0.019	0.009	0.012	0.019	0.009	0.012	0.019
P	1	—	—	—	1755	1560	1790	1065	1130	1295	835	900	1035	1790	1560	1445
	2	—	—	—	1755	1560	1790	1065	1130	1295	835	900	1035	1790	1560	1445
	3	—	—	—	1755	1560	1790	1065	1130	1295	835	900	1035	1790	1560	1445
	4	—	—	—	1755	1560	1790	1065	1130	1295	835	900	1035	1790	1560	1445
	5	—	—	—	1755	1560	1790	1065	1130	1295	835	900	1035	1790	1560	1445
	6	—	—	—	1080	1215	1345	785	950	1080	640	755	855	900	1000	1100
	7	—	—	—	1080	1215	1345	785	950	1080	640	755	855	900	1000	1100
	8	—	—	—	1000	1080	1215	705	835	1000	560	670	785	820	900	1000
	9	—	—	—	1000	1080	1215	705	835	1000	560	670	785	820	900	1000
	10	—	—	—	755	835	900	590	740	885	475	590	690	625	690	740
	11	—	—	—	755	835	900	590	740	885	475	590	690	625	690	740
	12	—	—	—	900	985	1080	590	655	740	475	525	590	835	900	1015
	13.1	—	—	—	575	655	755	395	490	655	310	395	525	—	540	625
13.2	—	—	—	575	655	755	395	490	655	310	395	525	—	540	625	
M	14.1	—	—	—	670	785	885	655	705	805	540	590	670	625	720	820
	14.2	—	—	—	490	575	640	375	475	560	310	395	460	460	525	575
	14.3	—	—	—	670	785	885	655	705	805	540	590	670	625	720	820
	14.4	—	—	—	625	705	805	525	625	740	425	525	605	560	640	740
K	15	1345	1510	1655	1425	1280	1150	720	820	900	—	—	—	935	1050	1165
	16	1345	1510	1655	1425	1280	1150	720	820	900	—	—	—	935	1050	1165
	17	1080	1165	1310	1130	1015	920	590	640	705	—	—	—	755	835	920
	18	1080	1165	1310	1130	1015	920	590	640	705	—	—	—	755	835	920
	19	900	985	1100	950	835	785	475	525	590	—	—	—	640	690	770
20	900	985	1100	950	835	785	475	525	590	—	—	—	640	690	770	
N	21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	23	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	29	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S	31	—	—	—	—	—	—	115	150	165	100	115	150	—	—	—
	32	—	—	—	—	—	—	115	150	165	100	115	150	—	—	—
	33	—	—	—	—	—	—	115	150	165	100	115	150	—	—	—
	34	—	—	—	—	—	—	115	165	195	100	150	180	—	—	—
	35	—	—	—	—	—	—	115	165	195	100	150	180	—	—	—
	36	—	—	—	—	—	—	150	195	280	115	180	245	—	—	—
	37	—	—	—	—	—	—	150	195	280	115	180	245	—	—	—
H	38.1	—	—	—	375	460	560	280	360	475	—	—	—	—	—	—
	38.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	39.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	39.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTE: First choice starting feed (fz) is in **bold** type.
 Use corresponding speed (vc).
 fz and vc are valid for ae ≥ 0.4 D1.
 For smaller ae, fz and vc should be multiplied by the factor given below:

ae/D1 =	0.2	0.3	0.4
fz-Factor	1.5	1.3	1.0
vc-Factor	1.3	1.2	1.1



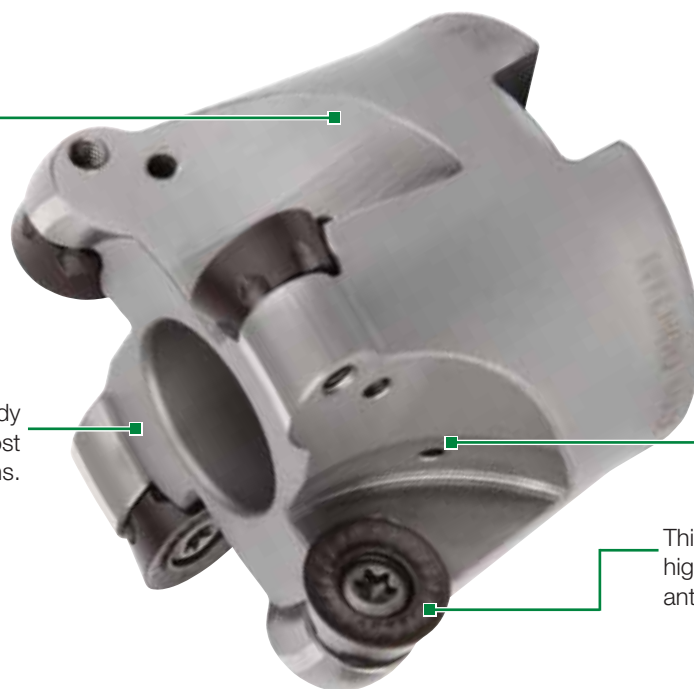
Versatile Platform for All Materials and Applications • **M100™ Series Copy Mills**

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

Large area for
chip evacuation.

Strong and rigid tool body
design for the most
demanding operations.



Through tool coolant.

Thick inserts for reliability and
higher MRR capabilities with
anti-rotation system.



- 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.



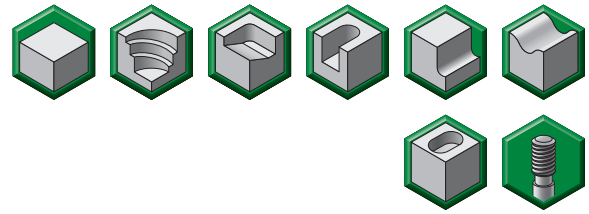
New -MMX geometry

M100™ Series • Copy Mills

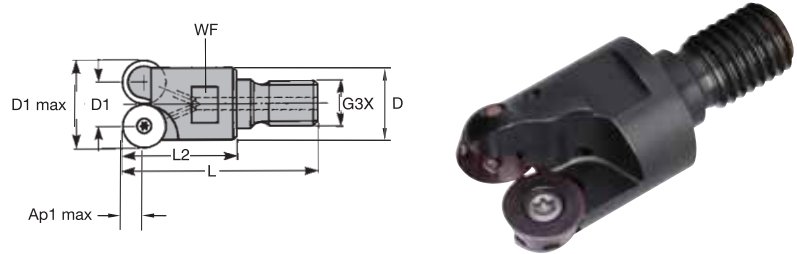
M100 iC 12 • Screw-On End Mills • Weldon® End Mills



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

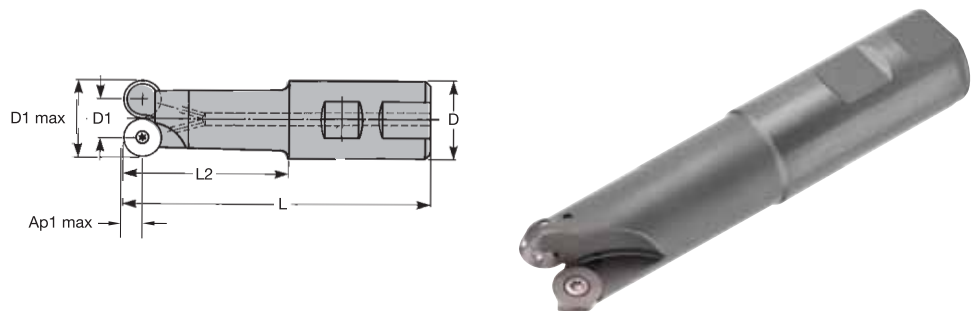
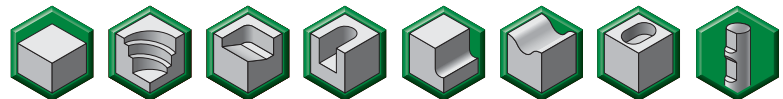


Indexable Milling



■ Screw-On End Mills

order number	catalog number	D1 max	D1	D	G3X	L	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646609	M100D100Z02M12RD12	1.000	.528	.827	M12	2.366	1.500	.750	.236	2	50.0°	23000	Yes	.44
2646615	M100D125Z02M16RD12	1.250	.778	1.142	M16	2.715	1.750	1.000	.236	2	23.0°	19000	Yes	.66
2646620	M100D150Z02M16RD12	1.500	1.028	1.142	M16	2.715	1.750	1.000	.236	3	27.0°	17000	Yes	.71



■ Weldon End Mills

order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646610	M100D100Z02W100RD12	1.000	.528	1.000	4.780	2.500	.236	2	50.0°	23000	Yes	1.00
2646611	M100D100Z02W100RD12L553	1.000	.528	1.000	5.530	3.250	.236	2	50.0°	23000	Yes	1.25
2646612	M100D100Z02W125RD12	1.000	.528	1.250	6.400	4.120	.236	2	50.0°	23000	Yes	1.60
2646613	M100D100Z02W125RD12L705	1.000	.528	1.250	7.050	4.870	.236	2	50.0°	23000	Yes	1.75
2646614	M100D100Z02W125RD12L715	1.000	.528	1.250	7.150	4.870	.236	2	50.0°	23000	Yes	1.75
2646616	M100D125Z02W125RD12	1.250	.778	1.250	5.400	3.120	.236	2	23.0°	19000	Yes	1.40
2646617	M100D125Z02W125RD12L615	1.250	.778	1.250	6.150	3.870	.236	2	23.0°	19000	Yes	1.60
2646618	M100D125Z02W150RD12	1.250	.778	1.500	7.250	4.560	.236	2	23.0°	19000	Yes	2.10
2646619	M100D125Z02W150RD12L800	1.250	.778	1.500	8.000	5.310	.236	2	23.0°	19000	Yes	2.50
2646621	M100D150Z03W125RD12	1.500	1.028	1.250	5.650	3.370	.236	3	27.0°	17000	Yes	1.80
2646622	M100D150Z03W125RD12L715	1.500	1.028	1.250	7.150	4.870	.236	3	27.0°	17000	Yes	2.25

■ Spare Parts



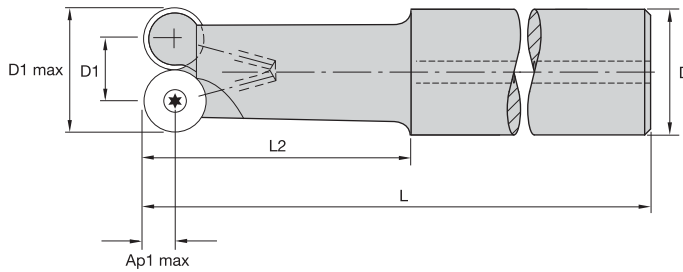
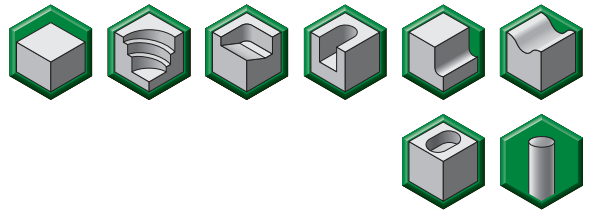
insert screw



Torx driver

D1 max	insert screw	in. lbs.	Torx driver
1.000	12148038800	27	1214800600
1.250	12148038800	27	1214800600
1.500	12148038800	27	1214800600

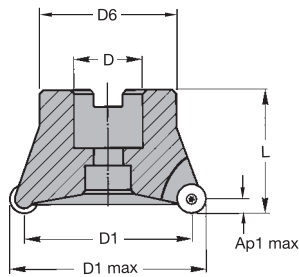
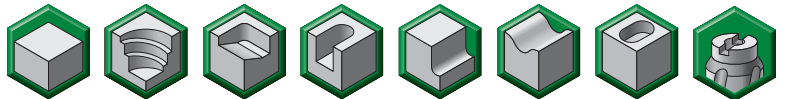
- General-purpose face and copy milling.
- Excellent variety of grades and geometries available.
- Anti-rotation feature for top security.



Indexable Milling

■ Cylindrical End Mills

order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646607	M100D100Z02C100RD12L478	1.000	.528	1.000	4.780	2.500	.236	2	50.0°	23000	Yes	1.00
2646608	M100D100Z02C125RD12L715	1.000	.528	1.250	7.150	4.870	.236	2	50.0°	23000	Yes	1.60



■ Shell Mills

order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646724	M100D200Z04S075RD12	2.000	1.530	.750	1.700	1.630	.236	4	10.0°	15000	Yes	.55
2646725	M100D200Z05S075RD12	2.000	1.530	.750	1.700	1.630	.236	5	10.0°	15000	Yes	.55
2646728	M100D250Z06S100RD12	2.500	2.028	1.000	2.200	1.750	.236	6	8.0°	14000	Yes	1.05
2646732	M100D300Z07S100RD12	3.000	2.528	1.000	2.300	2.000	.236	7	5.0°	12000	Yes	1.65

■ Spare Parts



insert screw



Torx driver

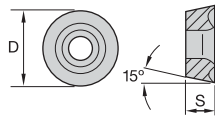
D1 max	insert screw	in. lbs.	Torx driver
1.000	12148038800	27	12148000600
2.000	12148038800	27	12148000600
2.500	12148038800	27	12148000600
3.000	12148038800	27	12148000600



RDHT-TX



RDHW-ML
RDHW-MH



● first choice
○ alternate choice

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

Indexable Milling

■ RDHT-TX

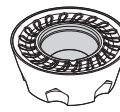
catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDHT1204M0TX	.472	.188	.005				●	

■ RDHW-ML

catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDHW1204M0ML	.472	.188	.004	●				

■ RDHW-MH

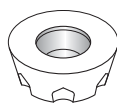
catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDHW1204M0MH	.472	.188	.006	●				



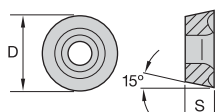
RDPT-MMX



RDMT-TX



RDMW-TX



■ RDPT-MMX

catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDPT1204M0SMMX	.472	.187	.007			●		●

■ RDMT-TX

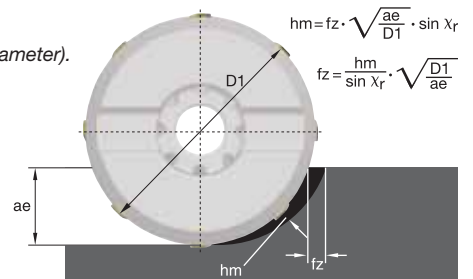
catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDMT1204M0TX	.472	.188	.006	●	●	●	●	●

■ RDMW-TX

catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535
RDMW1204M0TX	.472	.188	.006	●		●	●	●

		TN2510			TN6525			TN6540			TN7525			TN7535		
Edge Geometry		feed per tooth fz (inch)														
..ML		.0031	.0055	.0063				.0043	.0095	.0130	.0031	.0069	.0094	.0039	.0087	.0118
..MOTX		.0031	.0069	.0094	.0032	.0071	.0097									
..MH		.0031	.0069	.0094												
..MMX								.0039	.0095	.0157						
Material Group		vc (ft/min)														
P	1	1280	950	820	1150	850	750	950	720	620	1350	1050	920	1180	920	790
	2	850	660	590	790	590	520	660	490	430	950	720	620	820	620	540
	3	720	590	460	660	520	430	560	430	360	790	590	520	690	520	460
	4	720	590	460	660	520	430	560	430	360	820	620	520	710	540	460
	5	620	430	390	560	390	360	460	330	300	690	490	430	590	430	360
	6	820	620	490	750	560	460	620	460	390	920	690	560	790	590	490
	7	620	460	430	560	430	390	460	360	330	690	520	460	590	460	390
	8	590	430	360	520	390	330	430	330	260	590	460	390	520	390	330
	9	460	360	260	430	330	230	360	260	200	520	390	300	460	330	260
	10	620	490	430	560	460	390	460	390	330	690	560	490	590	480	430
	11	430	300	260	390	260	230	330	230	200	460	330	260	390	300	230
	12	790	720	490	720	560	460	590	460	390	850	660	560	750	570	490
	13.1	690	490	430	620	460	390	520	390	330	750	560	460	660	480	390
13.2	360	260	230	330	230	200	260	200	160	390	300	230	330	250	200	
M	14.1	—	—	—	750	620	430	620	520	360	920	750	520	790	660	460
	14.2	—	—	—	590	590	390	490	490	330	720	690	460	620	610	410
	14.3	—	—	—	430	430	330	360	360	260	520	520	360	460	440	310
	14.4	—	—	—	390	330	230	330	260	200	460	390	260	390	330	230
K	15	1510	1120	920	—	—	—	—	—	—	—	—	—	—	—	—
	16	1150	850	720	—	—	—	—	—	—	—	—	—	—	—	—
	17	1280	920	750	790	590	520	660	490	430	—	—	—	790	590	520
	18	920	560	460	660	520	430	560	430	360	—	—	—	660	520	430
	19	1280	750	620	—	—	—	—	—	—	—	—	—	—	—	—
	20	1020	620	520	—	—	—	—	—	—	—	—	—	—	—	—
N	21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	23	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	29	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S	31	—	—	—	—	—	—	200	160	150	—	—	—	—	—	—
	32	—	—	—	—	—	—	160	130	110	—	—	—	—	—	—
	33	—	—	—	—	—	—	110	80	70	—	—	—	—	—	—
	34	—	—	—	—	—	—	100	70	50	—	—	—	—	—	—
	35	—	—	—	—	—	—	100	70	50	—	—	—	—	—	—
	36	—	—	—	—	—	—	260	160	130	—	—	—	—	—	—
	37	—	—	—	—	—	—	230	150	110	—	—	—	—	—	—
H	38.1	950	790	660	—	—	—	—	—	—	—	—	—	—	—	—
	38.2	790	660	520	—	—	—	—	—	—	—	—	—	—	—	—
	39.1	590	490	390	—	—	—	—	—	—	—	—	—	—	—	—
	39.2	390	330	230	—	—	—	—	—	—	—	—	—	—	—	—

NOTE: First choice starting feed (fz) is in **bold** type. Use corresponding speed (vc).
 fz is valid for face milling with width of cut (ae) ≥ 0.4 D1 and Ap1 max.
 For smaller ae and ap, use the given correction factors (D = diameter of insert, D1 = cutter diameter).



ae/D1 =	0.2	0.3	0.4
fz-Factor	1.5	1.3	1.0
vc-Factor	1.3	1.2	1.1



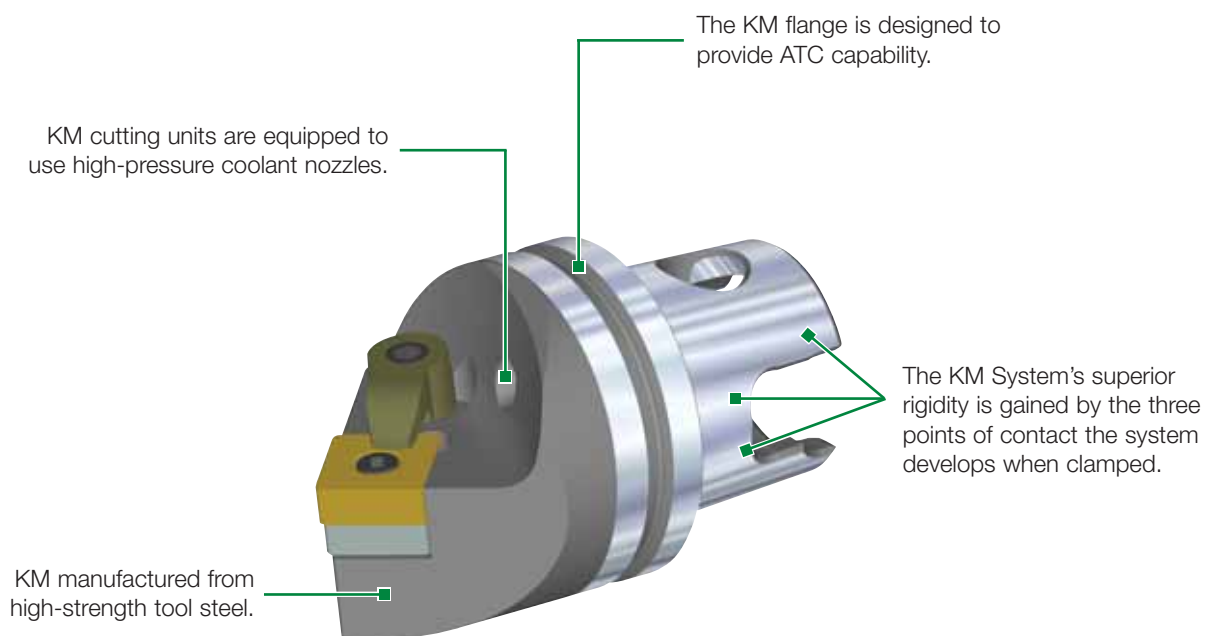
Tooling Systems

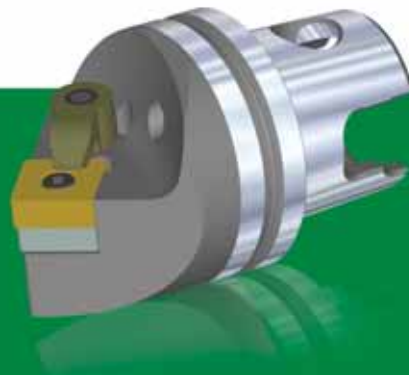
KM32TS Series .....	.D2-D21
KM4X 100 .....	.D22-D55
Automatic Clamping Units .....	.D24-D25
Cutting Units .....	.D26-D37
Shank Tools .....	.D38-D51
Technical Information .....	.D53-D55
SAFE-LOCK™ Shrink Fit Toolholders .....	.D56-D68
HSK63A Series .....	.D70-D74

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

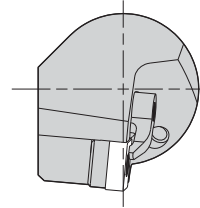
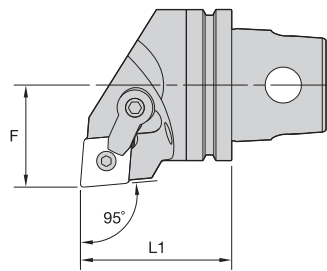




- KM™ is an ISO standard (ISO 26622).
- KM clamping units provide a 4:1 mechanical advantage.
- KM cutting units are capable of 100 bar (1,500 psi) coolant pressure.



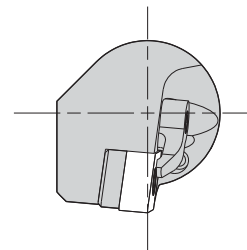
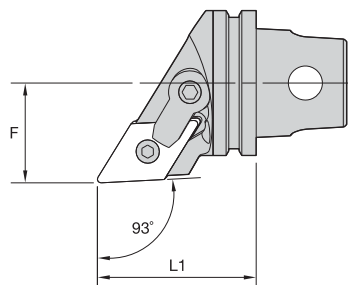
Tooling Systems



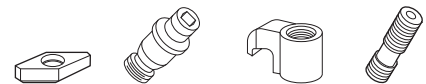
■ MCLN 95°



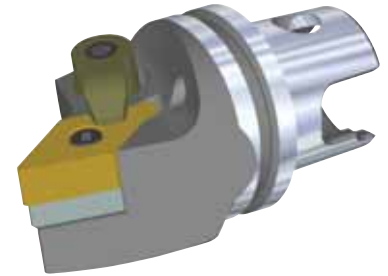
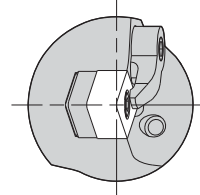
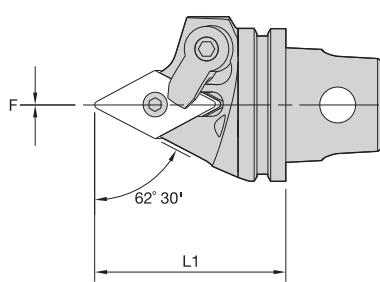
order number	catalog number	L1		F		gage insert	shim	lock pin	clamp	clamp screw
		mm	in	mm	in					
1023224	KM32TSMCLNR12	35	1.378	22	.866	CN..120408/CN..432	ICSN432	KLM46	CKM20LP	STCM11
1023228	KM32TSMCLNL12	35	1.378	22	.866	CN..120408/CN..432	ICSN432	KLM46	CKM20LP	STCM11



■ MDJN 93°



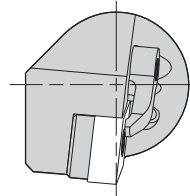
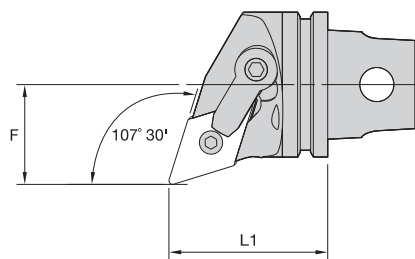
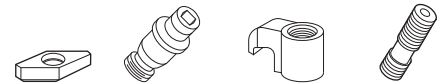
order number	catalog number	L1		F		gage insert	shim	lock pin	clamp	clamp screw
		mm	in	mm	in					
3095644	KM32TSMDJNR1504	35	1.378	22	.866	DN..150408/DN..432	IDSN442	KLM46L	CKM20LP	STCM11
1023232	KM32TSMDJNR1506	35	1.378	22	.866	DN..150608/DN..442	IDSN432	KLM46L	CKM20LP	STCM11
3095643	KM32TSMDJNL1504	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



Tooling Systems

■ MDPN 62° 30'

order number	catalog number	L1		F		gage insert	shim	lock pin	clamp	clamp screw
		mm	in	mm	in					
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



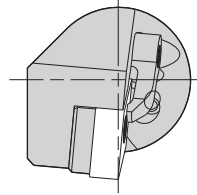
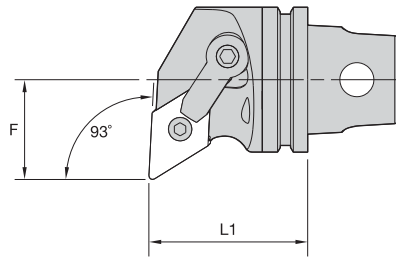
■ MDQN 107° 30'

order number	catalog number	L1		F		gage insert	shim	lock pin	clamp	clamp screw
		mm	in	mm	in					
	right hand									
1023233	KM32TSMQNR1506	35	1.378	22	.866	DN..150608/DN..442	IDSN432	KLM46L	CKM23LP	STCM11
	left hand									
1023276	KM32TSMQNL1506	35	1.378	22	.866	DN..150608/DN..442	IDSN432	KLM46L	CKM23LP	STCM11



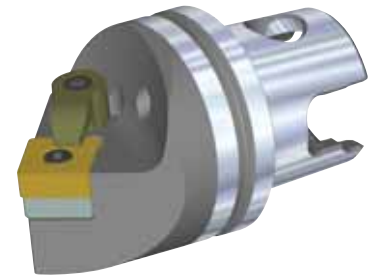
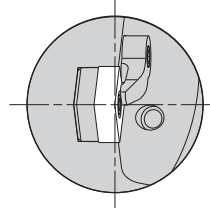
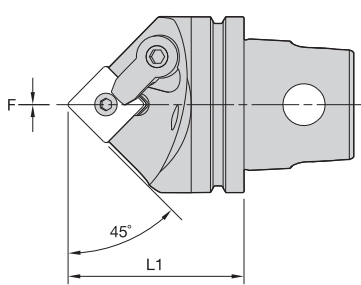


Tooling Systems



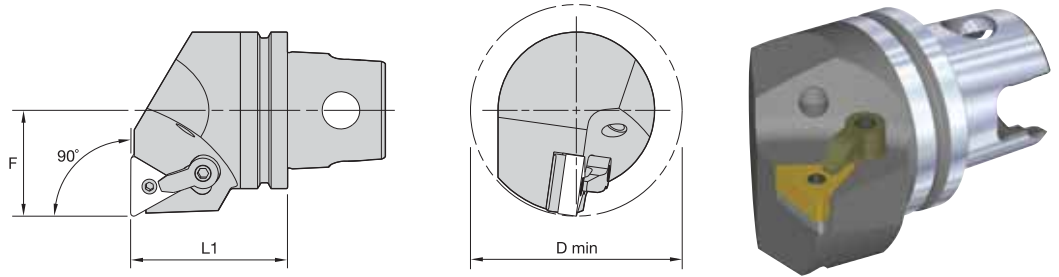
■ MDUN 93°

order number	catalog number	L1		F		gage insert	shim	lock pin	clamp	clamp screw
		mm	in	mm	in					



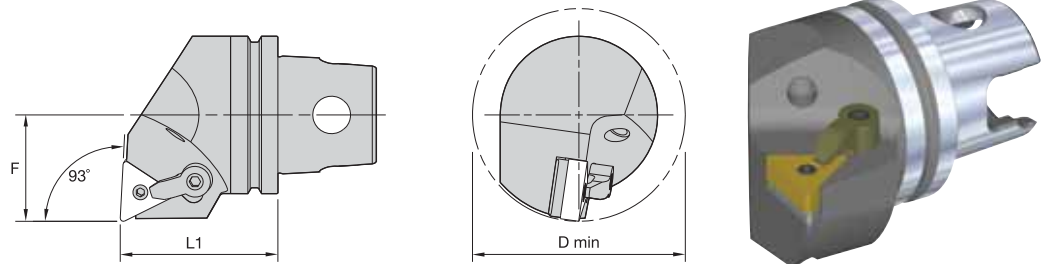
■ MSDN 45°

order number	catalog number	L1		F		gage insert	shim	lock pin	clamp	clamp screw
		mm	in	mm	in					
1144875	KM32TSMDDNN12	40	1.575	0	.000	SN..120408/SN..432	ISSN432	KLM46	CKM20LP	STCM11



■ MTFN 90°

order number	catalog number	L1		F		D min		gage insert	shim	lock pin	clamp	clamp screw
		mm	in	mm	in	mm	in					
1023281	KM32SMTFNL16	35	1.378	22	.866	44	1.732	TN..160408/TN..332	ITSN322	KLM34L	CKM7LP	STCM9

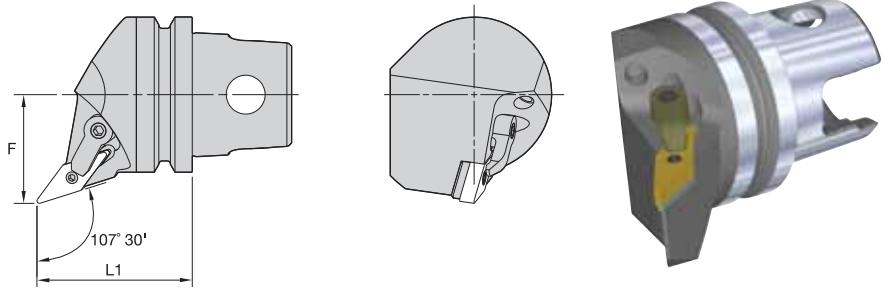


■ MTUN 93°

order number	catalog number	L1		F		D min		gage insert	shim	lock pin	clamp	clamp screw
		mm	in	mm	in	mm	in					
1144903	KM32SMTUNR16	35	1.378	22	.866	44	1.732	TN..160408/TN..332	ITSN322	KLM34L	CKM7LP	STCM9

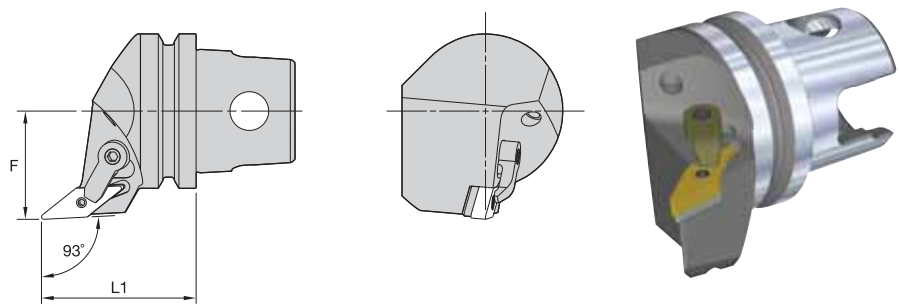


Tooling Systems



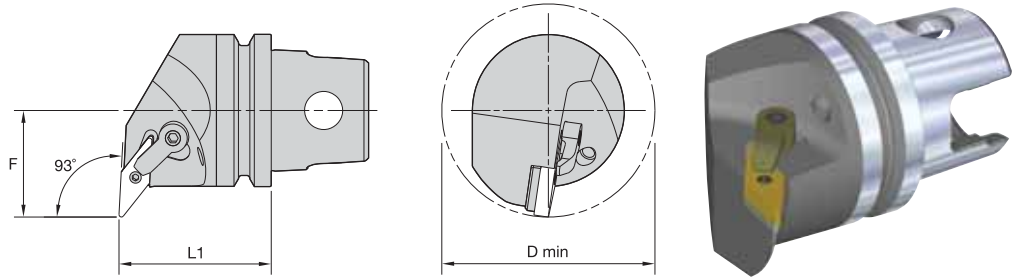
■ MVHN 107° 30'

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



■ MVJN 93°

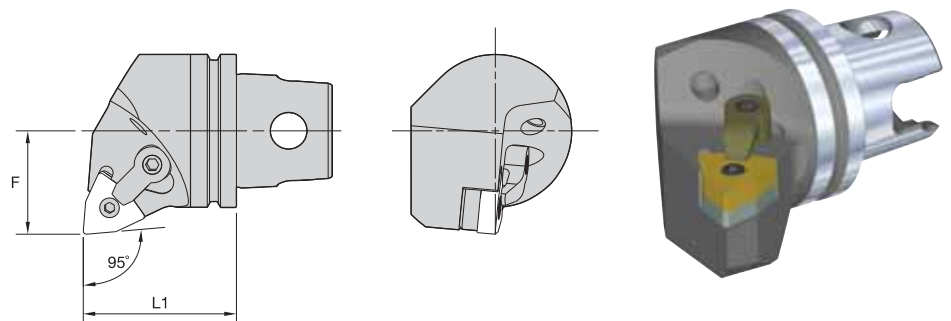
order number	catalog number	L1		F		gage insert	shim	lock pin	clamp	clamp screw
		mm	in	mm	in					
1023280	KM32TSMVJNR16	40	1.575	22	.866	VN..160408/VN..332	IVSN322	KLM34L	CKM23LP	STCM11
1023283	KM32TSMVJNL16	40	1.575	22	.866	VN..160408/VN..332	IVSN322	KLM34L	CKM23LP	STCM11



Tooling Systems

■ MVUN 93°

order number	catalog number	L1		F		D min		gage insert	shim	lock pin	clamp	clamp screw
		mm	in	mm	in	mm	in					
1144911	right hand KM32TSMVUNR16	35	1.378	27	1.063	54	2.126	VN..160408/VN..332	IVSN322	KLM34L	CKM23LP	STCM11
1144912	left hand KM32TSMVUNL16	35	1.378	27	1.063	54	2.126	VN..160408/VN..332	IVSN322	KLM34L	CKM23LP	STCM11



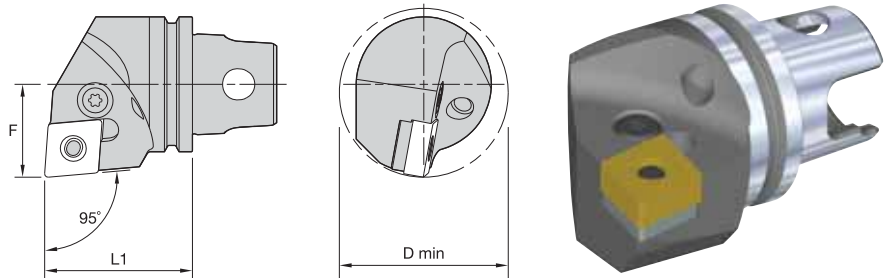
■ MWLN 95°

order number	catalog number	L1		F		gage insert	shim	lock pin	clamp	clamp screw
		mm	in	mm	in					
1144914	right hand KM32TSMWLNRO8	35	1.378	22	.866	WN..080408/WN..432	IWSN433	KLM46	CKM20LP	STCM11
1144915	left hand KM32TSMWLNLO8	35	1.378	22	.866	WN..080408/WN..432	IWSN433	KLM46	CKM20LP	STCM11



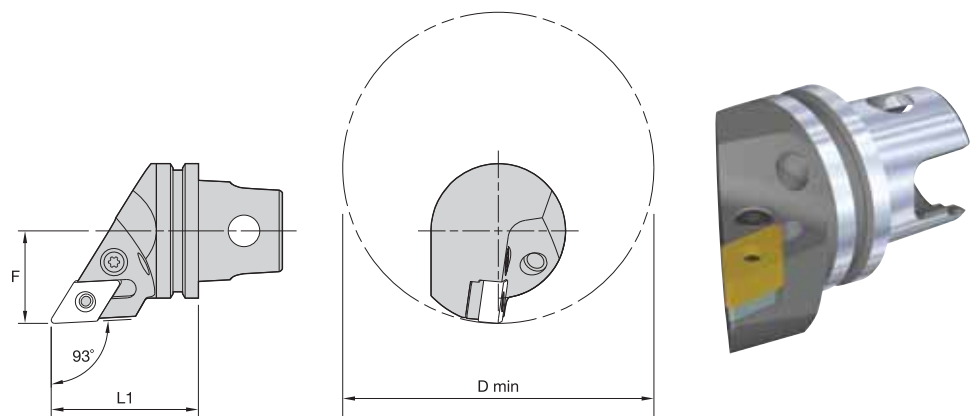


Tooling Systems



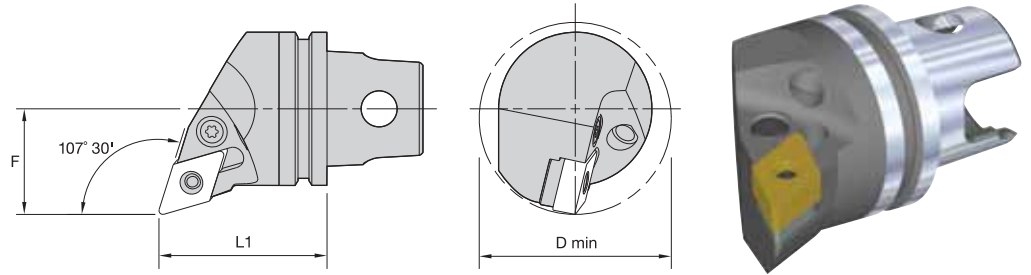
■ PCLN 95°

order number	catalog number	L1		F		D min		gage insert	shim	lever screw	shim pin	toggle lever	punch
		mm	in	mm	in	mm	in						
	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



■ PDJN 93°

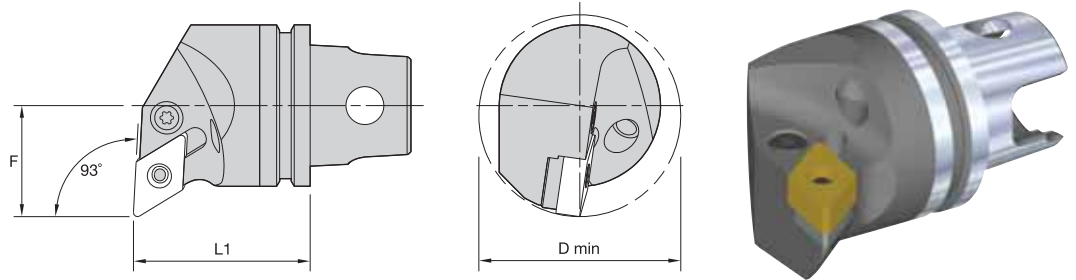
order number	catalog number	L1		F		D min		gage insert	shim	lever screw	shim pin	toggle lever	punch
		mm	in	mm	in	mm	in						
	right hand												
1232377	KM32TSPDJNR11	35	1.378	22	.866	74	2.913	DN..110408/DN..332	512.060	514.118	513.060	511.060	515.018
	left hand												
1232378	KM32TSPDJNL11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



Tooling Systems

■ PDQN 107° 30'

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

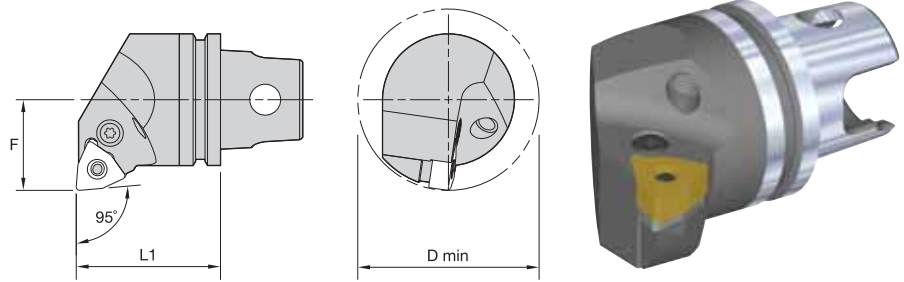


■ PDUN 93°

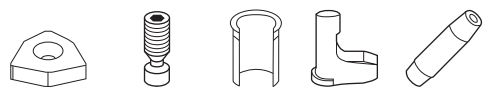
order number	catalog number	L1		F		D min		gage insert	shim	lever screw	shim pin	toggle lever	punch
		mm	in	mm	in	mm	in						
1232375	KM32TSPDUNR11	35	1.378	22	.866	40	1.575	DN..110408/DN..332	512.060	514.118	513.060	511.060	515.018
1232376	KM32TSPDUNL11	35	1.378	22	.866	40	1.575	DN..110408/DN..332	512.060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



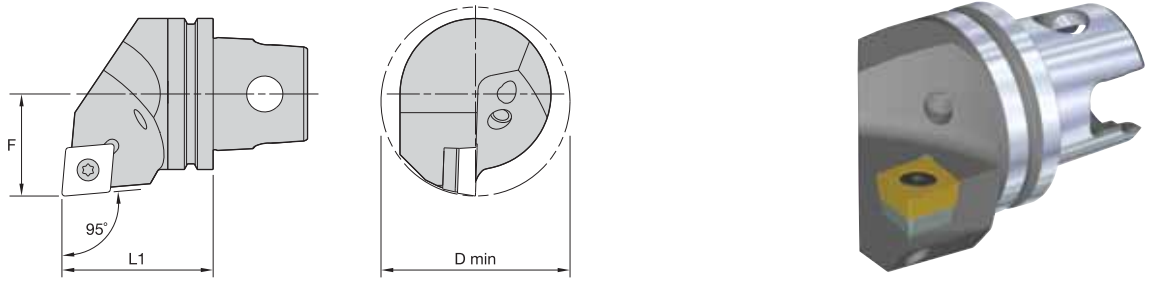
Tooling Systems



■ **PWLN 95°**



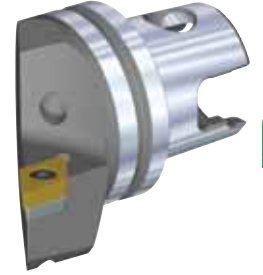
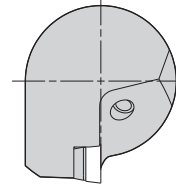
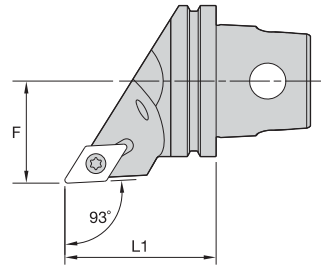
order number	catalog number	L1		F		D min		gage insert	shim	lever screw	shim pin	toggle lever	punch
		mm	in	mm	in	mm	in						
		right hand											
1232372	KM32TSPWLN R06	35	1.378	22	.866	44	1.732	WN..060408/WN..332	512.134	514.118	513.018	511.018	515.018
		left hand											
1232374	KM32TSPWLN L06	35	1.378	22	.866	44	1.732	WN..060408/WN..332	512.134	514.118	513.018	511.018	515.018



■ **SCLC 95°**



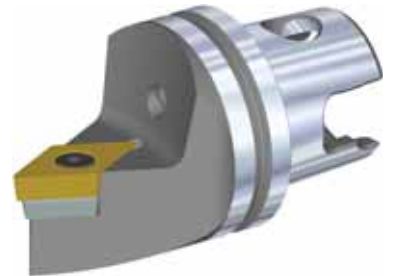
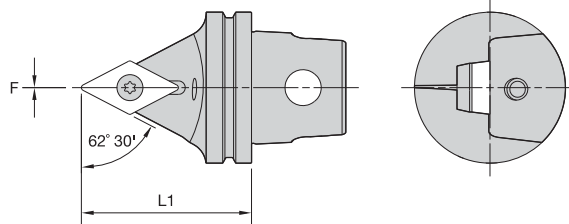
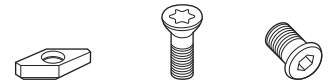
order number	catalog number	L1		F		D min		gage insert	shim	insert screw	shim screw	
		mm	in	mm	in	mm	in					
		right hand										
1144416	KM32TSSCLC R09	35	1.378	22	.866	44	1.732	CC..09T308/CC..3252	SKCP343	MS1156	SRS3	
1144430	KM32TSSCLC R12	35	1.378	22	.866	44	1.732	CC..120408/CC..432	SKCP453	MS1158	SRS4	
		left hand										
1144417	KM32TSSCLC L09	35	1.378	22	.866	44	1.732	CC..09T308/CC..3252	SKCP343	MS1156	SRS3	
1144434	KM32TSSCLC L12	35	1.378	22	.866	44	1.732	CC..120408/CC..432	SKCP453	MS1158	SRS4	



Tooling Systems

■ SDJC 93°

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



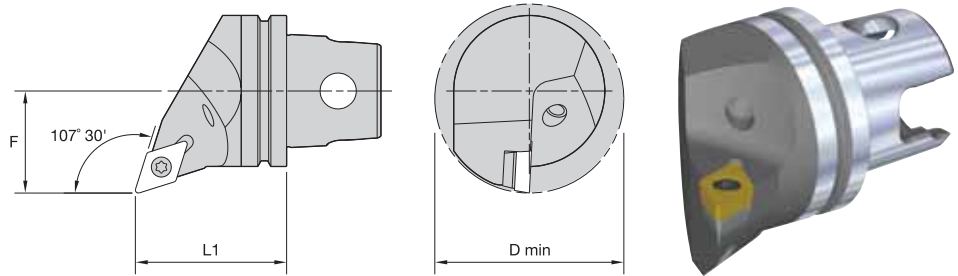
■ SDNC 62° 30'

order number	catalog number	L1		F		gage insert	shim	insert screw	shim screw
		mm	in	mm	in				
1144424	KM32TSSDNCN11	35	1.378	0	.000	DC..11T308/DC..3252	SKDP343	MS1156	SRS3



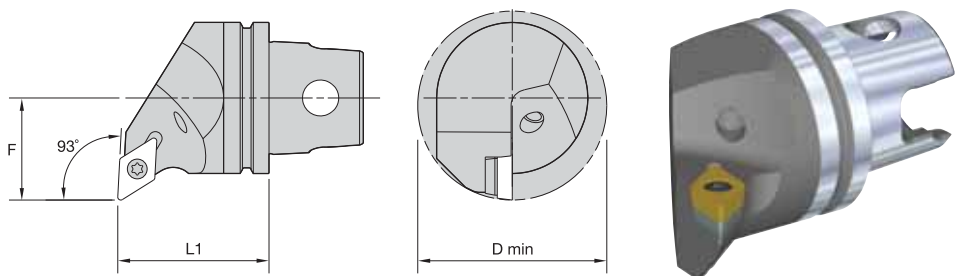


Tooling Systems



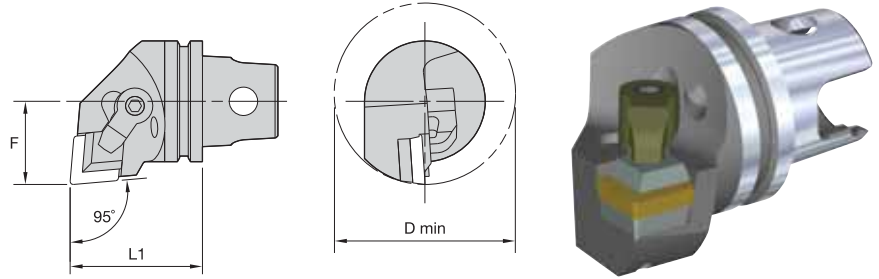
■ SDQC 107° 30'

order number	catalog number	L1		F		D min		gage insert	shim	insert screw	shim screw
		mm	in	mm	in	mm	in				
	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



■ SDUC 93°

order number	catalog number	L1		F		D min		gage insert	shim	insert screw	shim screw
		mm	in	mm	in	mm	in				
	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

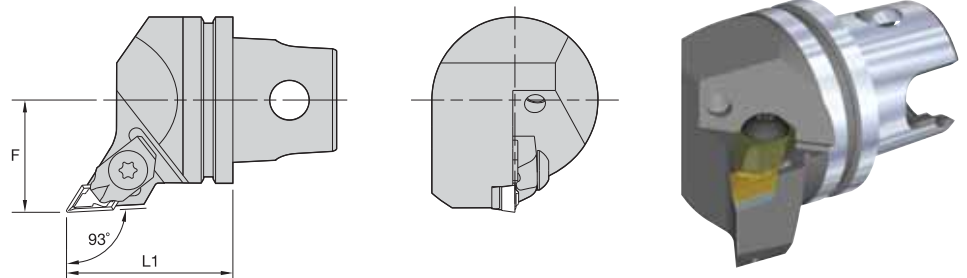


Tooling Systems

■ CCLP 95°

order number	catalog number	L1		F		D min		gage insert	shim	shim screw	clamp	clamp screw
		mm	in	mm	in	mm	in					
1091617	left hand KM32TSCCLPL12	35	1.378	22	.866	48	1.890	CP..120308/CP.422	SM891	MS109	CKM37	STCM11

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

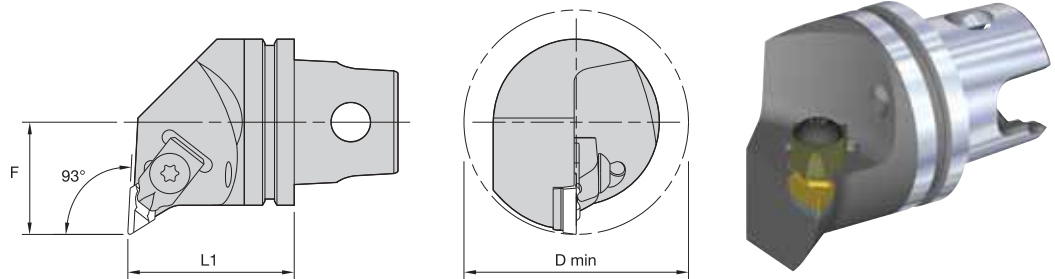


■ NKJC 93°

order number	catalog number	L1		F		gage insert	shim	shim screw	clamp	clamp screw
		mm	in	mm	in					
1019508	right hand KM32TSNKJCR11	35	1.378	22	.866	KC..110304R08/NP.51R	SM885	MS959	CM71	MS1220
1019565	left hand KM32TSNKJCL11	35	1.378	22	.866	KC..110304L08/NP.51L	SM886	MS959	CM79	MS1220



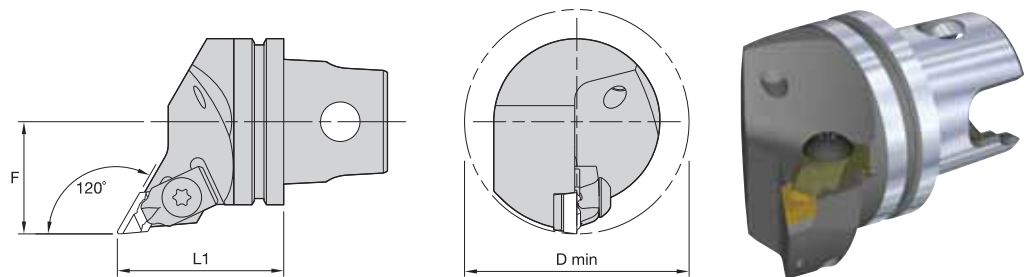
Tooling Systems



■ NKUC 93°



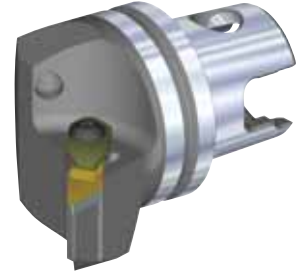
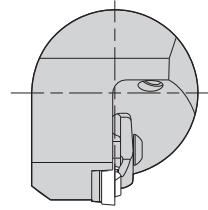
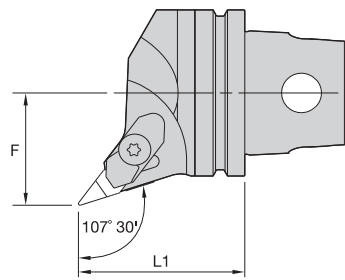
order number	catalog number	L1		F		D min		gage insert	shim	shim screw	clamp	clamp screw
		mm	in	mm	in	mm	in					
	right hand											
1019509	KM32TSNKUCR11	35	1.378	22	.866	44	1.732	KC..110304L08/NP.51L	SM886	MS959	CM68	MS1220
	left hand											
1019566	KM32TSNKUCL11	35	1.378	22	.866	44	1.732	KC..110304R08/NP.51R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



■ NKXC 120°



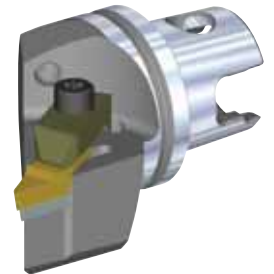
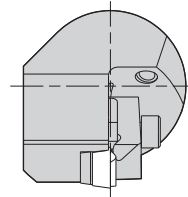
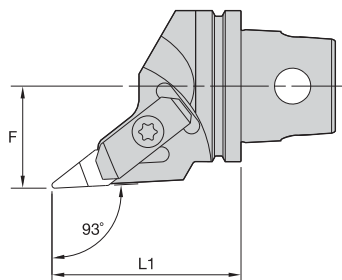
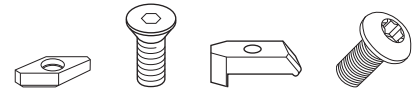
order number	catalog number	L1		F		D min		gage insert	shim	shim screw	clamp	clamp screw
		mm	in	mm	in	mm	in					
	left hand											
1019567	KM32TSNKXCL11	35	1.378	22	.866	44	1.732	KC..110304R08/NP.51R	SM885	MS959	CM68	MS1220



Tooling Systems

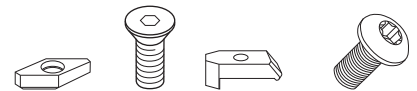
■ NVHB 107° 30'

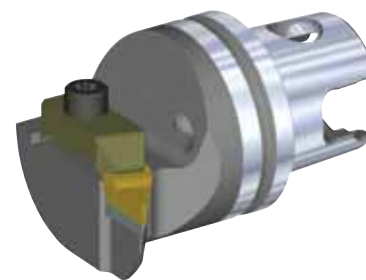
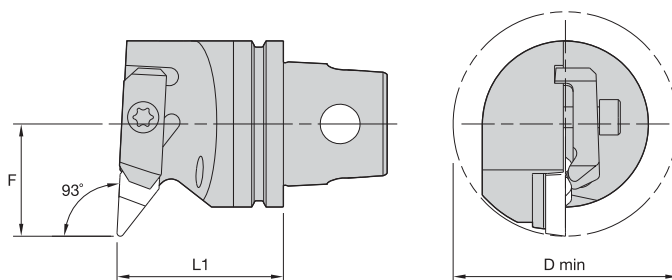
order number	catalog number	L1		F		gage insert	shim	shim screw	clamp	clamp screw
		mm	in	mm	in					
1144421	right hand KM32TSNVHBR11	35	1.378	22	.866	VBMR110304/VBMR221	SM813	MS959	CM158	MS1375



■ NVJC 93°

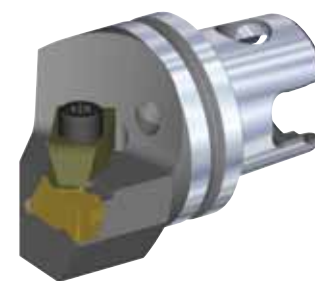
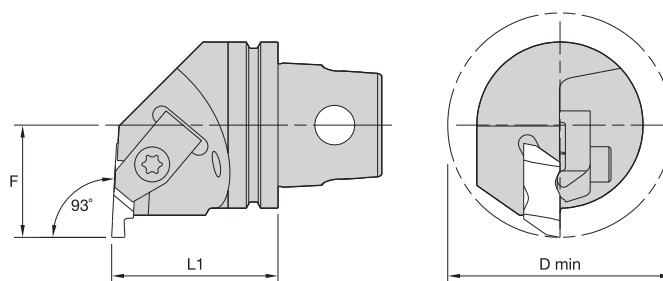
order number	catalog number	L1		F		gage insert	shim	shim screw	clamp	clamp screw
		mm	in	mm	in					
1144437	right hand KM32TSNVJCR16	47	1.850	22	.866	VCGR160408/VPGR332	SM812	MS959	CM113	MS1489PKG
1144440	left hand KM32TSNVJCL16	47	1.850	22	.866	VCGR160408/VPGR332	SM812	MS959	CM114	MS1489PKG





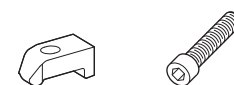
■ NVUC 93°

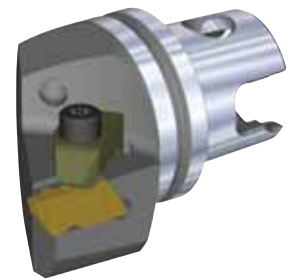
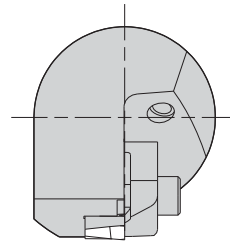
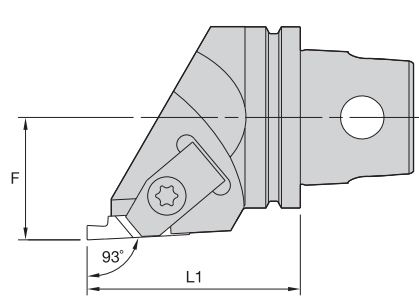
order number	catalog number	L1		F		D min		gage insert	shim	shim screw	clamp	clamp screw
		mm	in	mm	in	mm	in					
	right hand											
1091627	KM32TSNVUCR16	35	1.378	27	1.063	54	2.126	VCGR160408/VPGR332	SM812	MS959	CM113	MS1489
	left hand											
1019564	KM32TSNVUCL16	35	1.378	27	1.063	54	2.126	VCGR160408/VPGR332	SM812	MS959	CM114	MS1489



■ NE 93°

order number	catalog number	L1		F		D min		gage insert	clamp	clamp screw
		mm	in	mm	in	mm	in			
	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





Tooling Systems

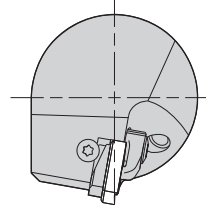
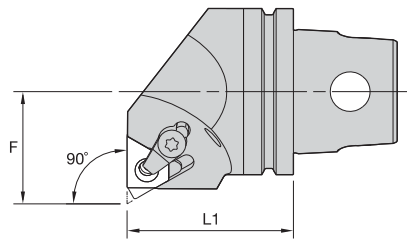
■ NS 90°

order number	catalog number	L1		F		gage insert	clamp	clamp screw
		mm	in	mm	in			
	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



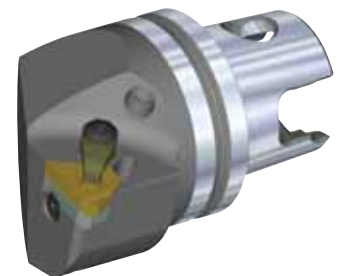
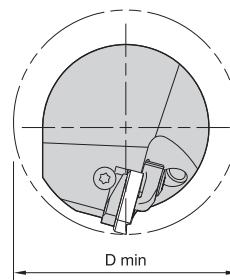
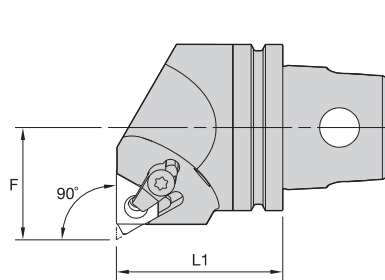


Tooling Systems



■ LSE-E 90° • External Only

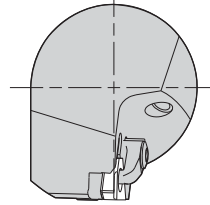
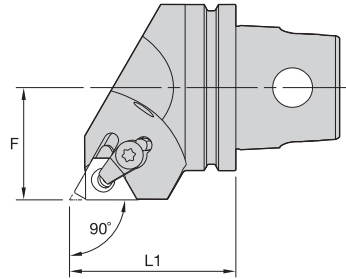
order number	catalog number	L1		F		gage insert	shim	insert screw	shim screw	clamp assembly
		mm	in	mm	in					
1144372	KM32TSLSEL16E	35	1.378	22	.866	LT16ER	SMYE3	SSA3T	SSY3T	CKC3



■ LSE-N 90° • Internal Only

order number	catalog number	L1		F		D min		gage insert	shim	insert screw	shim screw	clamp assembly
		mm	in	mm	in	mm	in					
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.



Tooling Systems

■ LSS 90°



order number	catalog number	L1		F		gage insert	shim	insert screw	shim screw	clamp assembly
		mm	in	mm	in					
1019298	KM32TSLSSR16	35	1.378	22	.866	LT16ER	SMYE3	SSA3T	SSY3T	CKC3
1019299	KM32TSLSSL16	35	1.378	22	.866	LT16EL	SMYI3	SSA3T	SSY3T	CKC3

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

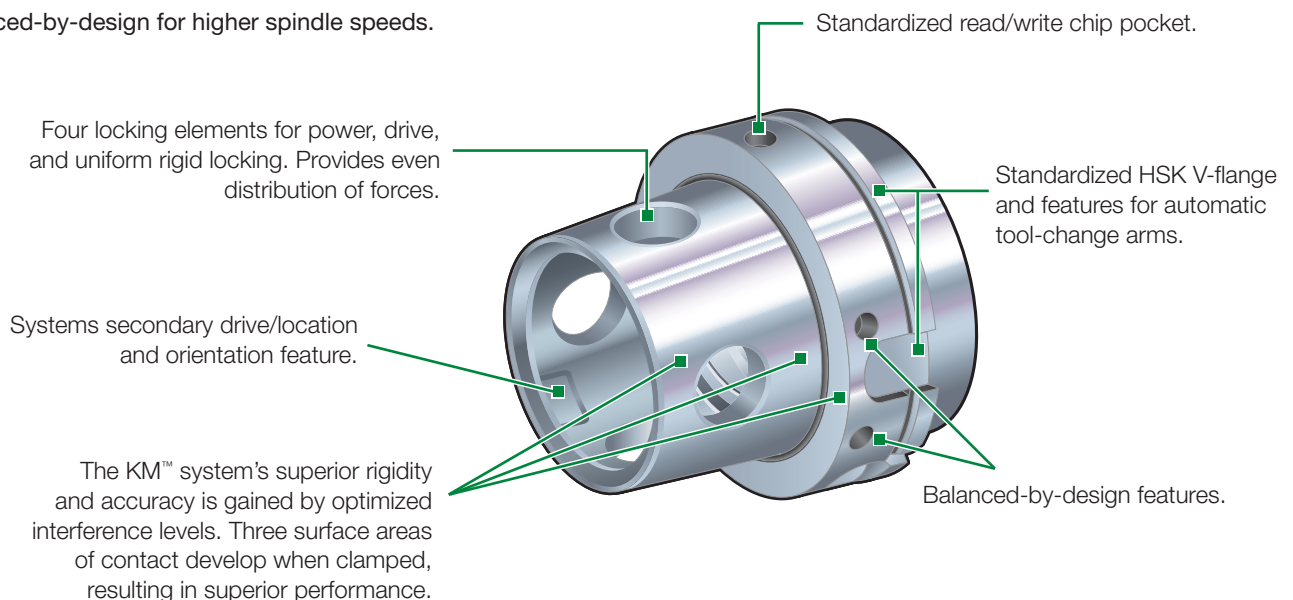
KM4X™

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



KM4X

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



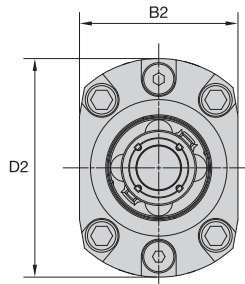
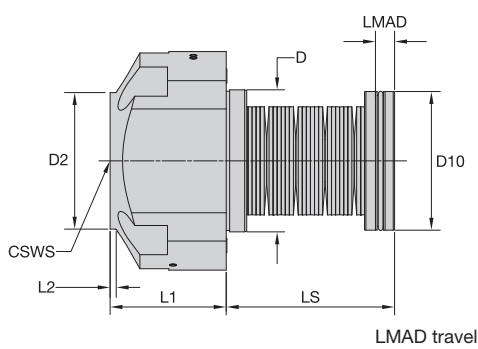
The Latest Innovation in Spindle Interface Technology

- KM4X™ offers the most rigid connection able to withstand extremely high bending due to a combination of high interference and high clamping forces.
- KM4X provides 3x more bending capacity than comparable face contact systems.
- KM™ is the only connection that maintains stiffness at elevated rotational speeds and is suitable for a range of applications from low speeds with high torque to very high spindle speeds.
- KM4X is better balanced between bending and torsion capabilities.
- The ability to retrofit KM4X to an existing machine tool offers the added advantage of increasing throughput.

Design Advantages

- The new screw-on KM4X is designed for high stability.
- Universal design enables old-style tools to be used interchangeably with new styles and many competitor screw-on cutters and extensions.
- Clamping method utilizes face contact to create a rigid connection.





Tooling Systems

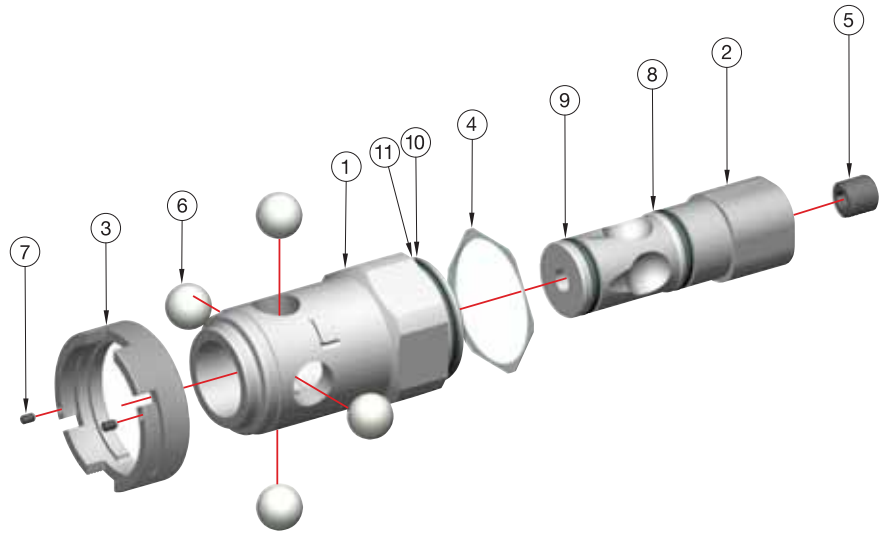


■ NACA

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

■ Actuating Force

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



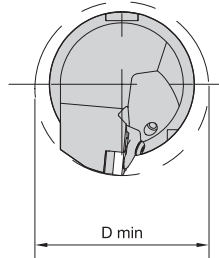
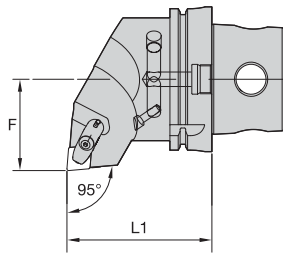
■ KIT

detail number	description	catalog number	order number
1	canister	2699630	5408797
2	lockrod	2404270	5408798
3	canister ring	2404272	5408799
4	canister spacer	2699631	5413745
5	modified set screw	(M16 x 2,0)	5408990
6	chrome ball	LMB200025	5413539
7	set screw	S-1786	5413744
8	O-ring	OR01109139V75	5413740
9	O-ring	OR01046139V75	5413741
10	back-up ring	BUR135V90	5413742
11	O-ring	OR01925103V75	5413743

Tooling Systems

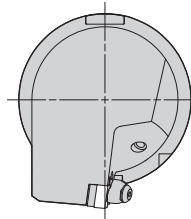
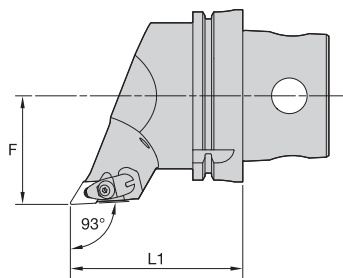


Tooling Systems



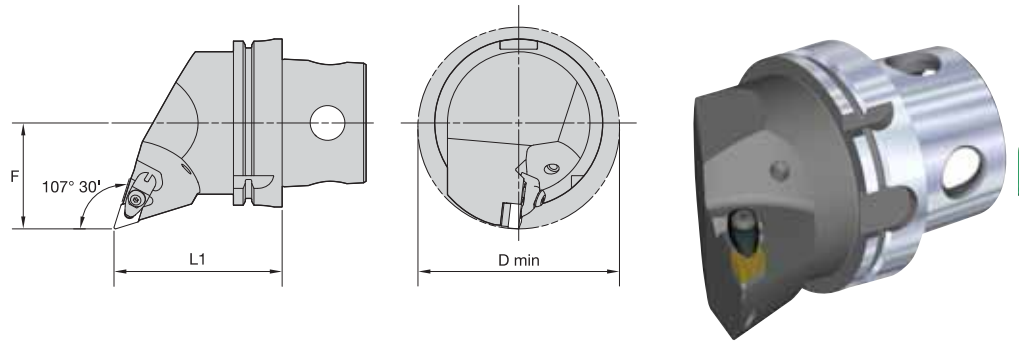
■ DCLN 95°

order number	catalog number	L1		F		D min		gage insert	shim	shim screw	clamp assembly	pin	kg	lbs
		mm	in	mm	in	mm	in							
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



■ DDJN 93°

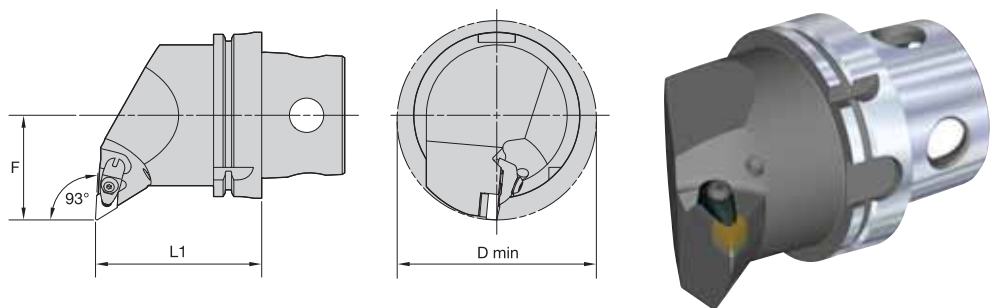
order number	catalog number	L1		F		gage insert	shim	shim screw	clamp assembly	pin	kg	lbs
		mm	in	mm	in							
right hand												
5345310	KM4X100DDJNR15KC06	100	3.937	63	2.480	DN..150608/DN..442	IDSN433	KMSP415IP	CM234R ASSY	SSP025016M	4,19	9.24
left hand												
5345269	KM4X100DDJNL15KC06	100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



■ DDQN 107,5°

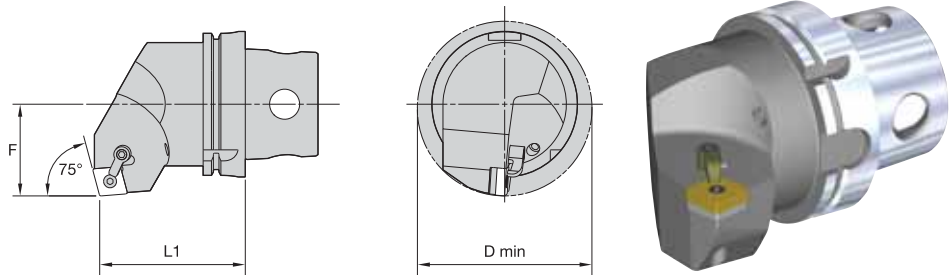
order number	catalog number	L1		F		D min		gage insert	shim	shim screw	clamp assembly	pin	kg	lbs
		mm	in	mm	in	mm	in							
right hand														
2265440	KM63TSDQNR15KC04	60	2.362	43	1.693	86	3.39	DN..150408/DN..432	IDSN443	KMSP415IP	CM234R ASSY	SSP025016M	1,11	2.44
2265442	KM63TSDQNR15KC06	60	2.362	43	1.693	86	3.39	DN..150608/DN..442	IDSN433	KMSP415IP	CM234R ASSY	SSP025016M	1,11	2.44
left hand														
2265441	KM63TSDQNL15KC04	60	2.362	43	1.693	86	3.39	DN..150408/DN..432	IDSN443	KMSP415IP	CM234R ASSY	SSP025016M	1,11	2.44
2265443	KM63TSDQNL15KC06	60	2.362	43	1.693	86	3.39	DN..150608/DN..442	IDSN433	KMSP415IP	CM234R ASSY	SSP025016M	1,11	2.44

Tooling Systems



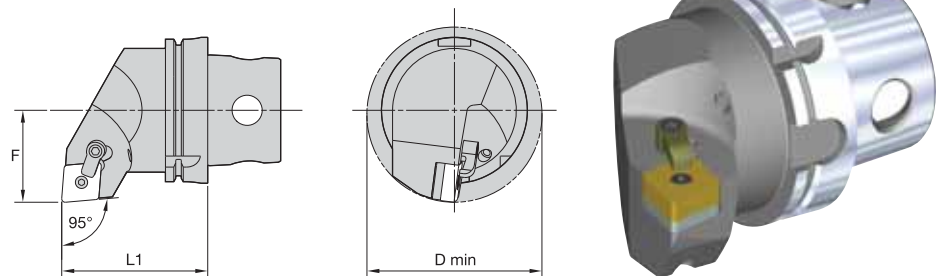
■ DDUN 93°

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



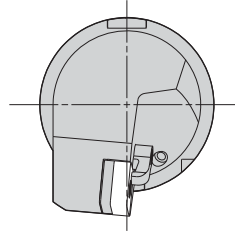
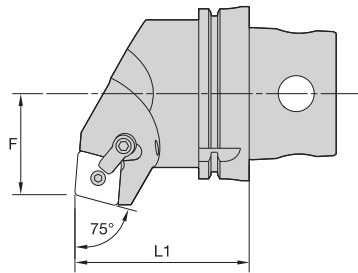
MCKN 75°

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



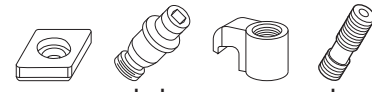
MCLN 95°

order number	catalog number	L1		F		D min		gage insert	shim	lock pin	clamp	clamp screw	kg	lbs	
		mm	in	mm	in	mm	in								
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	
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	

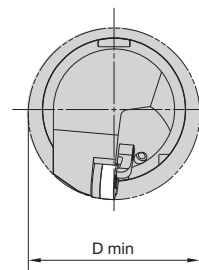
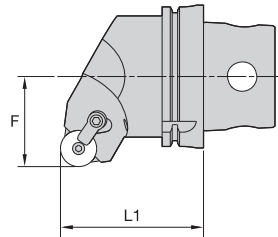


■ MCRN 75°

order number	catalog number	L1		F		gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
		mm	in	mm	in							
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

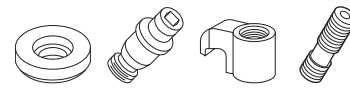


Tooling Systems



■ MRGN 0°

order number	catalog number	L1		F		D min		gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
		mm	in	mm	in	mm	in							
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

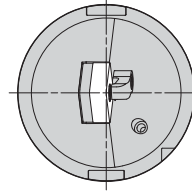
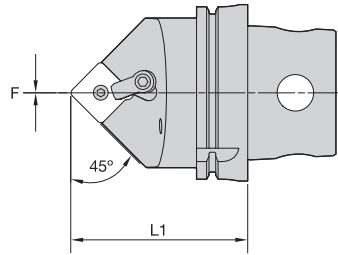


KM4X™ 100 Cutting Units

M-Clamping



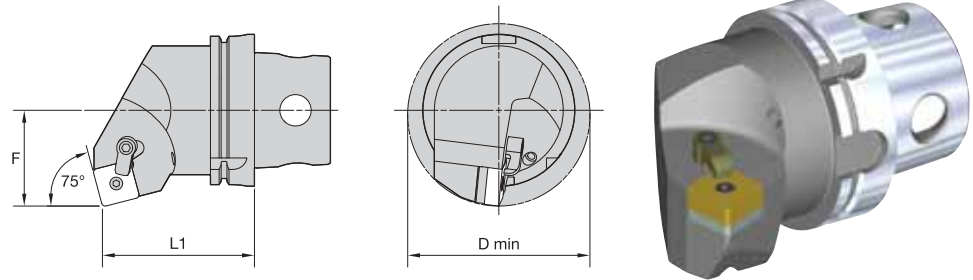
Tooling Systems



■ MSDN 45°

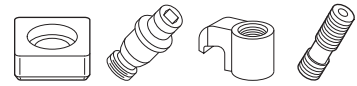


order number	catalog number	L1		F		gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
		mm	in	mm	in							
5337697	KM4X100MSDNN19	100	3.937	0	.000	SN..190612/SN..643	ISSN633	KLM68	CKM12	STCM4	3,97	8.76
5337698	KM4X100MSDNN25	100	3.937	0	.000	SN..250924/SN..856	ISSN846	KLM810	CKM24	STCM19	3,97	8.76



Tooling Systems

■ MSKN 75°



order number	catalog number	L1		F		D min		gage insert	shim	lock pin	clamp	clamp screw	kg	lbs	
		mm	in	mm	in	mm	in								
		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	

KM4X™ 100 Cutting Units

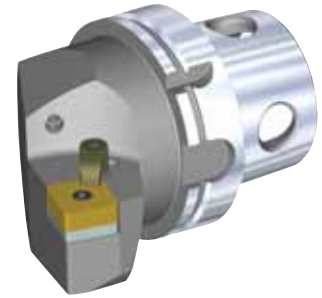
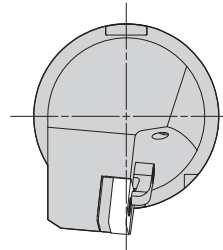
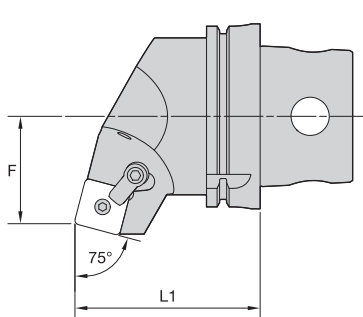
M-Clamping



Tooling Systems



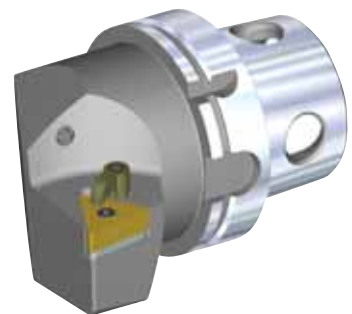
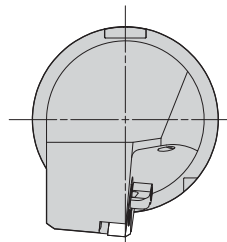
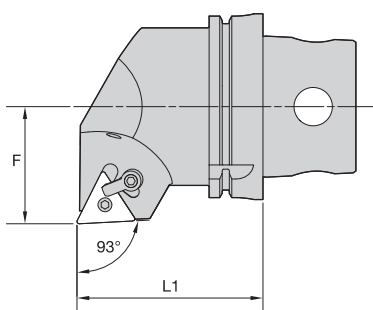
■ MSRN 75°



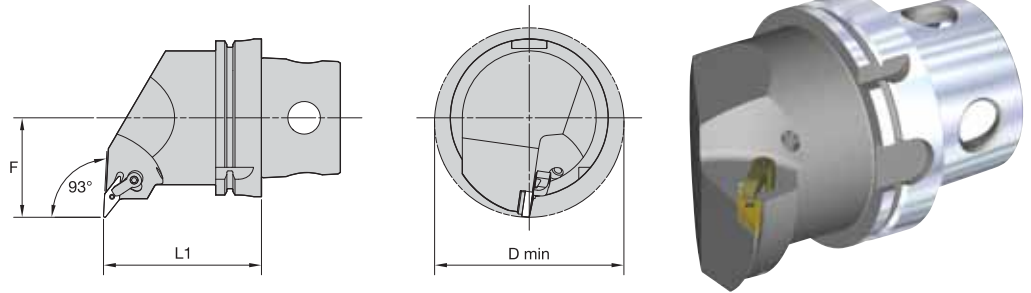
order number	catalog number	L1		F		gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
		mm	in	mm	in							
right hand												
5337715	KM4X100MSRNR19	100	3.937	58	2.283	SN..190612/SN..643	ISSN633	KLM68	CKM12	STCM4	4,47	9.85
5337716	KM4X100MSRNR25	100	3.937	58	2.283	SN..250924/SN..856	ISSN846	KLM810	CKM24	STCM19	4,46	9.83
left hand												
5337713	KM4X100MSRNL19	100	3.937	58	2.283	SN..190612/SN..643	ISSN633	KLM68	CKM12	STCM4	4,44	9.78
5337714	KM4X100MSRNL25	100	3.937	58	2.283	SN..250924/SN..856	ISSN846	KLM810	CKM24	STCM19	4,41	9.73



■ MTJN 93°



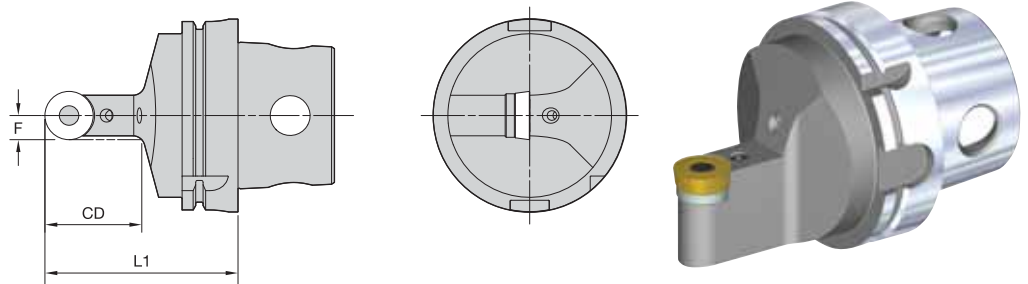
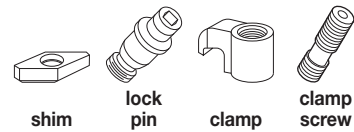
order number	catalog number	L1		F		gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
		mm	in	mm	in							
right hand												
5337717	KM4X100MTJNR27	100	3.937	63	2.480	TN..270612/TN..543	ITSN534	KLM58	CKM12	STCM4	4,75	10.49
5337718	KM4X100MTJNR33	100	3.937	63	2.480	TN..330912/TN..663	ITSN636	KLM68L	CKM12	STCM4	4,76	10.49
left hand												
5337719	KM4X100MTJNL27	100	3.937	63	2.480	TN..270612/TN..543	ITSN534	KLM58	CKM12	STCM4	4,82	10.62
5337730	KM4X100MTJNL33	100	3.937	63	2.480	TN..330912/TN..663	ITSN636	KLM68L	CKM12	STCM4	4,79	10.57



Tooling Systems

■ MVUN 93°

order number	catalog number	L1		F		D min		gage insert	shim	lock pin	clamp	clamp screw	kg	lbs
		mm	in	mm	in	mm	in							
5337732	KM4X100MVUNR16	100	3.937	63	2.480	120	4.724	VN..160408/VN..332	IVSN322	KLM34L	CKM22	STCM20	4,57	10.08
5337731	KM4X100MVUNL16	100	3.937	63	2.480	120	4.724	VN..160408/VN..332	IVSN322	KLM34L	CKM22	STCM20	4,90	10.81



■ PRDCN

order number	catalog number	L1		F		CD		gage insert	shim	clamp screw	clamp stud	kg	lbs
		mm	in	mm	in	mm	in						
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

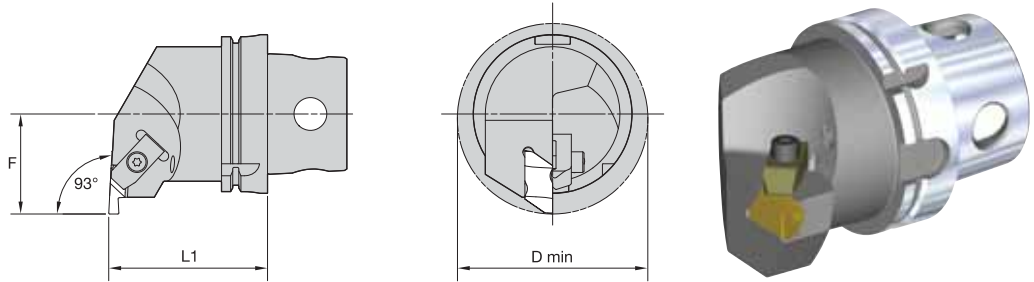


KM4X™ 100 Cutting Units

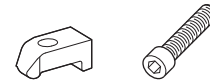
TopThread™ and TopGroove™



Tooling Systems



■ NE



order number	catalog number	L1		F		D min		gage insert	clamp	clamp screw	kg	lbs
		mm	in	mm	in	mm	in					
		right hand										
5337758	KM4X100NER3	100	3.937	63	2.480	120	4.724	NG3L	CM73	MS1489	4,44	9.79
5337759	KM4X100NER4	100	3.937	63	2.480	120	4.724	NG4L	CM73	MS1489	4,49	9.90
5337770	KM4X100NER5	100	3.937	63	2.480	120	4.724	NG5L	CM81	MS1490	4,59	10.13
5337771	KM4X100NER6	100	3.937	63	2.480	120	4.724	NG6L	CM121	MS1489	4,48	9.88
		left hand										
5337754	KM4X100NEL3	100	3.937	63	2.480	120	4.724	NG3R	CM72	MS1489	4,44	9.79
5337755	KM4X100NEL4	100	3.937	63	2.480	120	4.724	NG4R	CM72	MS1489	4,49	9.90
5337756	KM4X100NEL5	100	3.937	63	2.480	120	4.724	NG5R	CM80	MS1490	4,59	10.13
5337757	KM4X100NEL6	100	3.937	63	2.480	120	4.724	NG6R	CM120	MS1489	4,48	9.88

TOOLING SYSTEMS



ERICKSON™ Toolholders

WIDIA™ proudly offers premium quality ERICKSON toolholder products, so you can be sure that you're buying the best the industry has to offer. The entire portfolio — including steep taper, HSK, straight shank extensions, collets, sleeves, and accompanying products — offers high productivity, increased accuracy, and application flexibility.

Designed for both manual and automatic tool changing, ERICKSON interfaces are ideally suited for most machine tools and feature a compact and rigid construction guaranteed to handle high torque and deliver optimal metal removal rates.

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

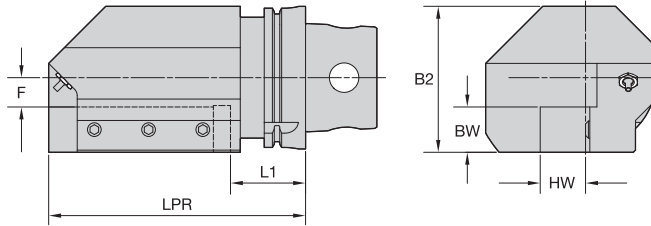
ERICKSON™

KM4X™ 100 Cutting Units

Single Square Shank Adapters



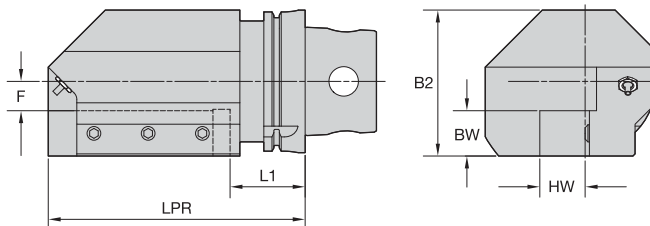
Tooling Systems



■ STA • Metric



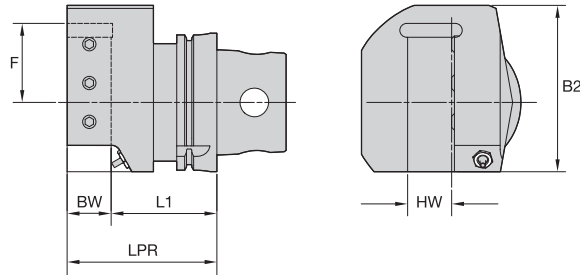
order number	catalog number	B2	BW	F	HW	L1	LPR	nozzle	kg
right hand									
5337782	KM4X100STAR20	102	32	21	32	53	180	PMT04526	12,09
5337783	KM4X100STAR24	102	38	14	38	53	180	PMT04526	11,61
5337784	KM4X100STAR2525M	102	25	27	25	55	180	PMT04526	12,52
left hand									
5337785	KM4X100STAR3232M	102	32	20	32	55	180	PMT04526	12,09
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



■ STA • Inch



order number	catalog number	B2	BW	F	HW	L1	LPR	nozzle	lbs
right hand									
5337782	KM4X100STAR20	4.028	1.250	.809	1.250	2.071	7.087	PMT04526	26.66
5337783	KM4X100STAR24	4.028	1.500	.559	1.500	2.071	7.087	PMT04526	25.60
5337784	KM4X100STAR2525M	4.028	.984	1.075	.984	2.165	7.087	PMT04526	27.60
left hand									
5337785	KM4X100STAR3232M	4.028	1.260	.799	1.260	2.165	7.087	PMT04526	26.67
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



Tooling Systems

■ ETA • Inch



order number	catalog number	B2	BW	F	HW	L1	LPR	nozzle	lbs
	right hand								
5337778	KM4X100ETAR20	4.724	1.250	-2.244	1.250	3.002	4.252	PMT04526	16.52
	left hand								
5337777	KM4X100ETAL20	4.724	1.250	-2.244	1.250	3.002	4.252	PMT04526	16.52

KM4X™ 100 Shank Tools

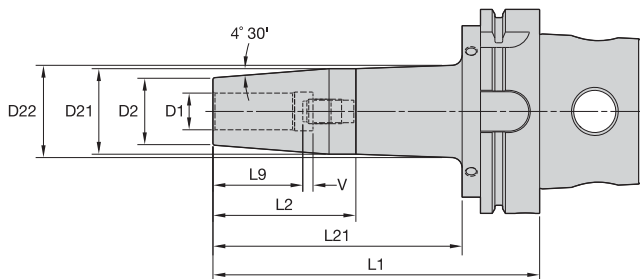
Shrink Fit Toolholders General Purpose (GP)



- Balanceable — fine tune with optional M6 set screws.
- Suitable for carbide and HSS cutting tools.



Tooling Systems



Cutting Tool Shank Requirements
metric (ISO standard)

cutting tool shank diameter	tolerance	
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013
32, 40, & 50	h6	0,000/-0,016



■ TT GP HPV MM-KM4X • Metric

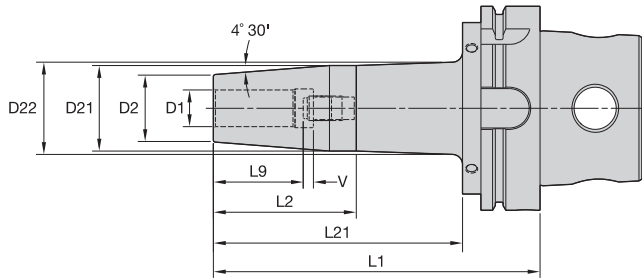


order number	catalog number	D1	D2	D21	D22	L1	L2	L9	L21	V	stop screw	wrench size stop screw
4156046	KM4X100HPVTT06085M	6	21	27	—	85	56	26	—	10	TTSS05014M	2,5mm
4156047	KM4X100HPVTT06160M	6	21	27	32	160	50	26	122	10	TTSS05014M	2,5mm
4156048	KM4X100HPVTT08085M	8	21	27	—	85	56	26	—	10	TTSS06014M	3mm
4156049	KM4X100HPVTT08160M	8	21	27	32	160	50	26	122	10	TTSS06014M	3mm
4156050	KM4X100HPVTT10090M	10	24	32	—	90	61	31	—	10	TTSS08014M	4mm
4156051	KM4X100HPVTT10160M	10	24	32	36	160	63	31	122	10	TTSS08014M	4mm
4156052	KM4X100HPVTT12095M	12	24	32	—	95	66	36	—	10	TTSS10014M	5mm
4156113	KM4X100HPVTT12160M	12	24	32	36	160	63	36	122	10	TTSS10014M	5mm
4156114	KM4X100HPVTT14095M	14	27	34	—	95	66	36	—	10	TTSS10014M	5mm
4156115	KM4X100HPVTT14160M	14	27	34	38	160	57	36	122	10	TTSS10014M	5mm
4156116	KM4X100HPVTT16100M	16	27	34	—	100	71	39	—	10	TTSS12014M	6mm
4156117	KM4X100HPVTT16160M	16	27	34	38	160	57	39	122	10	TTSS12014M	6mm
4156118	KM4X100HPVTT18100M	18	33	42	—	100	71	39	—	10	TTSS12014M	6mm
4156119	KM4X100HPVTT18160M	18	33	42	46	160	69	39	122	10	TTSS12014M	6mm
4156120	KM4X100HPVTT20105M	20	33	42	—	105	76	41	—	10	TTSS16014M	8mm
4156121	KM4X100HPVTT20160M	20	33	42	46	160	69	41	122	10	TTSS16014M	8mm
4156122	KM4X100HPVTT25115M	25	44	53	—	115	86	47	—	10	TTSS16014M	8mm
4156123	KM4X100HPVTT25160M	25	44	53	57	160	69	47	122	10	TTSS16014M	8mm
4156124	KM4X100HPVTT32120M	32	44	53	—	120	91	51	—	10	TTSS16014M	8mm
4156125	KM4X100HPVTT32160M	32	44	53	57	160	69	51	122	10	TTSS16014M	8mm

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
Supplied with stop screw.
Optional M6~1.0P x 5 lg fine-balancing screw set (10 pieces) available. Order number: MS1276PKG. Must be ordered separately.



- Balanceable — fine tune with optional M6 set screws.
- Suitable for carbide and HSS cutting tools.



Tooling Systems



Cutting Tool Shank Requirements
inch (industry standard)

cutting tool shank diameter	tolerance
1/4, 5/16, & 3/8	-.0001/- .0004
7/16, 1/2, 9/16, 5/8, & 11/16	.0000/- .0004
3/4, 7/8, 1, 1-1/4, 1-1/2, & 2	.0000/- .0005

■ TT GP HPV IN-KM4X • Inch



order number	catalog number	D1	D2	D21	D22	L1	L2	L9	L21	V	stop screw	wrench size stop screw
4155746	KM4X100HPVTT025335	1/4	0.83	1.06	—	3.35	2.21	1.02	—	0.39	TTSS05014M	2,5mm
4155747	KM4X100HPVTT025630	1/4	0.83	1.06	1.26	6.30	1.97	1.02	4.81	0.39	TTSS05014M	2,5mm
4155748	KM4X100HPVTT031335	5/16	0.83	1.06	—	3.35	2.21	1.02	—	0.39	TTSS06014M	3mm
4155749	KM4X100HPVTT031630	5/16	0.83	1.06	1.26	6.30	1.97	1.02	4.81	0.39	TTSS06014M	3mm
4155750	KM4X100HPVTT038354	3/8	0.95	1.24	—	3.54	2.40	1.22	—	0.39	TTSS08014M	4mm
4155751	KM4X100HPVTT038630	3/8	0.95	1.26	1.42	6.30	2.48	1.22	4.81	0.39	TTSS08014M	4mm
4155752	KM4X100HPVTT050374	1/2	0.95	1.26	—	3.74	2.60	1.42	—	0.39	TTSS10014M	5mm
4156153	KM4X100HPVTT050630	1/2	0.95	1.26	1.42	6.30	2.48	1.42	4.81	0.39	TTSS10014M	5mm
4156154	KM4X100HPVTT062394	5/8	1.06	1.34	—	3.94	2.80	1.54	—	0.39	TTSS12014M	6mm
4156155	KM4X100HPVTT062630	5/8	1.06	1.34	1.51	6.30	2.24	1.54	4.81	0.39	TTSS12014M	6mm
4156156	KM4X100HPVTT075413	3/4	1.30	1.65	—	4.13	2.99	1.61	—	0.39	TTSS16014M	8mm
4156157	KM4X100HPVTT075630	3/4	1.30	1.65	1.8	6.30	2.72	1.61	4.81	0.39	TTSS16014M	8mm
4156158	KM4X100HPVTT088413	7/8	1.30	1.65	—	4.13	2.99	1.61	—	0.39	TTSS16014M	8mm
4156159	KM4X100HPVTT088630	7/8	1.30	1.65	1.8	6.30	2.72	1.61	4.81	0.39	TTSS16014M	8mm
4156160	KM4X100HPVTT100453	1	1.73	2.08	—	4.53	3.39	1.85	—	0.39	TTSS16014M	8mm
4156161	KM4X100HPVTT100630	1	1.73	2.08	2.23	6.30	2.72	1.85	4.81	0.39	TTSS16014M	8mm
4156162	KM4X100HPVTT125472	1 1/4	1.73	2.08	—	4.72	3.59	2.01	—	0.39	TTSS16014M	8mm
4156163	KM4X100HPVTT125630	1 1/4	1.73	2.08	2.23	6.30	2.72	2.01	4.81	0.39	TTSS16014M	8mm
4156164	KM4X100HPVTT150531	1 1/2	2.36	2.75	—	5.31	4.18	2.01	—	0.39	TTSS20014M	10mm

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
Supplied with stop screw.
Optional M6~1.0P x 5 lg fine-balancing screw set (10 pieces) available. Order number: MS1276PKG. Must be ordered separately.

KM4X™ 100 Shank Tools

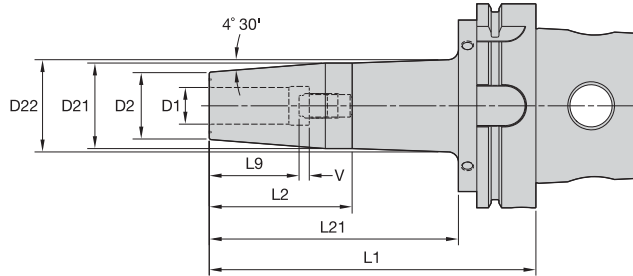
Shrink Fit Toolholders High Torque (HT)



- 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.



Tooling Systems



Cutting Tool Shank Requirements
metric (ISO standard)

cutting tool shank diameter	tolerance	
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013
32, 40, & 50	h6	0,000/-0,016

■ TT HT HPV MM-KM4X • Metric

order number	catalog number	D1	D2	D21	L1	L2	L9	V	stop screw	wrench size stop screw
4156182	KM4X100HPVTTHT12095M	12	24	31,9	95	66	36	10	TTSS10014M	5mm
4156193	KM4X100HPVTTHT14095M	14	27	33,9	95	66	36	10	TTSS10014M	5mm
4156194	KM4X100HPVTTHT16100M	16	27	33,9	100	71	39	10	TTSS12014M	6mm
4156195	KM4X100HPVTTHT18100M	18	33	41,9	100	71	39	10	TTSS12014M	6mm
4156196	KM4X100HPVTTHT20105M	20	33	41,9	105	76	41	10	TTSS16014M	8mm
4156197	KM4X100HPVTTHT25115M	25	44	52,9	115	86	47	10	TTSS16014M	8mm
4156198	KM4X100HPVTTHT32120M	32	44	52,9	120	91	51	10	TTSS16014M	8mm

(continued)

(TT HT HPV KM4X continued)

Cutting Tool Shank Requirements inch (industry standard)	
cutting tool shank diameter	tolerance
1/2 & 5/8	.0000/- .0004
3/4, 7/8, 1, 1-1/4, & 1-1/2	.0000/- .0005

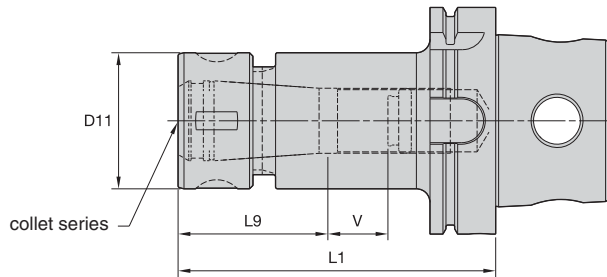
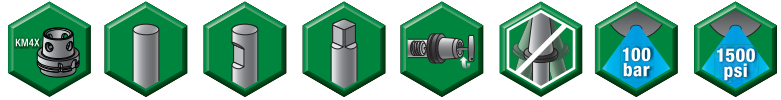
■ TT HT HPV IN-KM4X • Inch



order number	catalog number	D1	D2	D21	D22	L1	L2	L9	L21	V	stop screw	wrench size stop screw
4156166	KM4X100HPVTTH050374	1/2	0.95	1.26	—	3.74	2.60	1.42	—	0.39	TTSS10014M	5mm
4156167	KM4X100HPVTTH050630	1/2	0.95	1.26	1.42	6.30	2.48	1.42	4.81	0.39	TTSS10014M	5mm
4156168	KM4X100HPVTTH062394	5/8	1.06	1.34	—	3.94	2.80	1.54	—	0.39	TTSS12014M	6mm
4156169	KM4X100HPVTTH062630	5/8	1.06	1.34	1.51	6.30	2.24	1.54	4.81	0.39	TTSS12014M	6mm
4156170	KM4X100HPVTTH075413	3/4	1.30	1.65	—	4.13	2.99	1.61	—	0.39	TTSS16014M	8mm
4156171	KM4X100HPVTTH075630	3/4	1.30	1.65	1.8	6.30	2.72	1.61	4.81	0.39	TTSS16014M	8mm
4156172	KM4X100HPVTTH088413	7/8	1.30	1.65	—	4.13	2.99	1.61	—	0.39	TTSS16014M	8mm
4156203	KM4X100HPVTTH088630	7/8	1.30	1.65	1.8	6.30	2.72	1.61	4.81	0.39	TTSS16014M	8mm
4156204	KM4X100HPVTTH100453	1	1.73	2.08	—	4.53	3.39	1.85	—	0.39	TTSS16014M	8mm
4156205	KM4X100HPVTTH100630	1	1.73	2.08	2.23	6.30	2.72	1.85	4.81	0.39	TTSS16014M	8mm
4156206	KM4X100HPVTTH125472	1 1/4	1.73	2.08	—	4.72	3.59	2.01	—	0.39	TTSS16014M	8mm
4156207	KM4X100HPVTTH125630	1 1/4	1.73	2.08	2.23	6.30	2.72	2.01	4.81	0.39	TTSS16014M	8mm
4156208	KM4X100HPVTTH150531	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).



Tooling Systems

Collet Capacity

TG collet series	mm		inch	
	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

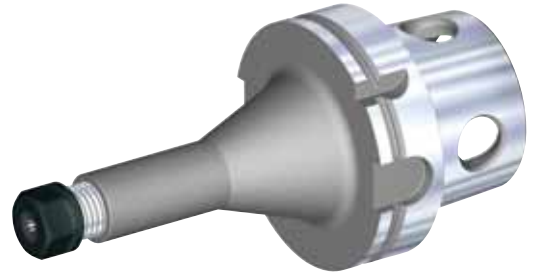
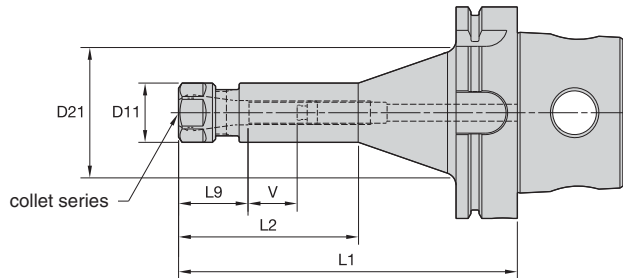


■ TG Round-KM4X

order number	catalog number	collet series	D11	L1	L9	V	locknut	locknut wrench	Nm	stop screw	wrench size stop screw
4156445	KM4X100TG050105M	TG50	38	105	42	40	LNA050M	HSW34M	68	SS056041G	4mm & 5/32
4156446	KM4X100TG050160M	TG50	38	160	42	58	LNA050M	HSW34M	68	SS056041G	4mm & 5/32
4156447	KM4X100TG075120M	TG75	50	120	54	46	LNA075M	HSW45M	136	SS081041G	4mm & 5/32
4156448	KM4X100TG100140M	TG100	60	140	70	45	LNA100M	HSW58M	203	SS112041G	4mm & 5/32
4156449	KM4X100TG150165M	TG150	85	165	84	46	LNA150M	HSW80M	271	SS162062G	4mm & 5/32

NOTE: First, load collet into locknut. Before loading into the chuck body, insert cutting tool, then tighten to recommended tightening torque.
 Supplied with locknut and stop screw.
 Locknut wrench must be ordered separately.

- Grip (2:1 advantage).



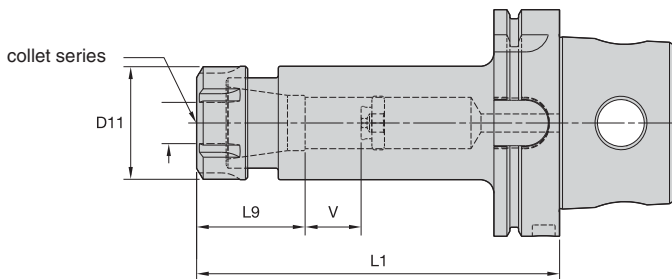
Tooling Systems

ER collet series	mm		inch	
	min	max	min	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



■ ER Hex-KM4X

order number	catalog number	collet series	D11	D21	L1	L2	L9	V	locknut	locknut wrench	Nm	stop screw	wrench size stop screw
4159999	KM4X100ER16100M	ER16	28	—	100	—	32	53	LNHSER16M	OEW25M	56	SS044038G	4mm & 5/32
4160000	KM4X100ER16160M	ER16	28	60	160	85	32	68	LNHSER16M	OEW25M	56	SS044038G	4mm & 5/32
4160001	KM4X100ER20100M	ER20	34	—	100	—	36	35	LNHSER20M	OEW30M	80	SS056041G	4mm & 5/32

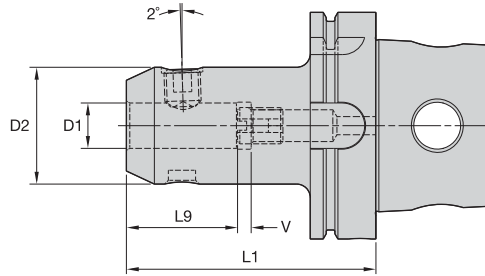


■ ER Round-KM4X

order number	catalog number	collet series	D11	L1	L9	V	locknut	locknut wrench	Nm	stop screw	wrench size stop screw
4160002	KM4X100ER25100M	ER25	42	100	40	33	LNSER25M	ER25WM	104	SS075041G	4mm & 5/32
4160043	KM4X100ER32100M	ER32	50	100	45	32	LNSER32M	ER32WM	136	SS094041G	4mm & 5/32
4160044	KM4X100ER32160M	ER32	50	160	45	92	LNSER32M	ER32WM	136	SS094041G	4mm & 5/32
4160045	KM4X100ER40120M	ER40	63	120	52	38	LNSER40M	ER40WM	175	SS112041G	4mm & 5/32



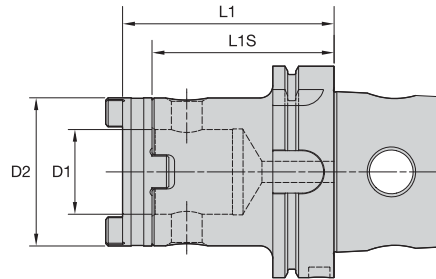
NOTE: First, load collet into locknut. Before loading into the chuck body, insert cutting tool, then tighten to recommended tightening torque.
 Supplied with locknut and stop screw.
 Locknut wrench must be ordered separately.



■ WN MM-KM4X • Metric

order number	catalog number	D1	D2	L1	L9	V	clamp screw	wrench size clamp screw	Nm	stop screw	wrench size stop screw
4160047	KM4X100WN06090M	6	24,5	90	30	10	SS03M012	3mm	7	571.060	2,5mm
4160048	KM4X100WN08090M	8	27,5	90	30	10	SS03M014	4mm	15	571.067	3mm
4160049	KM4X100WN10090M	10	34,5	90	35	10	SS03M018	5mm	25	571.068	4mm
4160050	KM4X100WN12100M	12	41,5	100	40	10	SS03M023	6mm	35	571.074	5mm
4160051	KM4X100WN14100M	14	43,5	100	40	10	SS03M023	6mm	35	571.074	5mm
4160052	KM4X100WN16100M	16	47,5	100	43	10	SS03M025	6mm	50	571.069	6mm
4160073	KM4X100WN18100M	18	49,5	100	43	10	SS03M025	6mm	50	571.069	6mm
4160074	KM4X100WN20110M	20	51,5	110	45	10	SS03M026	8mm	95	571.076	6mm
4160075	KM4X100WN25120M	25	64,5	120	50	10	SS03M027	10mm	135	571.077	6mm
4160076	KM4X100WN32120M	32	71,5	120	54	10	SS03M029	10mm	160	571.077	6mm

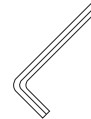
NOTE: Do not overtighten clamp screw; use torque recommendations above.
 Supplied with clamp screw and stop screw.
 Clamp screw and stop screw wrenches not included.



Tooling Systems



■ HTS-KM4X

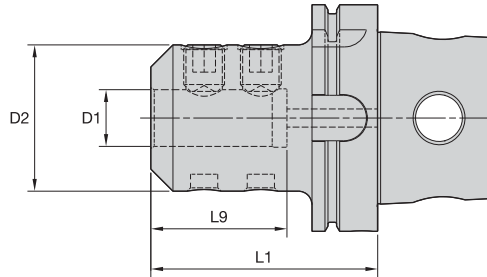


order number	catalog number	D1	D2	L1	L1S	clamp screw	hex wrench	drive ring	ft. lbs.	kg
4159439	KM4X100HTS40085M	40	70	99	85	191.728	170.008	192.424	26	3.80
4159440	KM4X100HTS50090M	50	80	106	90	191.728	170.008	192.425	26	4.27

NOTE: Shipped with drive ring and clamping screw.
Assemble components using recommended torque values.

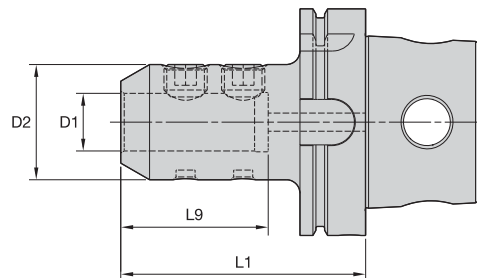


Tooling Systems



■ EM MM-KM4X • Metric

order number	catalog number	D1	D2	L1	L9	clamp screw	wrench size clamp screw	Nm
4160510	KM4X100EM06080M	6	24,5	80	52	SS03M012	3mm	7
4160511	KM4X100EM08080M	8	27,5	80	52	SS03M014	4mm	15
4160512	KM4X100EM10080M	10	34,5	80	52	SS03M018	5mm	25
4160533	KM4X100EM12080M	12	41,5	80	49	SS03M023	6mm	35
4160534	KM4X100EM14080M	14	43,5	80	49	SS03M023	6mm	35
4160535	KM4X100EM16100M	16	47,5	100	53	SS03M025	6mm	50
4160536	KM4X100EM18100M	18	49,5	100	53	SS03M025	6mm	50
4160537	KM4X100EM20100M	20	51,5	100	55	SS03M026	8mm	95
4160538	KM4X100EM25100M	25	64,5	100	60	SS03M027	10mm	135
4160539	KM4X100EM32100M	32	71,5	100	65	SS03M029	10mm	160
4160540	KM4X100EM40120M	40	89,5	120	75	SS03M032	10mm	160
4160541	KM4X100EM50130M	50	99,5	130	85	SS03M030	12mm	200

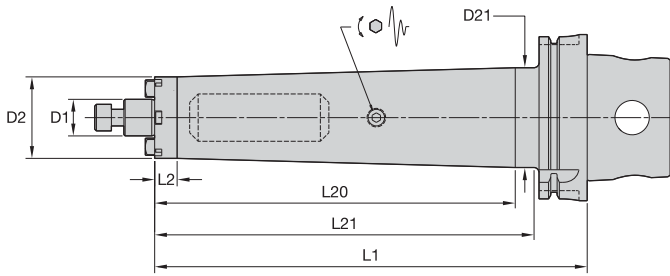


■ EM IN-KM4X • Inch

order number	catalog number	D1	D2	L1	L9	clamp screw	wrench size clamp screw	ft. lbs.
4160518	KM4X100EM025300	1/4	1.000	3.000	1.89	ELS025025	1/8	8
4160519	KM4X100EM038300	3/8	1.000	3.000	1.89	ELS038031	3/16	15
4160520	KM4X100EM050325	1/2	1.375	3.250	1.97	ELS044038	7/32	20
4160521	KM4X100EM062375	5/8	1.625	3.750	2.09	ELS056050	1/4	40
4160522	KM4X100EM075375	3/4	1.750	3.750	2.22	ELS062050	5/16	70
4160573	KM4X100EM100425	1	2.000	4.250	2.46	ELS075056	3/8	110
4160574	KM4X100EM125425	1 1/4	2.500	4.250	2.51	ELS075062	3/8	110
4160575	KM4X100EM150450	1 1/2	2.750	4.500	2.93	ELS075069	3/8	110
4160576	KM4X100EM200550	2	3.750	5.500	3.53	ELS100088	1/2	150
4160577	KM4X100EM250575	2 1/2	4.188	5.750	3.63	ELS100088	1/2	150

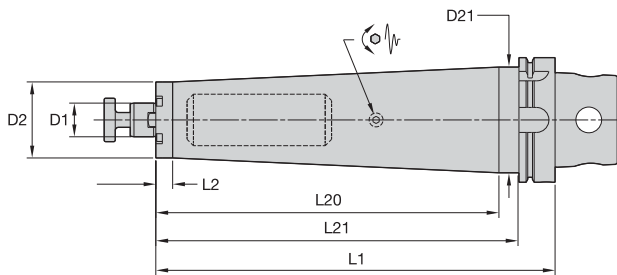


NOTE: Do not overtighten clamp screw; use torque recommendations above.
 Supplied with clamp screw.
 Clamp screw wrench not included.



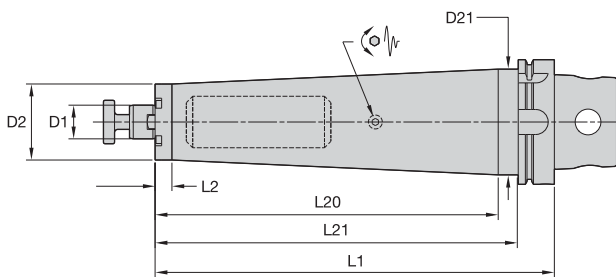
■ SMC TD CAP MM-KM4X • Metric

order number	catalog number	D1	D2	D21	L1	L2	L20	L21	lock screw	wrench size lock screw
4169583	KM4X100TDSMC22260M	22	49	65	260	13,5	215	231	MS-1234	8mm



■ SMC TD Lock MM-KM4X • Metric

order number	catalog number	D1	D2	D21	L1	L2	L20	L21	lock screw	wrench size lock screw
4169584	KM4X100TDSMC27320M	27	61	85	320	13,5	275	291	KLSS27M	10mm
4169585	KM4X100TDSMC32330M	32	78	—	330	299	—	—	KLSS32M	14mm

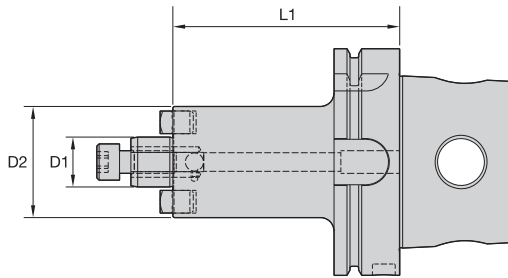


■ SMC TD Lock IN-KM4X • Inch

order number	catalog number	D1	D2	D21	L1	L2	L20	L21	clamp screw	wrench size clamp screw
4169586	KM4X100TDSMC0751050	3/4	1.75	2.56	10.5	.53	8.73	9.24	KLS07	1/4
4169587	KM4X100TDSMC1001250	1	2.75	3.33	12.5	.53	10.73	11.36	KLS10	5/16
4169588	KM4X100TDSMC1251300	1 1/4	2.88	3.33	13	.63	11.23	11.86	KLS12	5/16



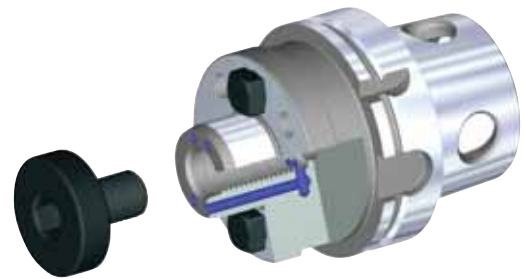
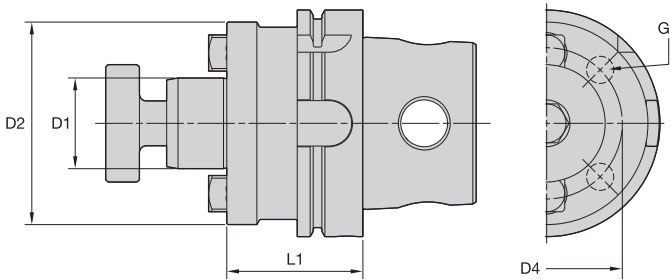
NOTE: Do not overtighten lock screw; use torque recommendations above.
Supplied with lock screw and drive keys.
Lock screw wrench not included.



■ SMC CAP MM-KM4X • Metric



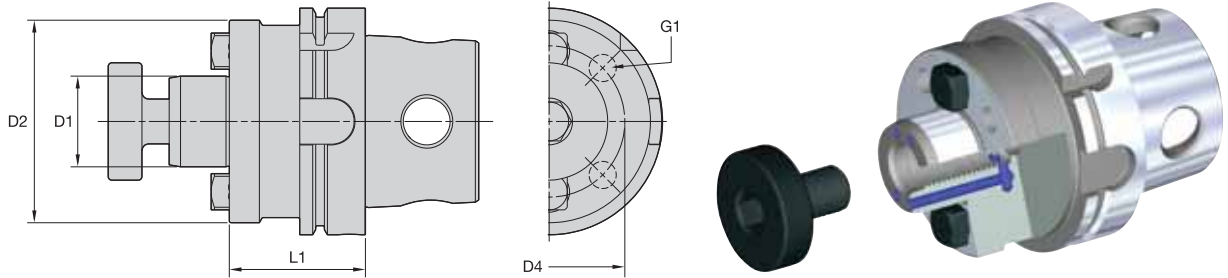
order number	catalog number	D1	D2	L1	lock screw	wrench size lock screw
4160335	KM4X100SMC22050M	22	49	50	MS1234	8mm
4160337	KM4X100SMC22100M	22	49	100	MS1234	8mm
4160338	KM4X100SMC22160M	22	49	160	MS1234	8mm



■ SMC Lock MM-KM4X • Metric



order number	catalog number	D1	D2	D4	G1	L1	lock screw	wrench size lock screw
4160340	KM4X100SMC27050M	27	60	—	—	50	KLSS27M	10mm
4160341	KM4X100SMC27100M	27	60	—	—	100	KLSS27M	10mm
4160342	KM4X100SMC27160M	27	60	—	—	160	KLSS27M	10mm
4160343	KM4X100SMC32050M	32	78	—	—	50	KLSS32M	14mm
4160344	KM4X100SMC32100M	32	78	—	—	100	KLSS32M	14mm
4160345	KM4X100SMC32160M	32	78	—	—	160	KLSS32M	14mm
4160346	KM4X100SMC40060M	40	89	67	M12x1,75	60	KLSS40M	17mm
4160347	KM4X100SMC40100M	40	89	67	M12x1,75	100	KLSS40M	17mm
4160348	KM4X100SMC40160M	40	89	67	M12x1,75	160	KLSS40M	17mm
4160350	KM4X100SMC50070M	50	98	—	—	70	KLS50M	SMW50M
4160351	KM4X100SMC50100M	50	98	—	—	100	KLS50M	SMW50M
4160352	KM4X100SMC50160M	50	98	—	—	160	KLS50M	SMW50M
4160353	KM4X100SMC60070M	60	129	102	M16x2,0	70	—	—
4160354	KM4X100SMC60100M	60	129	102	M16x2,0	100	—	—
4160355	KM4X100SMC60160M	60	129	102	M16x2,0	160	—	—

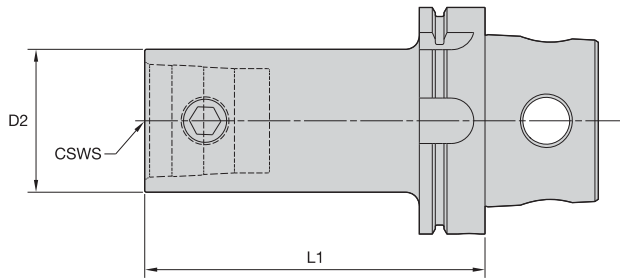


■ SMC Lock IN-KM4X • Inch



order number	catalog number	D1	D2	D4	G1	L1	lock screw	wrench size lock screw
4160286	KM4X100SMC075400	3/4	1.75	—	—	4.00	KLS07	1/4
4160287	KM4X100SM2C075400	3/4	1.46	—	—	4.00	KLS07	1/4
4160289	KM4X100SMC075600	3/4	1.75	—	—	6.00	KLS07	1/4
4160290	KM4X100SM2C075600	3/4	1.46	—	—	6.00	KLS07	1/4
4160291	KM4X100SMC100400	1	2.75	—	—	4.00	KLS10	5/16
4160292	KM4X100SM2C100400	1	2.19	—	—	4.00	KLS10	5/16
4160313	KM4X100SMC100600	1	2.75	—	—	6.00	KLS10	5/16
4160314	KM4X100SM2C100600	1	2.19	—	—	6.00	KLS10	5/16
4160315	KM4X100SMC125400	1 1/4	2.88	—	—	4.00	KLS12	5/16
4160316	KM4X100SMC125600	1 1/4	2.88	—	—	6.00	KLS12	5/16
4160317	KM4X100SMC150400	1 1/2	3.81	—	—	4.00	KLS15	3/8
4160318	KM4X100SMC150600	1 1/2	3.81	—	—	6.00	KLS15	3/8
4160319	KM4X100SMC200400	2	4.88	4.00	5/8 - 11	4.00	KLS20	9/16
4160320	KM4X100SMC200600	2	4.88	4.00	5/8 - 11	6.00	KLS20	9/16
4160321	KM4X100SMC250400	2 1/2	4.88	4.00	5/8 - 11	4.00	—	1/2
4160322	KM4X100SMC250600	2 1/2	4.88	4.00	5/8 - 11	6.00	—	1/2

NOTE: Do not overtighten lock screw; use torque recommendations above.
 Supplied with lock screw and drive keys.
 Lock screw wrench not included.



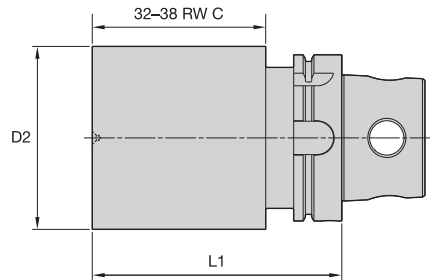
■ KM-KM4X

Tooling Systems

order number	catalog number	CSWS	D2	L1	spare parts package	wrench size actuation screw	Nm
4161856	KM4X100KM32075M	32	32	75	KM32PKGS	5mm	8 - 11
4161858	KM4X100KM40080M	40	40	80	KM40PKGS	6mm	12 - 16
4161859	KM4X100KM40100M	40	40	100	KM40PKGS	6mm	12 - 16
4161860	KM4X100KM40150M	40	40	150	KM40PKGS	6mm	12 - 16
4161861	KM4X100KM50100M	50	50	100	KM50PKGS	10mm	27 - 34
4161862	KM4X100KM50150M	50	50	150	KM50PKGS	10mm	27 - 34
4161863	KM4X100KM50200M	50	50	200	KM50PKGS	10mm	27 - 34
4161864	KM4X100KM63100M	63	63	100	KM63PKGS	12mm	47 - 54
4161865	KM4X100KM63150M	63	63	150	KM63PKGS	12mm	47 - 54
4161866	KM4X100KM63200M	63	63	200	KM63PKGS	12mm	47 - 54
4161867	KM4X100KM80100M	80	80	100	KM80PKGS	14mm	79 - 85
4161868	KM4X100KM80150M	80	80	150	KM80PKGS	14mm	79 - 85
4161869	KM4X100KM80200M	80	80	200	KM80PKGS	14mm	79 - 85

NOTE: Do not overtorque actuation screw; use torque recommendations above.
Supplied with KM actuation mechanism.

- Machinable front 32–38 RW C.



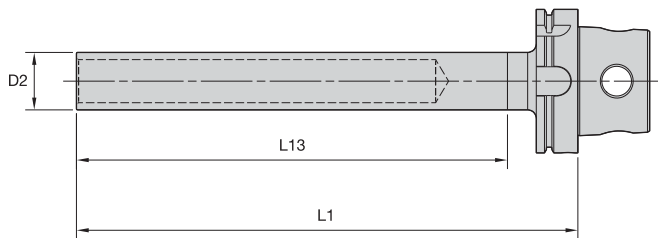
Tooling Systems



■ **BB-KM4X**

order number	catalog number	D2	L1
4160571	KM4X100BN080150M	80	150
4160572	KM4X100BN110150M	110	150
4160613	KM4X100BN130200M	130	200

- For acceptance testing on machine tool spindles.
- 0,003mm (.0001") maximum TIR.
- Precision ground.



■ **GB-KM4X**

order number	catalog number	D2	L1	L13
4160529	KM4X100GB40349M	40	349	330

Our complete portfolio. Your complete satisfaction.



From turning, holmaking, and indexable milling to solid carbide end milling, solid carbide drilling, and tapping, the most powerful tools in the business now proudly wear WIDIA™ brands. When you buy WIDIA products, you're not just purchasing speed, power, and precision, you're investing in quality and complete satisfaction.

Match the most expansive portfolio of precision-engineered products and engineered solution services available today with a global, specialized network of Authorized Distributor partners, and you have the tools you need — and the power that only comes from WIDIA brands. For product information, or to schedule an onsite demonstration, visit www.widia.com.

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

WIDIA 

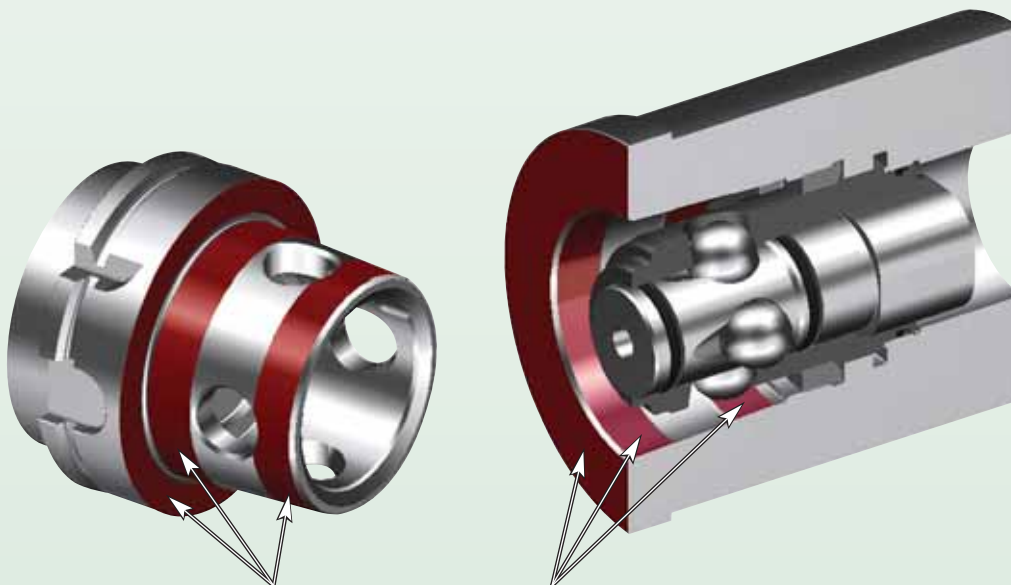
KM4X™ — The Next Generation Spindle Connection System

As a global tooling supplier and a true customer support partner, we recognize the need to offer tooling products for all spindle interfaces and make available solutions to provide the best cutting edges to gain maximum productivity at the spindle system connection.

KM4X is the latest version of the KM™ spindle interface targeted at heavy-duty machining operations and is a top choice for machining large, structural tough-to-machine materials like titanium for the aerospace industry.

The Latest Innovation in Spindle Interface Technology

- KM4X offers the most rigid connection able to withstand extremely high bending due to a combination of high interference and high clamping forces.
- KM4X provides 3x more bending capacity than comparable face contact systems.
- KM is the only connection that maintains stiffness at elevated rotational speeds and is suitable for a range of applications from low speeds with high torque to very high spindle speeds with low torque.
- KM4X maintains a better balance between bending and torsion capabilities.
- The ability to retrofit KM4X to an existing machine tool offers the added advantage of increasing throughput.
- Heavy-duty, rigid configuration with evenly distributed clamping force.
- Simple design enables front-loaded spindle configuration.
- Balanced-by-design for high spindle speed capacity.



KM4X three-surface contact for improved stability and accuracy.
Optimized clamping force distribution and interference fit provides higher stiffness.

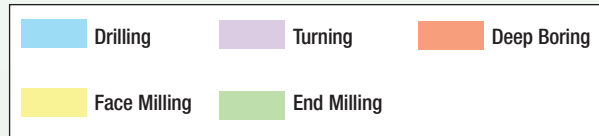
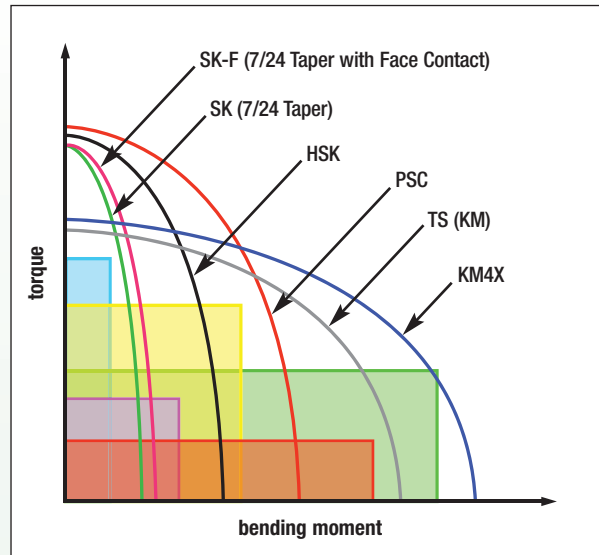
Tooling Systems

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.

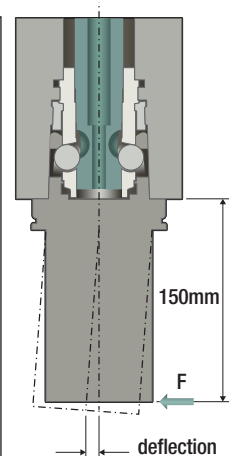
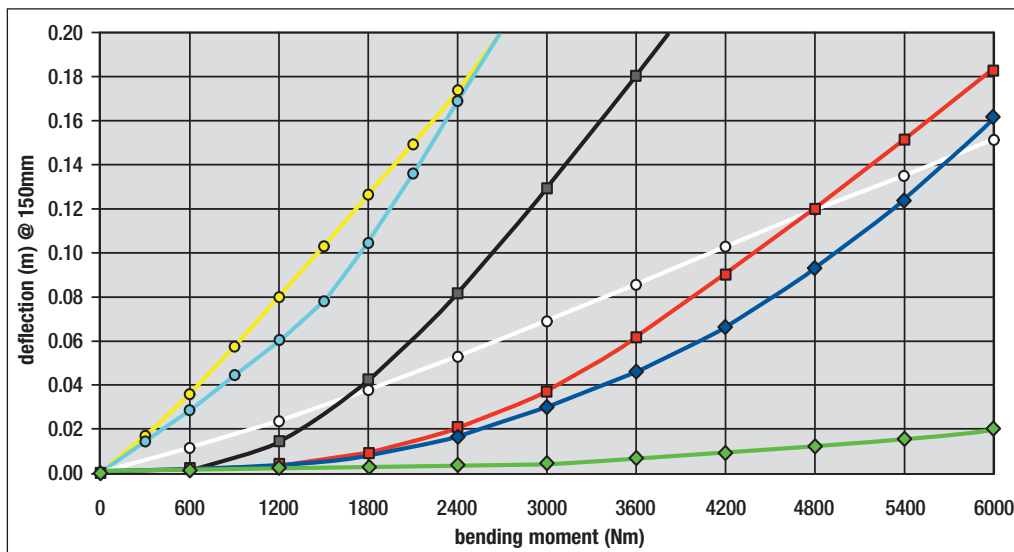
The lines on the chart to the right represent the load capacity of HSK, PSC, and KM4X. The shaded areas represent the typical requirements for heavy-duty applications in various machining processes. KM4X is the only system that can deliver the torque and bending capacity required for achieving high-performance 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.

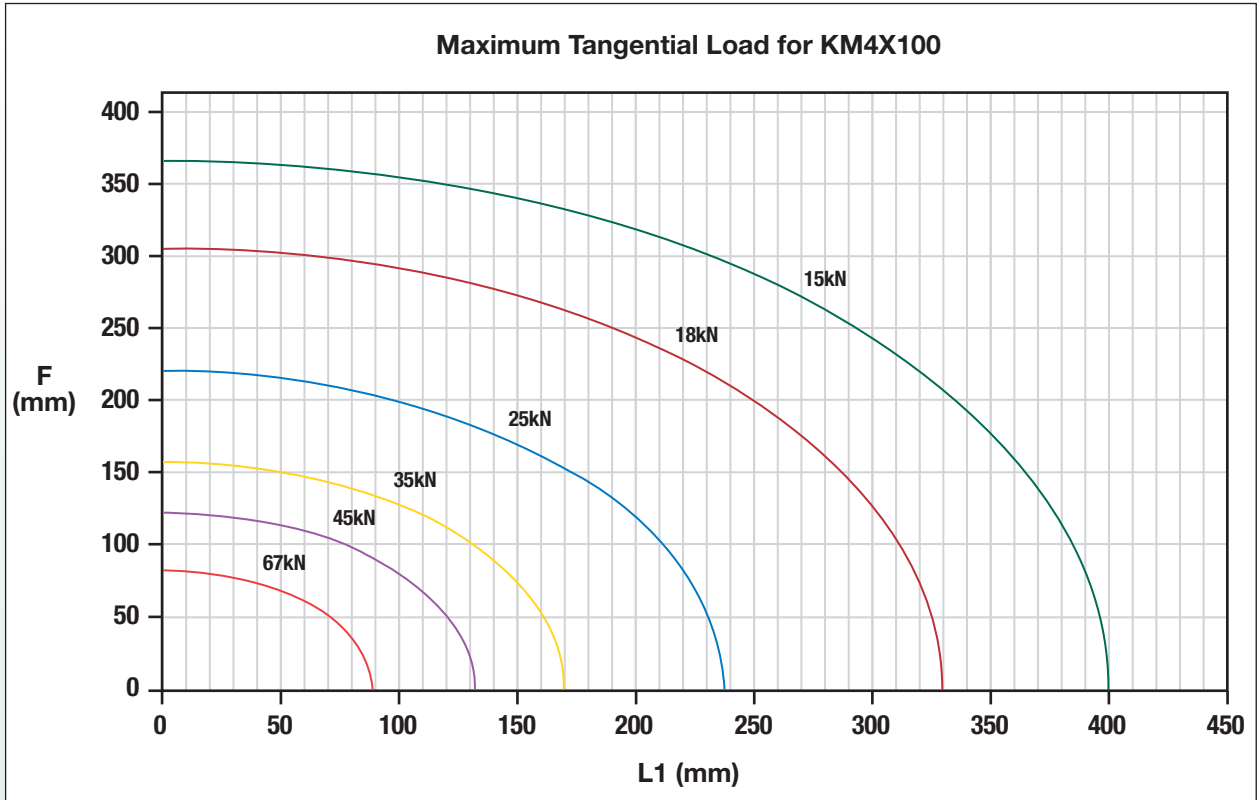


IMPORTANT

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 pull out or spinning of the tool.
- No damage to the workpiece or machine.
- Groove on tool shank is directed so the tool will be pulled into the chuck (depending on direction of rotation).



Order Information

WIDIA™ high-performance end mills with a shank diameter of 1/2" (12mm) and larger are available with **SAFE-LOCK™** technology, as a special tool, upon request. Please contact your local customer service location to receive a quote.

Features

- Form-closed clamping.
- High accuracy clamping.
- Helical grooves.

Functions

- No pullout.
- Excellent runout.
- Adjustable clamping length.

Benefits

- Reduce scrap rate.
- Higher tool life.
- No need to change NC program after regrinding.



Example for Highest Metal Removal Rates



The VariMill II™ ER proprietary design with **unequal flute spacing** and unique core geometry for chatter-free machining enables slotting operations in titanium up to 1 x D.



SAFE-LOCK™

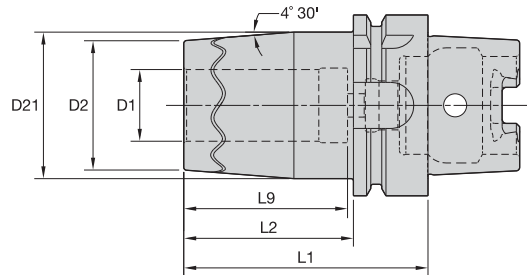
The safety belt for high-performance solid carbide end mills provides a form-closed clamping with high accuracy and helical grooves for length adjustment.

HSK63A Shank Tools

SAFE-LOCK™ Shrink Fit Toolholders



- SAFE-LOCK™, innovative and unique non-slip system.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 10 kW shrink unit.



SAFE-LOCK™
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-HSK Form A

order number	catalog number	D1	D2	D21	L1	L2	L9	kg
5090218	HSK63ASFTT12070M	12	27	33	70	44	46	0,84
5090219	HSK63ASFTT14075M	14	30	37	75	49	48	0,91
5090220	HSK63ASFTT16075M	16	30	37	75	49	49	0,89
5090221	HSK63ASFTT18075M	18	36	43	75	49	49	1,00
5090222	HSK63ASFTT20075M	20	36	43	75	49	49	0,97
5090223	HSK63ASFTT25085M	25	45	51	85	59	57	1,27
5090224	HSK63ASFTT32085M	32	45	51	85	59	59	1,12

Cutting Tool Shank Requirements
inch (industry standard)

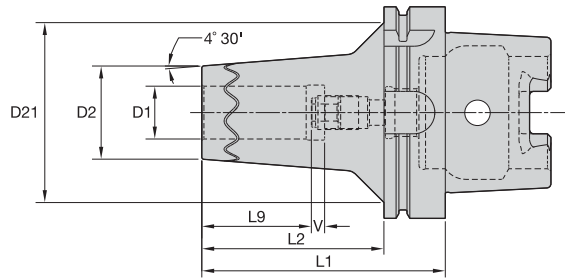
cutting tool shank diameter	tolerance
7/16, 1/2, 9/16, & 5/8	.0000/-0.0004
3/4, 7/8, 1, & 1-1/4	.0000/-0.0005

■ TT SF IN-HSK Form A

order number	catalog number	D1	D2	D21	L1	L2	L9	lbs
5090233	HSK63ASFTT050276	1/2	1.04	1.32	2.76	1.73	1.81	1.84
5090234	HSK63ASFTT062295	5/8	1.16	1.47	2.95	1.93	1.93	1.96
5090235	HSK63ASFTT075295	3/4	1.40	1.70	2.95	1.93	1.93	2.16
5090236	HSK63ASFTT100335	1	1.77	2.01	3.35	2.32	2.24	2.78
5090237	HSK63ASFTT125335	1 1/4	1.77	2.01	3.35	2.32	2.32	2.49

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
HSK coolant unit and wrench are available and must be ordered separately;
see Tooling Systems catalog A-09-02122.

- SAFE-LOCK™, innovative and unique.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 10 kW shrink unit.



SAFE-LOCK™
by HAIMER

Cutting Tool Shank Requirements
metric (ISO standard)

cutting tool shank diameter	tolerance	
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013
32	h6	0,000/-0,016

ERICKSON

■ TT SF MM-HSK Form A

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5090056	HSK100ASFTT12095M	12	27	73	95	66	37	10	2,45
5090057	HSK100ASFTT14095M	14	33	60	95	66	37	10	2,54
5090058	HSK100ASFTT16100M	16	33	78	100	71	40	10	2,60
5090059	HSK100ASFTT18100M	18	44	76	100	71	40	10	2,98
5090210	HSK100ASFTT20105M	20	44	85	105	76	42	10	3,07
5090211	HSK100ASFTT25115M	25	44	85	115	86	48	10	3,16

Cutting Tool Shank Requirements
inch (industry standard)

cutting tool shank diameters	tolerance
1/4, 5/16, & 3/8	.0000/- .0004
1/2 & 5/8	.0000/- .0004
3/4, 7/8, 1, 1-1/4, & 1-1/2	.0000/- .0005

■ TT SF IN-HSK Form A

order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
5090225	HSK100ASFTT050374	1/2	1.06	2.87	3.74	2.60	1.46	.39	5.40
5090226	HSK100ASFTT062394	5/8	1.30	3.07	3.94	2.80	1.57	.39	5.64
5090227	HSK100ASFTT075413	3/4	1.73	3.35	4.13	2.99	1.65	.39	6.81
5090228	HSK100ASFTT100453	1	1.73	3.35	4.53	3.39	1.89	.39	6.94

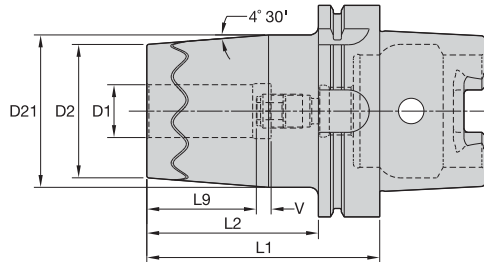
NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder. HSK coolant unit and wrench are available and must be ordered separately; see Tooling Systems catalog A-09-02122.

HSK100A Shank Tools

SAFE-LOCK™ Heavy-Duty Shrink Fit Toolholders



- SAFE-LOCK™, innovative and unique.
- Ultra short and heavy-duty design.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 20 kW shrink unit.



SAFE-LOCK™
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 HD MM-HSK Form A

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5090212	HSK100ASFHDTT16100M	16	51	62	100	71	40	10	3,27
5090213	HSK100ASFHDTT20100M	20	58	67	100	71	42	10	3,57
5090214	HSK100ASFHDTT25110M	25	63	72	110	81	48	10	4,06
5090215	HSK100ASFHDTT32110M	32	70	78	110	81	52	10	4,37
5090216	HSK100ASFHDTT40140M	40	82	94	140	111	77	10	6,36
5090217	HSK100ASFHDTT50140M	50	82	94	140	111	77	10	5,90

Cutting Tool Shank Requirements
inch (industry standard)

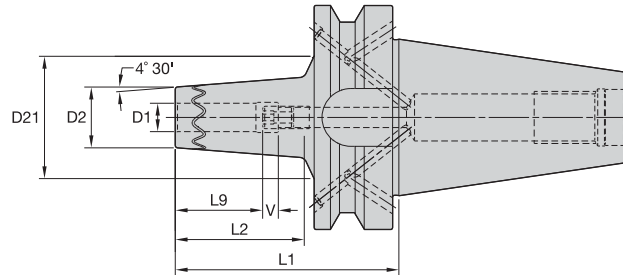
cutting tool shank diameters	tolerance
1/4, 5/16, & 3/8	.0000/- .0004
1/2 & 5/8	.0000/- .0004
3/4, 7/8, 1, 1-1/4, & 1-1/2	.0000/- .0005

■ TT SF HD IN-HSK Form A

order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
5090229	HSK100ASFHDTT100433	1	2.48	2.83	4.33	3.19	1.89	.39	8.90
5090230	HSK100ASFHDTT125433	1 1/4	2.76	3.07	4.33	3.19	2.05	.39	9.64
5090231	HSK100ASFHDTT150551	1 1/2	3.23	3.70	5.51	4.37	3.03	.39	14.15
5090232	HSK100ASFHDTT200551	2	3.23	3.70	5.51	4.37	3.03	.39	12.90

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
HSK coolant unit and wrench are available and must be ordered separately;
see Tooling Systems catalog A-09-02122.

- SAFE-LOCK™, innovative and unique non-slip system.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 10 kW shrink unit.



SAFE-LOCK™
by HAIMER

Tooling Systems

Cutting Tool Shank Requirements
metric (ISO standard)

cutting tool shank diameter	tolerance	
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013
32	h6	0,000/-0,016

ERICKSON

■ TT SF MM-BT Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5090264	BT40BSFTT12070M	12	27	33	70	43	37	10	1,14
5090265	BT40BSFTT14075M	14	30	37	75	48	37	10	1,21
5090266	BT40BSFTT16075M	16	30	37	75	48	40	10	1,18
5090267	BT40BSFTT18075M	18	36	43	75	48	40	10	1,29
5090268	BT40BSFTT20075M	20	36	43	75	48	42	10	1,24
5090269	BT40BSFTT25085M	25	46	55	85	58	48	10	1,59
5090270	BT40BSFTT32085M	32	46	55	85	58	48	10	1,43

Cutting Tool Shank Requirements
inch (industry standard)

cutting tool shank diameters	tolerance
1/2 & 5/8	.0000/- .0004
3/4, 1	.0000/- .0005

■ TT SF IN-BT Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
5129960	BT40BSFTT050276	1/2	1.04	1.31	2.76	1.69	1.46	.39	2.50
5129962	BT40BSFTT062295	5/8	1.16	1.46	2.95	1.89	1.58	.39	2.61
5129963	BT40BSFTT075295	3/4	1.40	1.70	2.95	1.89	1.65	.39	2.77
5129964	BT40BSFTT100335	1	1.79	2.15	3.35	2.28	1.89	.39	3.48

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
For retention knobs, see Tooling Systems catalog A-09-02122.

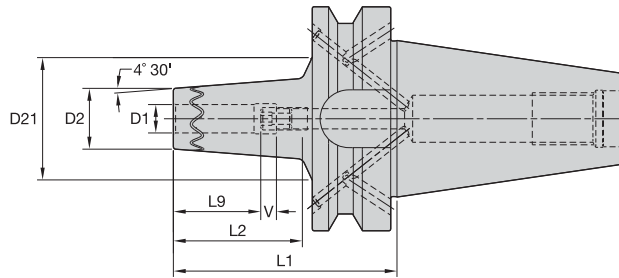
			40	(2x) SFV40	1,5mm
			50	(2x) SFV50	1,5mm

BT50 Shank Tools

SAFE-LOCK™ Shrink Fit Toolholders



- SAFE-LOCK™, innovative and unique non-slip system.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 10 kW shrink unit.



SAFE-LOCK™
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

ERICKSON

■ TT SF HPV MM-BT Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5090277	BT50BSFTT12100M	12	27	55	100	62	37	10	3,98
5090278	BT50BSFTT14100M	14	33	43	100	62	37	10	4,11
5090279	BT50BSFTT16100M	16	33	43	100	62	40	10	4,08
5090280	BT50BSFTT18100M	18	45	54	100	62	40	10	4,44
5090281	BT50BSFTT20100M	20	45	54	100	62	42	10	4,39
5090282	BT50BSFTT25100M	25	45	54	100	62	48	10	4,29

Cutting Tool Shank Requirements
inch (industry standard)

cutting tool shank diameters	tolerance
	1/2 & 5/8	.0000/- .0004
3/4, 1	.0000/- .0005

■ TT SF HPV IN-BT Form B/AD

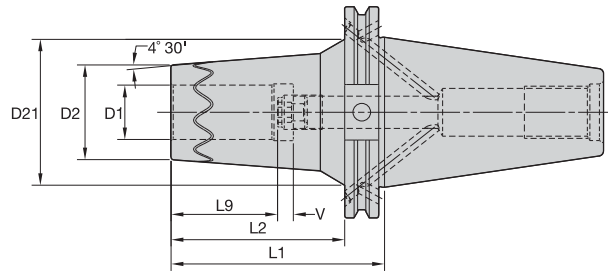
order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
5129965	BT50BSFTT050394	1/2	1.06	2.17	3.94	2.44	1.46	.39	8.76
5129966	BT50BSFTT062394	5/8	1.31	1.70	3.94	2.44	1.58	.39	8.99
5129967	BT50BSFTT075394	3/4	1.76	2.14	3.94	2.44	1.65	.39	9.71
5129968	BT50BSFTT100394	1	1.76	2.14	3.94	2.44	1.89	.39	9.45

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
HSK coolant unit and wrench are available and must be ordered separately;
see Tooling Systems catalog A-09-02122.

			40	(2x) SFV40	1,5mm
			50	(2x) SFV50	1,5mm



- SAFE-LOCK™, innovative and unique non-slip system.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 10 kW shrink unit.



SAFE-LOCK™
by HAIMER

Tooling Systems

ERICKSON

■ TT SF MM-CV Z Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5089582	CV40ZBSFTT12M256	12	27	34	65	46	37	10	1,00
5089583	CV40ZBSFTT16M256	16	30	37	65	46	40	10	1,01
5089584	CV40ZBSFTT20M256	20	36	43	65	46	42	10	1,06
5089585	CV40ZBSFTT25M295	25	46	51	75	56	48	10	1,29

Cutting Tool Shank Requirements
metric (ISO standard)

cutting tool shank diameter	tolerance	
	12, 16	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013

Cutting Tool Shank Requirements
inch (industry standard)

cutting tool shank diameters	tolerance
	1/2 & 5/8	.0000/- .0004
3/4, 1	.0000/- .0005

■ TT SF IN-CV Z Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
5089586	CV40ZBSFTT050256	1/2	1.04	1.33	2.56	1.81	1.46	.39	2.20
5089587	CV40ZBSFTT062256	5/8	1.16	1.45	2.56	1.81	1.58	.39	2.22
5089588	CV40ZBSFTT075256	3/4	1.40	1.68	2.56	1.81	1.65	.39	2.37
5089589	CV40ZBSFTT100295	1	1.79	2.03	2.95	2.20	1.89	.39	2.82

CV40Z toolholders deviate from ANSI-B5.50 standard. The 1.750" hub in front of the V-flange has been eliminated to achieve short gage lengths.

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
HSK coolant unit and wrench are available and must be ordered separately;
see Tooling Systems catalog A-09-02122.

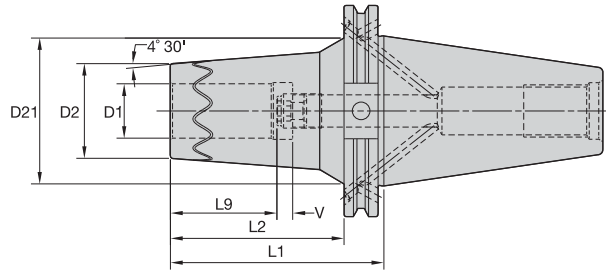
			40	(2x) SFV40	1,5mm
			50	(2x) SFV50	1,5mm

CAT50 Shank Tools

SAFE-LOCK™ Shrink Fit Toolholders



- SAFE-LOCK™, innovative and unique non-slip system.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 10 kW shrink unit.



SAFE-LOCK™
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

ERICKSON

■ TT SF MM-CV Z Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5089650	CV50ZBSFTT12M315	12	27	55	80	61	37	10	2,95
5089651	CV50ZBSFTT14M315	14	33	43	80	61	37	10	3,08
5089652	CV50ZBSFTT16M315	16	33	43	80	61	37	10	3,04
5089653	CV50ZBSFTT18M315	18	45	54	80	61	40	10	3,39
5089654	CV50ZBSFTT20M315	20	45	54	80	61	42	10	3,35
5089655	CV50ZBSFTT25M394	25	44	68	100	81	48	10	3,63

Cutting Tool Shank Requirements
inch (industry standard)

cutting tool shank diameters	tolerance
1/2 & 5/8	.0000/- .0004
3/4, 7/8, 1	.0000/- .0005

■ TT SF IN-CV Z Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
5089656	CV50ZBSFTT050315	1/2	1.06	2.17	3.15	2.40	1.46	.39	6.49
5089657	CV50ZBSFTT062315	5/8	1.31	1.69	3.15	2.40	1.46	.39	6.71
5089658	CV50ZBSFTT075315	3/4	1.76	2.14	3.15	2.40	1.65	.39	7.41
5089659	CV50ZBSFTT100394	1	1.73	2.68	3.94	3.19	1.89	.39	7.33

CV50Z toolholders deviate from ANSI-B5.50 standard. The 1.750" hub in front of the V-flange has been eliminated to achieve short gage lengths.

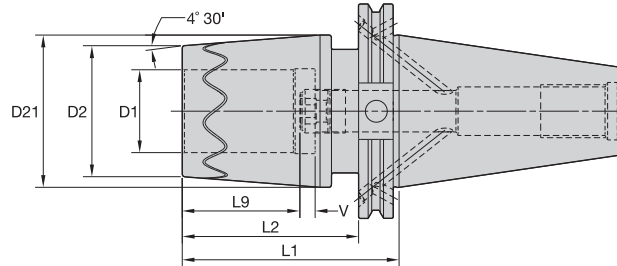
NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
HSK coolant unit and wrench are available and must be ordered separately;
see Tooling Systems catalog A-09-02122.

			40	(2x) SFV40	1,5mm
			50	(2x) SFV50	1,5mm



Tooling Systems

- SAFE-LOCK™, innovative and unique non-slip system.
- Ultra short and heavy-duty design.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 20 kW shrink unit.



SAFE-LOCK™
by HAIMER

Cutting Tool Shank Requirements
metric (ISO standard)

cutting tool shank diameter	tolerance	
	25	h6	0,000/-0,013
32, 40, & 50	h6	0,000/-0,016

ERICKSON

■ TT SF HD MM-CV Z Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5089660	CV50ZBSFHDTT25M354	25	63	71	90	71	48	10	4,29
5089661	CV50ZBSFHDTT32M354	32	70	78	90	71	51	10	4,44
5089662	CV50ZBSFHDTT40M394	40	82	90	100	81	78	10	5,07
5089663	CV50ZBSFHDTT50M551	50	82	94	140	121	78	10	6,77

Cutting Tool Shank Requirements
inch (industry standard)

cutting tool shank diameters	tolerance
1, 1-1/4, 1-1/2, & 2	.0000/-0.0005

■ TT SF HD IN-CV Z Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
5089664	CV50ZBSFHDTT100354	1	2.48	2.81	3.54	2.79	1.89	.39	9.44
5089665	CV50ZBSFHDTT125354	1 1/4	2.76	3.07	3.54	2.79	2.01	.39	9.81
5089666	CV50ZBSFHDTT150394	1 1/2	3.23	3.54	3.94	3.19	3.07	.39	11.35
5089667	CV50ZBSFHDTT200551	2	3.23	3.70	5.51	4.76	3.07	.39	14.84

CV50Z toolholders deviate from ANSI-B5.50 standard. The 2.750" hub in front of the V-flange has been eliminated to achieve short gage lengths.

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
HSK coolant unit and wrench are available and must be ordered separately;
see Tooling Systems catalog A-09-02122.

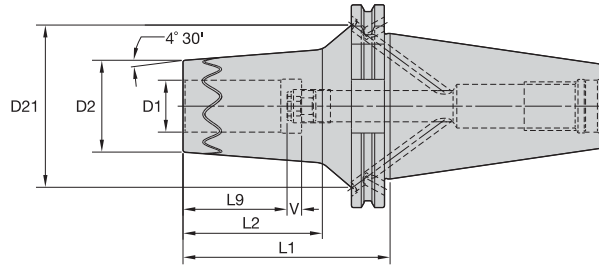
			40	(2x) SFV40	1,5mm
			50	(2x) SFV50	1,5mm

DV40 Shank Tools

SAFE-LOCK™ Shrink Fit Toolholders



- SAFE-LOCK™, innovative and unique non-slip system.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 10 kW shrink unit.



SAFE-LOCK™
by HAIMER

Tooling Systems

Cutting Tool Shank Requirements
metric (ISO standard)

cutting tool shank diameter	tolerance	
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013
32	h6	0,000/-0,016

ERICKSON

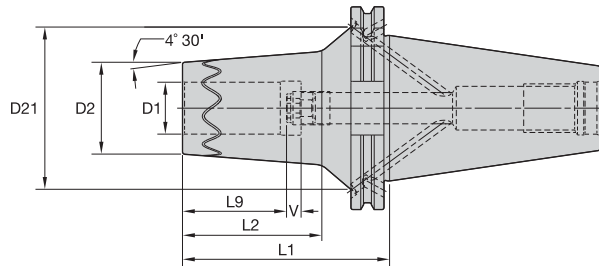
TT SF HPV MM-DV Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5129969	DV40BSFTT12065M	12	27	34	65	46	37	10	1,00
5129970	DV40BSFTT14065M	14	30	37	65	46	37	10	1,04
5090239	DV40BSFTT16065M	16	30	37	65	46	40	10	1,01
5090260	DV40BSFTT18065M	18	36	43	65	46	40	10	1,10
5090261	DV40BSFTT20065M	20	36	43	65	46	42	10	1,07
5090262	DV40BSFTT25075M	25	46	52	75	56	48	10	1,35
5090263	DV40BSFTT32080M	32	46	53	80	61	48	10	1,27

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
HSK coolant unit and wrench are available and must be ordered separately;
see Tooling Systems catalog A-09-02122.

			40	(2x) SFV40	1,5mm
			50	(2x) SFV50	1,5mm

- SAFE-LOCK™, innovative and unique non-slip system.
- Suitable for carbide and HSS cutting tools.
- Need ≥ 10 kW shrink unit.



SAFE-LOCK™
by HAIMER

Tooling Systems

Cutting Tool Shank Requirements
metric (ISO standard)

cutting tool shank diameter	tolerance	
12, 14, 16, & 18	h6	0,000/-0,011
20 & 25	h6	0,000/-0,013

ERICKSON

■ TT SF HPV MM-DV Form B/AD

order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
5090271	DV50BSFTT12080M	12	27	55	80	61	37	10	2,97
5090272	DV50BSFTT14080M	14	33	43	80	61	37	10	3,10
5090273	DV50BSFTT16080M	16	33	43	80	61	40	10	3,06
5090274	DV50BSFTT18080M	18	45	54	80	61	40	10	3,41
5090275	DV50BSFTT20080M	20	45	54	80	61	42	10	3,37
5090276	DV50BSFTT25100M	25	44	78	100	81	48	10	3,72

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
HSK coolant unit and wrench are available and must be ordered separately;
see Tooling Systems catalog A-09-02122.

form AD					
form B			40	(2x) SFV40	1,5mm
			50	(2x) SFV50	1,5mm



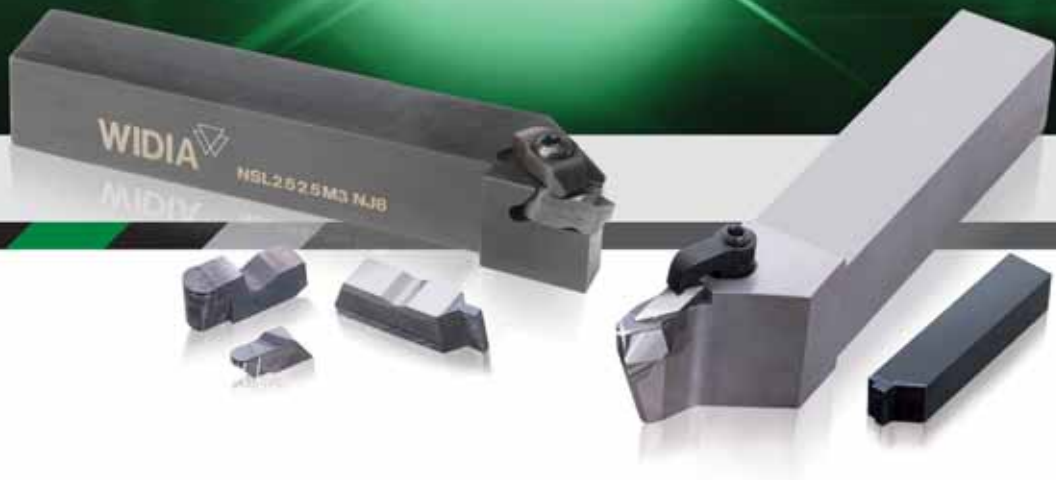
SAFE-LOCK™

SAFE-LOCK™ is a pullout protection system for end mill cutters and holder systems that benefits security, in particular for heavy-duty cutting. This is achieved by helical grooves that are ground into the shank of the end mill tool shank. These, together with the respective pin drivers in a shrink fit holder, prevent the tool from being pulled out, even during extreme machining conditions. By locking the cutting tool in the holder, this pullout security ensures optimum process reliability in conjunction with shrink fit runout accuracies and rigidity for longer tool life and maintains higher productivity and part accuracies for our customers.



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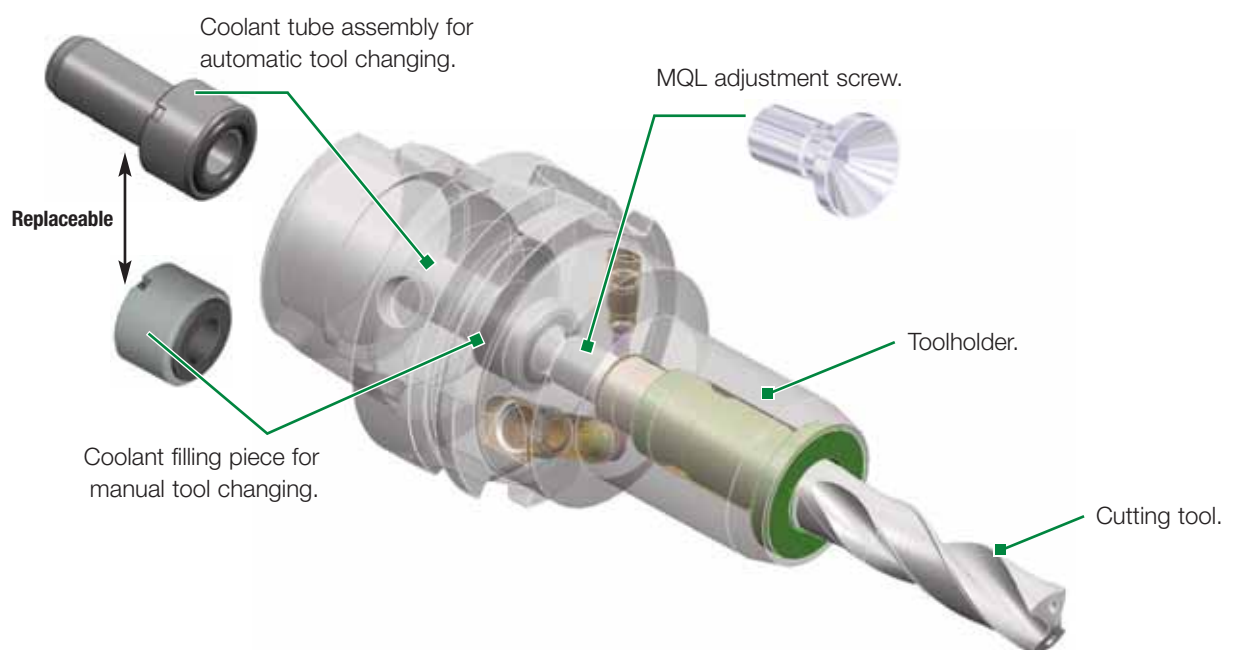
WIDIA 

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

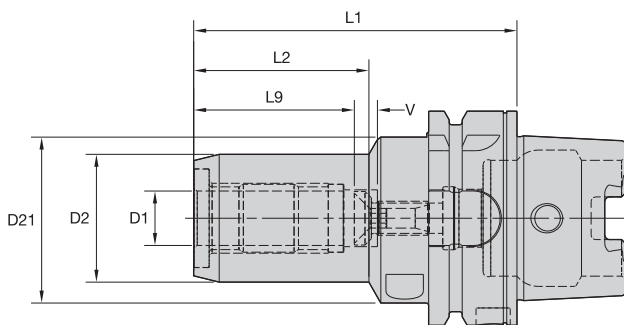




- DIN 69090 1–3 standard.
- Open-source solution.
- Universal for wet, MQL, or dry machining.
- Designed for all straight shanks.
- Equal dimensions for wet and MQL tools.

HSK63A Shank Tools

Hydraulic Chucks Standard Trend Line • MQL



Tooling Systems

ERICKSON

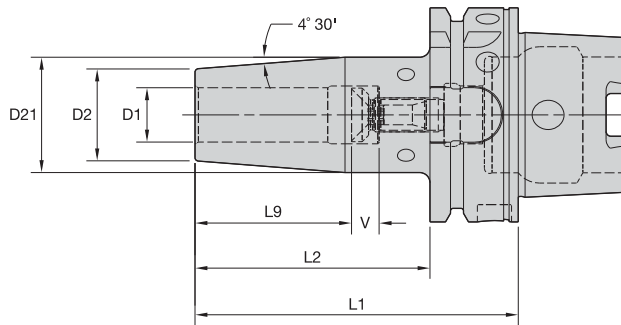
■ HCT • MQL • Metric



order number	catalog number	D1	D2	D21	L1	L2	L9	V	actuation wrench	wrench size actuation screw	length adjustment wrench	wrench size stop screw	kg
5006410	HSK63AHCTMQL1C06080M	6	25,7	50	80	34	27	10	170.135	5 mm	170.002	2.5 mm	1,00
5006411	HSK63AHCTMQL1C08080M	8	27,7	50	80	34	27	10	170.135	5 mm	170.003	3 mm	1,02
5006413	HSK63AHCTMQL1C10085M	10	29,7	50	85	39	31	10	170.135	5 mm	170.004	4 mm	1,06
5006414	HSK63AHCTMQL1C12090M	12	31,6	50	90	45	36	10	170.135	5 mm	—	5 mm	1,09
5006415	HSK63AHCTMQL1C14090M	14	33,6	50	90	46	36	10	170.135	5 mm	—	5 mm	1,11
5006416	HSK63AHCTMQL1C16095M	16	37,6	50	95	52	39	10	170.135	5 mm	—	5 mm	1,21
5006417	HSK63AHCTMQL1C18095M	18	39,6	50	95	52	39	10	170.135	5 mm	—	5 mm	1,24
5006418	HSK63AHCTMQL1C20100M	20	41,6	50	100	58	41	10	170.135	5 mm	—	5 mm	1,31
5006419	HSK63AHCTMQL1C25120M	25	49,8	70	120	53	47	10	170.136	6 mm	170.005	5 mm	2,10
5006430	HSK63AHCTMQL1C32125M	32	59,8	75	125	59	51	10	170.136	6 mm	170.005	5 mm	2,45

NOTE: Do not overtorque actuation screw. Tighten by hand until stop is felt.
 Wrenches must be ordered separately.
 Supplied with adjusting stop screw.
 Reduction sleeves are available and must be ordered separately.
 HSK coolant unit and wrench are available and must be ordered separately.
 Shank of the cutting tool according to DIN 69090.

- Balanceable — fine tune with optional M6 set screws.
- Suitable for carbide and HSS cutting tools (requirements below).



Tooling Systems

Cutting Tool Shank Requirements metric (ISO standard)

cutting tool shank diameter	tolerance
3	h4 0,000/-0,003
4	h4 0,000/-0,004
5	h5 0,000/-0,005
6	h6 0,000/-0,008
8 & 10	h6 0,000/-0,009
12, 14, 16, & 18	h6 0,000/-0,011
20 & 25	h6 0,000/-0,013
32	h6 0,000/-0,016

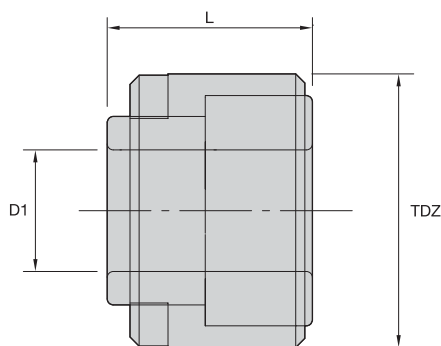
ERICKSON

■ HPVTT • MQL • Metric



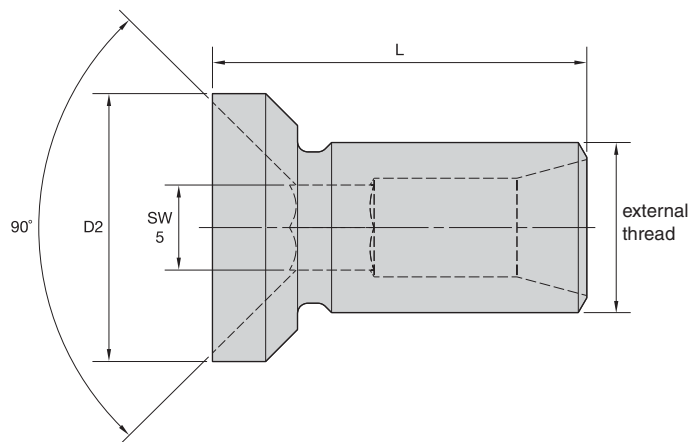
order number	catalog number	D1	D2	D21	L1	L2	L9	V	screw	wrench size stop screw	kg
5008181	HSK63AHPVTTMQL1C06080M	6	21	27	80	54	26	10,0	06ASMQL1C05170M	2.5 mm	0,82
5008182	HSK63AHPVTTMQL1C08080M	8	21	27	80	54	26	10,0	08ASMQL1C06180M	3 mm	0,82
5008183	HSK63AHPVTTMQL1C10085M	10	24	32	85	59	31	10,0	10ASMQL1C08180M	4 mm	0,90
5008184	HSK63AHPVTTMQL1C12090M	12	24	32	90	64	36	10,0	12ASMQL1C10180M	5 mm	0,91
5008185	HSK63AHPVTTMQL1C14090M	14	27	34	90	64	36	10,0	14ASMQL1C10195M	5 mm	0,96
5008186	HSK63AHPVTTMQL1C16095M	16	27	34	95	69	39	10,0	16ASMQL1C10220M	5 mm	0,97
5008187	HSK63AHPVTTMQL1C18095M	18	33	42	95	69	39	10,0	18ASMQL1C10220M	5 mm	1,14
5008188	HSK63AHPVTTMQL1C20100M	20	33	42	100	74	41	10,0	20ASMQL1C10235M	5 mm	1,16
5008189	HSK63AHPVTTMQL1C25115M	25	44	53	115	89	47	10,0	25ASMQL1C10275M	5 mm	1,73
5008210	HSK63AHPVTTMQL1C32120M	32	44	53	120	94	51	10,0	32ASMQL1C10305M	5 mm	1,61

NOTE: Do not overheat. Overheating will destroy the accuracy and functionality of the toolholder.
 Supplied with adjusting stop screw.
 Optional M6-1.0P x 5mm lg fine-balancing screw set (10 pieces) is available.
 Order number is MS1276PKG and must be ordered separately.
 HSK coolant unit and wrench are available and must be ordered separately.
 Shank of the cutting tool according to DIN 69090.



FP • MQL

order number	catalog number	D1		L		TDZ
		mm	in	mm	in	
5086819	HSK40AFPMQL1C050095M	5,00	.197	9,50	.374	M12 X 1.0
5086840	HSK50AFPMQL1C064115M	6,40	.252	11,50	.453	M16 X 1.0
5086841	HSK63AFPMQL1C080135M	8,00	.315	13,50	.532	M18 X 1.0
5086842	HSK80AFPMQL1C080155M	8,00	.315	15,50	.610	M20 X 1.5
5086843	HSK100AFPMQL1C080175M	8,00	.315	17,50	.689	M24 X 1.5



AS • MQL

order number	catalog number	D2		L		external thread size	I.D. drive size
		mm	in	mm	in		
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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Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
1013484	...LNA150M	.....D42	1019508	...KM32TSNKJCR11	.....D15	1021343	...MS1156	.....D12-D14	1058526	...KLM68L	.....D32
1013485	...LNA100M	.....D42	1019509	...KM32TSNKUCR11	.....D16	1021375	...MS1158	.....D12	1058528	...KLM810	.....D28-D30, D32
1013486	...LNA075M	.....D42	1019564	...KM32TSNVUCL16	.....D18	1021387	...MS1220	.....D15-D16	1059844	...MS326	.....A26
1016536	...SM812	.....D17-D18	1019565	...KM32TSNKJCL11	.....D15	1021421	...STCM9	.....D7	1067609	...CKC3	.....A167, A170, D20-D21
1016576	...SM885	.....D15-D16	1019566	...KM32TSNKUCL11	.....D16	1021423	...STCM11	.....D4-D6, D8-D9, D15	1067610	...CKC4	.....A167
1016578	...SM886	.....D15-D16	1019567	...KM32TSNKXCL11	.....D16	1021451	...STCM4	.....D28-D32	1067613	...CM74	.....A40, A42-A44, A136, A138, A143, D19
1016580	...SM891	.....D15	1019640	...S111	.....A41, A137	1021461	...STCM19	.....D28-D30, D32	1067614	...CM75	.....A40, A42-A44, A136, A138, A143, D18-D19
1016624	...SKCP343	.....D12	1019696	...S112	.....A41, A137	1021463	...STCM20	.....D33	1067630	...CM146	.....A44, A143
1016626	...SKDP343	.....D13-D14	1019938	...S39	.....A44	1021537	...KLM46	.....D4, D6, D9, D29	1067631	...CM147	.....A44, A143
1016628	...SKCP453	.....D12	1019940	...S310	.....A40, A42-A44, A136, A138	1021539	...KLM58	.....D32	1091617	...KM32TSCCLPL12	.....D15
1016644	...IWSN433	.....D9	1019977	...SS044038G	.....D43	1021541	...KLM68	.....D28-D32	1091627	...KM32TSNVUCR16	.....D18
1016680	...IDSN433	.....D26-D27	1019978	...S304	.....A45	1021565	...KLM34L	.....D7-D9, D33	1092064	...STCC11	.....D5
1016682	...IDSN443	.....D27	1019981	...SS056041G	.....D42-D43	1021567	...KLM46L	.....D4-D6	1093381	...CM182	.....A42, A138
1017172	...SM420	.....A41, A137	1019985	...SS075041G	.....D43	1021657	...CM113	.....D17-D18	1093382	...CM183	.....A42, A138
1017174	...SMYE3	.....A167, A170, D20-D21	1019987	...SS081041G	.....D42	1021659	...CM114	.....D17-D18	1093384	...CM185	.....A42
1017176	...SMYI3	.....A167, A170, D20-D21	1019989	...SS094041G	.....D43	1021679	...CM120	.....A41, A43-A44, A137, A143, D34	1099427	...SM813	.....D17
1017178	...SMYE4	.....A167	1019990	...S412	.....A41-A44, A137	1021681	...CM121	.....A41, A43-A44, A137, A143, D34	1099461	...SM416	.....A41, A137
1017180	...SMYI4	.....A167	1019991	...SS112041G	.....D42-D43	1021783	...KLC46L	.....D5	1099463	...SM419	.....A41, A137
1017220	...ITSN322	.....D7	1020017	...SS162062G	.....D42	1022051	...CM144	.....A41, A137	1108062	...515.018	.....D10-D12
1017226	...IVSN322	.....D8-D9, D33	1020058	...S352	.....A40, A43-A44, A92-A93	1022071	...CM158	.....D17	1108063	...513.023	.....D10
1017230	...IDSN432	.....D4-D6	1020272	...S965	.....A42, A138	1022436	...CKM37	.....D15	1108065	...511.023	.....D10
1017232	...IDSN442	.....D4-D5	1020355	...SL344	.....A41, A137	1022560	...KM32TSMDPNN1506	.....D5	1108068	...512.112	.....D10
1017246	...IRSN43	.....D29	1020376	...LNA050M	.....D42	1023224	...KM32TSMCLNR12	.....D4	1126170	...MS1489PKG	.....D17
1017252	...ICSN432	.....D4	1020550	...KLS07	.....D47, D49	1023228	...KM32TSMCLNL12	.....D4	1127019	...MS1162	.....A28
1017300	...ISSN633	.....D30-D32	1020552	...KLS10	.....D47, D49	1023232	...KM32TSMDJNR1506	.....D4	1129648	...MS1234	.....D47-D48
1017302	...IRSN63	.....D29	1020574	...KLS12	.....D47, D49	1023233	...KM32TSMQNR1506	.....D5	1131459	...MS1488	.....D18-D19
1017334	...ICSN633	.....D28-D29	1020576	...KLS15	.....D49	1023244	...S422	.....A41, A137	1131991	...SS03M012	.....D44, D46
1018413	...CM109	.....A45, A144	1020578	...KLS20	.....D49	1023274	...KM32TSMQDNR1506	.....D6	1132000	...SS03M014	.....D44, D46
1018527	...CM68	.....D16	1020579	...CKM7LP	.....D7	1023275	...KM32TSMQJNL1506	.....D4	1132007	...SS03M018	.....D44, D46
1018529	...CM71	.....D15	1020581	...CKM9	.....D29	1023276	...KM32TSMQNL1506	.....D5	1132026	...SS03M023	.....D44, D46
1018531	...CM72	.....D19, D34	1020595	...CKM12	.....D28-D32	1023277	...KM32TSMQUNL1506	.....D6	1132034	...SS03M025	.....D44, D46
1018533	...CM73	.....D18-D19, D34	1020603	...CKM20	.....D29	1023280	...KM32TSMVJNR16	.....D8	1132041	...SS03M026	.....D44, D46
1018567	...CM79	.....D15	1020607	...CKM22	.....D33	1023281	...KM32TSMVJNL16	.....D8	1132048	...SS03M027	.....D44, D46
1018569	...CM80	.....A40, A43-A44, A136, A143, D34	1020611	...CKM24	.....D28-D30, D32	1023283	...KM32TSMVJNL16	.....D8	1132054	...SS03M029	.....D44, D46
1018571	...CM81	.....A40, A43-A44, A136, A143, D34	1020647	...CKM23LP	.....D5-D6, D8-D9	1024980	...ELS025025	.....D46	1132436	...191.848	.....C18-C21
1019298	...KM32TSLSSR16	.....D21	1020649	...CKM20LP	.....D4-D6, D9	1024981	...ELS038031	.....D46	1132599	...ISSN846	.....D30, D32
1019299	...KM32TSLSSL16	.....D21	1020917	...SRS3	.....D12-D14	1024982	...ELS044038	.....D46	1133349	...SN3TPKG	.....A170
1019406	...KM32TSNER2	.....D18	1020919	...SRS4	.....D12	1024983	...ELS056050	.....D46	1135392	...512.134	.....D12
1019407	...KM32TSNSR2	.....D19	1020943	...SSA3T	.....A167, D20-D21	1025014	...ELS062050	.....D46	1135468	...KM32TSPCLNL12	.....D10
1019409	...KM32TSNSL2	.....D19	1020965	...SSA4T	.....A167	1025015	...ELS075069	.....D46	1136087	...ER32WWM	.....D43
1019410	...KM32TSNER3	.....D18	1020967	...MS109	.....D15	1025016	...ELS100088	.....D46	1136096	...ER40WWM	.....D43
1019411	...KM32TSNSR3	.....D19	1021135	...MS959	.....D15-D18	1025177	...ELS075056	.....D46	1136113	...ER25WWM	.....D43
1019413	...KM32TSNSL3	.....D19	1021183	...MS1375	.....D17	1025543	...ELS075062	.....D46	1136302	...118.404	.....D33

Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
1136352	...119.073	.....D33	1147628	...118.604	.....D33	2008931	...123567330 THM	.....A84	2018445	...3ER175ISO TN6025	.....A176
1136423	...121.030	.....D33	1178775	...KLS50M	.....D48	2009080	...123567340 THM	.....A84	2018447	...3EL175ISO TN6025	.....A176
1136718	...121.820	.....D33	1186649	...0EW25M	.....D43	2009385	...123567360 THM	.....A84	2018460	...3ER20ISO TN6025	.....A176
1137111	...125.625	.....A76	1188700	...HSK100ASM50070M	....D47-D49	2009482	...123567380 TN8025	.....A84	2018466	...3EL20ISO TN6025	.....A176
1137131	...125.63	.....A76	1192229	...HSW45M	.....D42	2009504	...123567380 THM	.....A84	2018472	...3ER25ISO TN6025	.....A176
1137321	...511.018	.....D12	1192230	...HSW58M	.....D42	2009562	...123568080 TTM	.....A86	2018476	...3EL25ISO TN6025	.....A176
1137452	...511.060	.....D10-D11	1192231	...HSW80M	.....D42	2012484	...RDHW1204MOMH TN2510	.....C38	2018489	...3EL30ISO TN6025	.....A176
1137610	...512.060	.....D10-D11	1232372	...KM32TSPWLNRO6	.....D12	2012486	...RDHW1204MOML TN2510	.....C38	2018495	...4ER35ISO TN6025	.....A176
1137987	...513.018	.....D12	1232374	...KM32TSPWLNLO6	.....D12	2017822	...123567330 TN8025	.....A84	2018496	...12148031686	.....A78
1138071	...513.060	.....D10-D11	1232375	...KM32TSPDUNR11	.....D11	2017912	...123567730 TN8025	.....A85	2018501	...4ER40ISO TN6025	.....A176
1138100	...169.333	.....D33	1232376	...KM32TSPDUNL11	.....D11	2017915	...123567731 TN8025	.....A85	2018508	...4ER45ISO TN6025	.....A176
1138108	...169.337	.....D33	1232377	...KM32TSPDJNR11	.....D10	2017973	...123568080 THM	.....A86	2018517	...4ER50ISO TN6025	.....A176
1138118	...169.339	.....D33	1232378	...KM32TSPDJNL11	.....D10	2017976	...123568100 THM	.....A86	2018522	...5ER55ISO TN6025	.....A176
1138297	...170.002	.....D72	1273814	...HSW34M	.....D42	2017980	...123568120 THM	.....A86	2018528	...5ER60ISO TN6025	.....A176
1138307	...170.003	.....D72	1274659	...IRSN84	.....D29	2017993	...123568121 THM	.....A86	2018549	...12148038800	.....C36
1138315	...170.004	.....D72	1284014	...0EW30M	.....D43	2018214	...3ERA60 TN6025	.....A173	2018550	...2IR15ISO TN6025	.....A177
1138323	...170.005	.....D72	1315965	...MS1489	.....D18-D19, D34	2018222	...3ER60 TN6025	.....A173	2018557	...2IL15ISO TN6025	.....A177
1138438	...170.025	..C18-C21, C24, C27, C30	1621087	...MS2002	.....A28	2018236	...3ELG60 TN6025	.....A173	2018612	...3IR10ISO TN6025	.....A177
1138748	...170.135	.....D72	1624632	...KM32TSPCLNR12	.....D10	2018246	...3ERAG60 TN6025	.....A173	2018616	...3IL10ISO TN6025	.....A177
1138755	...170.136	.....D72	1671515	...KM32TSPDQNR11	.....D11	2018252	...4ERN60 TN6025	.....A173	2018626	...3IR125ISO TN6025	.....A177
1144357	...KM32TSLSER16N	.....D20	1775478	...CM72LP	.....A40-A45,	2018256	...5ERQ60 TN6025	.....A173	2018636	...3IR15ISO TN6025	.....A177
1144372	...KM32TSLSEL16E	.....D20			A136-A138, A140, A143,	2018262	...2IRA60 TN6025	.....A174	2018642	...3IL15ISO TN6025	.....A177
1144416	...KM32TSSCLCR09	.....D12	1775479	...CM73LP	.....A40-A45,	2018272	...3IRA60 TN6025	.....A174	2018652	...3IR175ISO TN6025	.....A177
1144417	...KM32TSSCLCL09	.....D12			A136-A138, A140, A143,	2018278	...3IRG60 TN6025	.....A174	2018663	...3IR20ISO TN6025	.....A177
1144421	...KM32TNSVHBR11	.....D17	1848655	...ICSN443	.....D26	2018284	...3IRAG60 TN6025	.....A174	2018667	...3IL20ISO TN6025	.....A177
1144422	...KM32TSSDJCR11	.....D13	1867212	...SSP025016M	.....D26-D27	2018290	...4IRN60 TN6025	.....A174	2018674	...3IR25ISO TN6025	.....A177
1144423	...KM32TSSDQCR11	.....D14	1867278	...KMSP415IP	.....D26-D27	2018301	...3ERA55 TN6025	.....A181	2018678	...3IL25ISO TN6025	.....A177
1144424	...KM32TSSDNCN11	.....D13	1867314	...KMSP515IP	.....D26	2018308	...3ERG55 TN6025	.....A181	2018684	...3IR30ISO TN6025	.....A177
1144425	...KM32TSSDUCR11	.....D14	1872409	...ICSN543	.....D26	2018314	...3ERAG55 TN6025	.....A181	2018688	...3IL30ISO TN6025	.....A177
1144427	...KM32TSSDJCL11	.....D13	1888505	...193.343	.....C30	2018320	...4ERN55 TN6025	.....A181	2018695	...4IR35ISO TN6025	.....A177
1144428	...KM32TSSDQCL11	.....D14	1968759	...TF4V4507002 TIALN-LT	.....B12	2018328	...2IRA55 TN6025	.....A181	2018702	...4IR40ISO TN6025	.....A177
1144429	...KM32TSSDUC11	.....D14	2007404	...2ERA60 TN6025	.....A173	2018334	...3IRA55 TN6025	.....A181	2018708	...4IR45ISO TN6025	.....A177
1144430	...KM32TSSCLCR12	.....D12	2007414	...12191062086	.....A78	2018340	...3IRG55 TN6025	.....A181	2018714	...4IR50ISO TN6025	.....A177
1144434	...KM32TSSCLCL12	.....D12	2007542	...2ER15ISO TN6025	.....A176	2018346	...3IRAG55 TN6025	.....A181	2018720	...5IR60ISO TN6025	.....A177
1144437	...KM32TNSVJCR16	.....D17	2007613	...2IR10ISO TN6025	.....A177	2018348	...3ILAG55 TN6025	.....A181	2018736	...3ER48UN TN6025	.....A178
1144440	...KM32TNSVJCL16	.....D17	2008113	...12251352000	.....A76	2018354	...4IRN55 TN6025	.....A181	2018744	...3ER40UN TN6025	.....A178
1144875	...KM32TMSDNN12	.....D6	2008116	...12251353000	.....A76	2018377	...3ER05ISO TN6025	.....A176	2018748	...3ER36UN TN6025	.....A178
1144903	...KM32TSMTUNR16	.....D7	2008119	...12251354000	.....A76	2018389	...3ER07ISO TN6025	.....A176	2018752	...3ER32UN TN6025	.....A178
1144909	...KM32TSMVHNR16	.....D8	2008122	...12251355000	.....A76	2018395	...3ER075ISO TN6025	.....A176	2018756	...3ER28UN TN6025	.....A178
1144910	...KM32TSMVHNL16	.....D8	2008135	...12251356000	.....A76	2018403	...3ER08ISO TN6025	.....A176	2018766	...3ER24UN TN6025	.....A178
1144911	...KM32TSMVUNR16	.....D9	2008138	...12251358000	.....A76	2018411	...3ER10ISO TN6025	.....A176	2018772	...3ER20UN TN6025	.....A178
1144912	...KM32TSMVUNL16	.....D9	2008187	...3EL10ISO TN6025	.....A176	2018412	...12148021100	.....A78	2018778	...3ER18UN TN6025	.....A178
1144914	...KM32TSMWLNRO8	.....D9	2008256	...3ER30ISO TN6025	.....A176	2018421	...3ER125ISO TN6025	.....A176	2018782	...3ER16UN TN6025	.....A178
1144915	...KM32TSMWLNLO8	.....D9	2008275	...3ILAG60 TN6025	.....A174	2018429	...3ER15ISO TN6025	.....A176	2018802	...3ER12UN TN6025	.....A178
1147002	...ICSN846	.....D28-D29	2008876	...123567320 THM	.....A84	2018435	...3EL15ISO TN6025	.....A176	2018808	...3ER11UN TN6025	.....A178

Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
2018814	...3ER10UN TN6025	.....A178	2019266	...12148591111	.....A78	2021902	...123567360 TN8025	.....A84	2192607	...3EL12UN TN6025	.....A178
2018824	...3ER8UN TN6025	.....A178	2019273	...3ER27NPT TN6025	.....A180	2022764	...123567702 TN8025	.....A85	2232055	...TF4V4513005 TIALN-LW	.....B13
2018882	...2IR18UN TN6025	.....A179	2019278	...3ER18NPT TN6025	.....A180	2022766	...123567704 TN8025	.....A85	2246197	...TF4V0525008 TIALN-LW	.....B15
2018886	...2IR16UN TN6025	.....A179	2019287	...12148596200	.....A75	2022767	...123567720 TN8025	.....A85	2251521	...SSP025018M	.....D26
2018918	...3IR32UN TN6025	.....A179	2019288	...3ER14NPT TN6025	.....A180	2022768	...123567721 TN8025	.....A85	2253984	...TF4V0516006 TIALN-LW	.....B14
2018922	...3IR28UN TN6025	.....A179	2019298	...3ER115NPT TN6025	.....A180	2022781	...123567740 TN8025	.....A85	2263299	...MS1490	.....D34
2018932	...3IR24UN TN6025	.....A179	2019305	...3ER8NPT TN6025	.....A180	2022783	...123567741 TN8025	.....A85	2265440	...KM63TSDQNR15KC04	.....D27
2018938	...3IR20UN TN6025	.....A179	2019335	...3IR115NPT TN6025	.....A180	2022787	...123568081 THM	.....A86	2265441	...KM63TSDQNL15KC04	.....D27
2018944	...3IR18UN TN6025	.....A179	2019339	...3IR8NPT TN6025	.....A180	2022789	...123568140 THM	.....A86	2265442	...KM63TSDQNR15KC06	.....D27
2018950	...3IR16UN TN6025	.....A179	2019347	...3ER8RD TN6025	.....A185	2022791	...123568161 THM	.....A86	2265443	...KM63TSDQNL15KC06	.....D27
2018955	...3IR14UN TN6025	.....A179	2019359	...4ER6RD TN6025	.....A185	2022921	...12191061900	.....A78	2269914	...DT15IP	.....C10-C12
2018966	...3IR12UN TN6025	.....A179	2019365	...4ER4RD TN6025	.....A185	2022922	...12191062586	.....A78	2398566	...TF4V0519007 TIALN-LW	.....B14
2018972	...3IR11UN TN6025	.....A179	2019381	...3IR8RD TN6025	.....A186	2022923	...12191063286	.....A78	2398567	...TF4V0513015 TIALN-LW	.....B13
2018990	...3IR8UN TN6025	.....A179	2019394	...4IR6RD TN6025	.....A186	2029211	...12146003800	.....A76	2402078	...TF4V0513005 TIALN-LW	.....B13
2019023	...3ER32W TN6025	.....A182	2019400	...4IR4RD TN6025	.....A186	2029220	...12146009500	.....A76	2429602	...514.118	.....D10-D12
2019029	...3ER28W TN6025	.....A182	2019409	...3ER18PG TN6025	.....A184	2029478	...12148000600	.....C36-C37	2429634	...514.123	.....D10
2019039	...3ER24W TN6025	.....A182	2019417	...3ER16PG TN6025	.....A184	2029499	...12148021900	.....A78	2430681	...TF4V451101A TIALN-LT	.....B13
2019055	...3ER19W TN6025	.....A182	2019435	...3IR18PG TN6025	.....A185	2029506	...12148024100	.....A78	2447114	...TF4V4510004 TIALN-LT	.....B13
2019061	...3ER16W TN6025	.....A182	2019441	...3IR16PG TN6025	.....A185	2029507	...12148024200	.....A78	2498713	...123567320 TN7535	.....A84
2019071	...3ER14W TN6025	.....A182	2019447	...3ER15TR TN6025	.....A186	2029508	...12148024500	.....A78	2498714	...123567330 TN7535	.....A84
2019083	...3ER11W TN6025	.....A182	2019453	...3ER2TR TN6025	.....A186	2029511	...12148024800	.....A78	2498715	...123567340 TN7535	.....A84
2019089	...3ER10W TN6025	.....A182	2019455	...3EL2TR TN6025	.....A186	2029521	...12148031686 TTR	.....A78	2498716	...123567350 TN7535	.....A84
2019101	...3ER8W TN6025	.....A182	2019461	...3ER3TR TN6025	.....A186	2029523	...12148032086	.....A78	2498717	...123567230 TN7535	.....A84
2019109	...4ER5W TN6025	.....A182	2019463	...3EL3TR TN6025	.....A186	2029544	...12148041100	.....A78	2498718	...123567231 TN7535	.....A84
2019121	...2IR19W TN6025	.....A183	2019469	...4ER4TR TN6025	.....A186	2029545	...12148041200	.....A75, A78	2498719	...123567240 TN7535	.....A84
2019136	...2IR14W TN6025	.....A183	2019471	...4EL4TR TN6025	.....A186	2029546	...12148041300	.....A76	2498720	...123567241 TN7535	.....A84
2019146	...12148580411	.....A78	2019479	...4ER5TR TN6025	.....A186	2029667	...12148580011	.....A78	2498721	...123567420 TN7535	.....A84
2019148	...12148580511	.....A78	2019487	...5ER6TR TN6025	.....A186	2029684	...12148586611	.....A78	2498722	...123567430 TN7535	.....A84
2019150	...12148580611	.....A78	2019511	...3IR3TR TN6025	.....A187	2029685	...12148587011	.....A78	2498723	...123567440 TN7535	.....A84
2019171	...12148582511	.....A78	2019520	...4IR4TR TN6025	.....A187	2029686	...12148587111	.....A78	2498724	...123567450 TN7535	.....A84
2019172	...3IR19W TN6025	.....A183	2019528	...4IR5TR TN6025	.....A187	2029691	...12148588311	.....A78	2498725	...123567320 TN7525	.....A84
2019178	...3IR16W TN6025	.....A183	2019534	...5IR6TR TN6025	.....A187	2029696	...12148589800	.....A78	2498726	...123567330 TN7525	.....A84
2019183	...12148583800	.....A78	2019618	...3IR10APIRD TN6025	.....A184	2039635	...TF4V4519007 TIALN-LW	.....B14	2498727	...123567340 TN7525	.....A84
2019189	...3IR14W TN6025	.....A183	2020775	...RDHT1204MOTX TN7525	.....C38	2050082	...S2112 .A40-A45, A136-138, A140		2498728	...123567350 TN7525	.....A84
2019202	...12148586000	.....A78	2021597	...5IR55ISO TN6025	.....A177	2058066	...12191062686	.....A78	2498729	...123567230 TN7525	.....A84
2019205	...3IR11W TN6025	.....A183	2021629	...12251332000	.....A76	2065289	...3EL11W TN6025	.....A182	2498730	...123567231 TN7525	.....A84
2019217	...12148586900	.....A78	2021639	...12251342000	.....A76	2065297	...3IL14NPT TN6025	.....A180	2498731	...123567240 TN7525	.....A84
2019224	...3IR8W TN6025	.....A183	2021640	...12251343000	.....A76	2071904	...3ELAG60 TN6025	.....A173	2498732	...123567241 TN7525	.....A84
2019228	...4IR7W TN6025	.....A183	2021641	...12251344000	.....A76	2079043	...4IL35ISO TN6025	.....A177	2498733	...123567420 TN7525	.....A84
2019234	...4IR6W TN6025	.....A183	2021677	...3ER18W TN6025	.....A182	2100216	...2ELA60 TN6025	.....A173	2498734	...123567430 TN7525	.....A84
2019235	...12148588211	.....A78	2021683	...3IR18W TN6025	.....A183	2101539	...4EL40ISO TN6025	.....A176	2498735	...123567440 TN7525	.....A84
2019239	...12148588411	.....A78	2021743	...12251368000	.....A76	2101597	...4EL50ISO TN6025	.....A176	2498736	...123567450 TN7525	.....A84
2019240	...4IR5W TN6025	.....A183	2021798	...123568160 TTM	.....A86	2102322	...4IL40ISO TN6025	.....A177	2539334	...CM184LP	.....A42, A138
2019249	...12148589200	.....A78	2021804	...123567320 TN8025	.....A84	2102347	...4IL45ISO TN6025	.....A177	2539335	...CM185LP	.....A42, A138
2019251	...12148589300	.....A78	2021869	...123567350 TN8025	.....A84	2102627	...3EL8UN TN6025	.....A178	2558739	...44315901 PN120	.....A175
2019264	...12148591011	.....A78	2021873	...123567350 THM	.....A84	2103958	...5EL6TR	.....A186	2558745	...44315901 TTS	.....A175

Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
2558754	....44315900 PN120	.....A175	2831895	....TM4VPT16006 ALTIN-MT	.....B18	2837110	....TF4VN525028 TIALN-LW	.....B19	2837707	....TF4V0019007 TIALN-LW	.....B21
2558759	....44315900 TTS	.....A175	2831901	....TM4VPT13015S ALTIN-MT	.....B18	2837117	....TF4VN525018 TIALN-LW	.....B19	2837714	....TF4V0016006 TIALN-LW	.....B21
2576202	....S459	.....C30	2831907	....TM4VPT13015 ALTIN-MT	.....B18	2837125	....TF4VN525008 TIALN-LW	.....B19	2837720	....TF4V0013015 TIALN-LW	.....B21
2636822	....S445	.....C12, C30	2831913	....TM4VPT13005S ALTIN-MT	.....B18	2837146	....TF4VN519017 TIALN-LW	.....B19	2837734	....TF4V001101A TIALN-LT	.....B21
2642318	....5IL55ISO TN6025	.....A177	2831918	....TM4VPT13005 ALTIN-MT	.....B18	2837154	....TF4VN519007 TIALN-LW	.....B19	2837746	....TF4V0010004 TIALN-LT	.....B21
2642319	....5IL60ISO TN6025	.....A177	2831947	....TM4VOT32009 ALTIN-MW	.....B16	2837160	....TF4VN516016 TIALN-LW	.....B19	2837756	....TF4V0008003 TIALN-LT	.....B21
2646607	....M100D100Z02C100RD12L478	.....C37	2831954	....TM4VOT25008S ALTIN-MW	.....B16	2837171	....TF4VN516006 TIALN-LW	.....B19	2837765	....TF4V0007002 TIALN-LT	.....B21
2646608	....M100D100Z02C125RD12L715	.....C37	2831961	....TM4VOT25008 ALTIN-MW	.....B16	2837178	....TF4VN513005 TIALN-LW	.....B19	2837773	....TF4V0005000 TIALN-LT	.....B21
2646609	....M100D100Z02M12RD12	.....C36	2831967	....TM4VOT19007S ALTIN-MW	.....B16	2837182	....TF4VN510014 TIALN-LT	.....B19	2837781	....TF4V0003001 TIALN-LT	.....B21
2646610	....M100D100Z02W100RD12	.....C36	2831974	....TM4VOT19007 ALTIN-MW	.....B16	2837188	....TF4VN507012 TIALN-LT	.....B19	2870163	....TM4V4T19007S ALTIN-MW	.....B16
2646611	....M100D100Z02W100RD12L553	.....C36	2831980	....TM4VOT16006S ALTIN-MW	.....B16	2837207	....TF4V6525028S TIALN-LW	.....B15	2870164	....TM4V4T19007 ALTIN-MW	.....B16
2646612	....M100D100Z02W125RD12	.....C36	2831988	....TM4VOT16006 ALTIN-MW	.....B16	2837213	....TF4V6525018S TIALN-LW	.....B15	2870165	....TM4V4T16006S ALTIN-MW	.....B16
2646613	....M100D100Z02W125RD12L705	.....C36	2831994	....TM4VOT13015S ALTIN-MW	.....B16	2837219	....TF4V6525018 TIALN-LW	.....B15	2870166	....TM4V4T16006 ALTIN-MW	.....B16
2646614	....M100D100Z02W125RD12L715	.....C36	2832003	....TM4VOT13015 ALTIN-MW	.....B16	2837227	....TF4V6519017S TIALN-LW	.....B15	2870167	....TM4V4T13005S ALTIN-MW	.....B16
2646615	....M100D125Z02M16RD12	.....C36	2836863	....TF4VP525028S TIALN-LT	.....B17	2837235	....TF4V6519017 TIALN-LW	.....B15	2870168	....TM4V4T13005 ALTIN-MW	.....B16
2646616	....M100D125Z02W125RD12	.....C36	2836872	....TF4VP525028 TIALN-LT	.....B17	2837245	....TF4V6519007S TIALN-LW	.....B15	2870191	....TF4V4519007S TIALN-LW	.....B14
2646617	....M100D125Z02W125RD12L615	.....C36	2836879	....TF4VP525018S TIALN-LT	.....B17	2837255	....TF4V6519007 TIALN-LW	.....B15	2870192	....TF4V4516006S TIALN-LW	.....B14
2646618	....M100D125Z02W150RD12	.....C36	2836887	....TF4VP525018 TIALN-LT	.....B17	2837261	....TF4V6516016 TIALN-LW	.....B14	2870193	....TF4V4513005S TIALN-LW	.....B13
2646619	....M100D125Z02W150RD12L800	.....C36	2836892	....TF4VP525008S TIALN-LT	.....B17	2837266	....TF4V6513025S TIALN-LW	.....B14	2870194	....TF4V451101AS TIALN-LT	.....B13
2646620	....M100D150Z02M16RD12	.....C36	2836900	....TF4VP525008 TIALN-LT	.....B17	2837274	....TF4V6513015S TIALN-LW	.....B14	2870196	....TF4V4510004S TIALN-LT	.....B13
2646621	....M100D150Z03W125RD12	.....C36	2836907	....TF4VP519027S TIALN-LT	.....B17	2837283	....TF4V6513015 TIALN-LW	.....B14	2870197	....TF4V4508003S TIALN-LT	.....B12
2646622M100D150Z03W125RD12L715C36	2836916TF4VP519027 TIALN-LTB17	2837307TF4V4516006 TIALN-LWB14	2870198TF4V4508003 TIALN-LTB12
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2646725M100D200Z05S075RD12C37	2836930TF4VP519017 TIALN-LTB17	2837388TF4V2525008 TIALN-LWB15	2870200TF4V4505000S TIALN-LTB12
2646728	....M100D250Z06S100RD12	.....C37	2836936	....TF4VP519007S TIALN-LT	.....B17	2837395	....TF4V2519007S TIALN-LW	.....B15	2870201	....TF4V4505000 TIALN-LT	.....B12
2646732	....M100D300Z07S100RD12	.....C37	2836946	....TF4VP519007 TIALN-LT	.....B17	2837408	....TF4V2516006S TIALN-LW	.....B14	2870202	....TF4V4503001S TIALN-LT	.....B12
2655020	....TF4V0013005 TIALN-LW	.....B21	2836951	....TF4VP516026S TIALN-LT	.....B17	2837414	....TF4V2513005S TIALN-LW	.....B14	2870203	....TF4V4503001 TIALN-LT	.....B12
2831835TM4VPT25028 ALTIN-MTB18	2836956TF4VP516026 TIALN-LTB17	2837422TF4V251100AS TIALN-LTB13	2870204TF4V0532009S TIALN-LWB15
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2831847TM4VPT25018 ALTIN-MTB18	2836977TF4VP516016 TIALN-LTB17	2837441TF4V2508003S TIALN-LTB13	2870206TF4V0519007S TIALN-LWB14
2831852	....TM4VPT25008 ALTIN-MT	.....B18	2836985	....TF4VP516006S TIALN-LT	.....B17	2837447	....TF4V2507002S TIALN-LT	.....B12	2870207	....TF4V0516006S TIALN-LW	.....B14
2831858	....TM4VPT19027 ALTIN-MT	.....B18	2836992	....TF4VP516006 TIALN-LT	.....B17	2837457	....TF4V1525008S TIALN-LW	.....B15	2870208	....TF4V0513015S TIALN-LW	.....B13
2831865	....TM4VPT19017 ALTIN-MT	.....B18	2837002	....TF4VP513015S TIALN-LT	.....B17	2837467	....TF4V1525008 TIALN-LW	.....B15	2870209	....TF4V0513005S TIALN-LW	.....B13
2831871	....TM4VPT19007 ALTIN-MT	.....B18	2837007	....TF4VP513015 TIALN-LT	.....B17	2837472	....TF4V1519007S TIALN-LW	.....B15	2870210	....TF4V051101AS TIALN-LT	.....B13
2831878	....TM4VPT16026S ALTIN-MT	.....B18	2837017	....TF4VP513005S TIALN-LT	.....B17	2837477	....TF4V1519007 TIALN-LW	.....B15	2870211	....TF4V051101A TIALN-LT	.....B13
2831883	....TM4VPT16026 ALTIN-MT	.....B18	2837025	....TF4VP513005 TIALN-LT	.....B17	2837484	....TF4V1516006S TIALN-LW	.....B14	2870212	....TF4V0510004S TIALN-LT	.....B13
2831889	....TM4VPT16016 ALTIN-MT	.....B18	2837032	....TF4VP510014S TIALN-LT	.....B17	2837501	....TF4V1513005S TIALN-LW	.....B14	2870213	....TF4V0508003S TIALN-LT	.....B13
			2837038	....TF4VP510014 TIALN-LT	.....B17	2837514	....TF4V151100AS TIALN-LT	.....B13	2870214	....TF4V0507002S TIALN-LT	.....B12
			2837046	....TF4VP507012S TIALN-LT	.....B17	2837528	....TF4V1510004S TIALN-LT	.....B13	2870215	....TF4V0505000S TIALN-LT	.....B12
			2837055	....TF4VP507012 TIALN-LT	.....B17	2837533	....TF4V1508003S TIALN-LT	.....B13	2870216	....TF4V0505000 TIALN-LT	.....B12
			2837061	....TF4VP025018 TIALN-LT	.....B20	2837541	....TF4V1507002S TIALN-LT	.....B12	2870217	....TF4V0503001S TIALN-LT	.....B12
			2837073	....TF4VP019017 TIALN-LT	.....B20	2837553	....TF4V0532009 TIALN-LW	.....B15	2870218	....TF4V0503001 TIALN-LT	.....B12
			2837081	....TF4VP016016 TIALN-LT	.....B20	2837671	....TF4V0507002 TIALN-LT	.....B12	2877809	....TF4V0510004 TIALN-LT	.....B13
			2837088	....TF4VP013005 TIALN-LT	.....B20	2837694	....TF4V0032009 TIALN-LW	.....B21	2892518	....E06LSER2	.....A170
			2837105	....TF4VP007012 TIALN-LT	.....B20	2837700	....TF4V0025008 TIALN-LW	.....B21	2892519	....E06LSEL2	.....A170

Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
2892520	...E08LSER2	.....A170	2953667	...123567240 TN6030	.....A84	2968847	...32251222000	.....A76	3118240	...2EL07ISO TN6025	.....A176
2892521	...E08LSEL2	.....A170	2953671	...123567450 TN6030	.....A84	2983280	...32250110100	.....A77	3118242	...2EL08ISO TN6025	.....A176
2892522	...E10LSER3	.....A170	2953672	...123567231 TN6030	.....A84	2983282	...32250110500	.....A77	3118374	...2EL10ISO TN6025	.....A176
2892553	...E10LSEL3	.....A170	2953673	...123567350 TN6030	.....A84	2983973	...32250110700	.....A77	3118376	...2EL125ISO TN6025	.....A176
2892554	...E12LSER3	.....A170	2953674	...123567360 TN6030	.....A84	2983975	...32250110200	.....A77	3118378	...2EL15ISO TN6025	.....A176
2892555	...E12LSEL3	.....A170	2953675	...123567480 TN6030	.....A84	2983977	...32250110600	.....A77	3118380	...2EL175ISO TN6025	.....A176
2898190	...TF4V6525028 TIALN-LW	.....B15	2953676	...123567241 TN6030	.....A84	2983978	...32250110800	.....A77	3118382	...2IL035ISO TN6025	.....A177
2898534	...TF4V6516016S TIALN-LW	.....B14	2953677	...123567460 TN6030	.....A84	2983979	...32250111000	.....A77	3118384	...2IL04ISO TN6025	.....A177
2899253	...TF4V0508003 TIALN-LT	.....B13	2953678	...123567430 TN6030	.....A84	2988603	...TM4VPT19027S ALTIN-MT	.....B18	3118386	...2IL05ISO TN6025	.....A177
2952333	...123567360 TN7525	.....A84	2953679	...123567420 TN6030	.....A84	3003329	...TM4VOT32009S ALTIN-MW	.....B16	3118387	...2IL06ISO TN6025	.....A177
2952334	...123567380 TN7525	.....A84	2962743	...12250023000	.....A75	3003330	...TM4VPT16006S ALTIN-MT	.....B18	3118389	...2IL075ISO TN6025	.....A177
2952335	...123567460 TN7525	.....A84	2962744	...12250023100	.....A75	3003331	...TM4VPT16016S ALTIN-MT	.....B18	3118390	...2IL07ISO TN6025	.....A177
2952336	...123567480 TN7525	.....A84	2962745	...12250023200	.....A75	3003332	...TM4VPT19007S ALTIN-MT	.....B18	3118392	...2IL08ISO TN6025	.....A177
2952337	...123567803 TN7525	.....A85	2962751	...12250025200	.....A75	3004373	...TM4VPT19017S ALTIN-MT	.....B18	3118628	...TF4V0519007B TIALN-LW	.....B14
2952338	...123567804 TN7525	.....A85	2968567	...LSASR83	.....A167	3004374	...TM4VPT25008S ALTIN-MT	.....B18	3119081	...TF4V0513015D TIALN-LW	.....B13
2952339	...123567805 TN7525	.....A85	2968568	...LSASL103	.....A167	3004375	...TM4VPT25028S ALTIN-MT	.....B18	3120264	...TF4V0508003B TIALN-LT	.....B12
2952340	...123567806 TN7525	.....A85	2968569	...LSASL123	.....A167	3018276	...TF4VP010014 TIALN-LT	.....B20	3121225	...193.492	.....C24-C27
2952341	...123568080 TN7525	.....A86	2968570	...LSASL163	.....A167	3030148	...TTSS20014M	.....D39, D41	3122015	...3EL035ISO TN6025	.....A176
2952342	...123568100 TN7525	.....A86	2968571	...LSASL164	.....A167	3062811	...LNHSER16M	.....D43	3122017	...3EL045ISO TN6025	.....A176
2952343	...123568120 TN7525	.....A86	2968572	...LSASL83	.....A167	3062812	...LNHSER20M	.....D43	3122018	...3EL04ISO TN6025	.....A176
2952344	...123568140 TN7525	.....A86	2968583	...LSASR103	.....A167	3063113	...LNSER25M	.....D43	3122021	...3EL06ISO TN6025	.....A176
2952345	...123568160 TN7525	.....A86	2968584	...LSASR123	.....A167	3063114	...LNSER32M	.....D43	3122028	...3EL10UN TN6025	.....A178
2952350	...123567360 TN7535	.....A84	2968585	...LSASR163	.....A167	3063115	...LNSER40M	.....D43	3122032	...3EL11UN TN6025	.....A178
2952351	...123567380 TN7535	.....A84	2968586	...LSASR164	.....A167	3095643	...KM32TSMDJNL1504	.....D4	3122037	...3EL12W TN6025	.....A182
2952352	...123567460 TN7535	.....A84	2968587	...LSASR203	.....A167	3095644	...KM32TSMDJNR1504	.....D4	3122039	...3EL13UN TN6025	.....A178
2952353	...123567480 TN7535	.....A84	2968588	...LSSL123D	.....A167	3095645	...KM32TSMDPNN1504	.....D5	3122414	...3IL56UN TN6025	.....A179
2952354	...123567702 TN7535	.....A85	2968589	...LSSL163D	.....A167	3098372	...TF4V0507002C TIALN-LT	.....B12	3122416	...3IL64UN TN6025	.....A179
2952355	...123567703 TN7535	.....A85	2968590	...LSSL164D	.....A167	3105272	...TF4V0516006B TIALN-LW	.....B14	3122418	...3IL6RD TN6025	.....A186
2952356	...123567704 TN7535	.....A85	2968591	...LSSR123D	.....A167	3107325	...TF4V0510004C TIALN-LT	.....B13	3122422	...3IL8RD TN6025	.....A186
2952357	...123567720 TN7535	.....A85	2968592	...LSSR163D	.....A167	3109031	...TF4V0516006C TIALN-LW	.....B14	3122444	...3IL8UN TN6025	.....A179
2952358	...123567721 TN7535	.....A85	2968593	...LSSR164D	.....A167	3109032	...TF4V0516006D TIALN-LW	.....B14	3122446	...3IL9UN TN6025	.....A179
2952359	...123567730 TN7535	.....A85	2968594	...LSSR203D	.....A167	3109807	...TF4V0519007E TIALN-LW	.....B14	3122449	...3ILA55 TN6025	.....A181
2952360	...123567731 TN7535	.....A85	2968595	...S2020LSER3	.....A170	3110264	...TF4V0503001A TIALN-LT	.....B12	3122460	...5EL45W TN6025	.....A182
2952361	...123567740 TN7535	.....A85	2968596	...S0612LSEL2	.....A170	3111394	...TF4V0525008D TIALN-LW	.....B15	3122461	...5EL4RD TN6025	.....A185
2952363	...123568080 TN7535	.....A86	2968597	...S0612LSER2	.....A170	3111395	...TF4V0525008E TIALN-LW	.....B15	3122733	...5EL4W TN6025	.....A182
2952364	...123568100 TN7535	.....A86	2968598	...S0812LSEL2	.....A170	3111396	...TF4V0525008F TIALN-LW	.....B15	3122739	...5IL45W TN6025	.....A183
2952365	...123568120 TN7535	.....A86	2968599	...S0812LSER2	.....A170	3113793	...TF4V0508003C TIALN-LT	.....B13	3122740	...5IL4RD TN6025	.....A186
2952366	...123568140 TN7535	.....A86	2968600	...S1012LSEL3	.....A170	3115146	...TF4V0507002A TIALN-LT	.....B12	3122741	...5IL4W TN6025	.....A183
2952367	...123568160 TN7535	.....A86	2968601	...S1012LSER3	.....A170	3116458	...TF4V0505000A TIALN-LT	.....B12	3123198	...2IL125ISO TN6025	.....A177
2953284	...123567330 TN6030	.....A84	2968602	...S1212LSEL3	.....A170	3116459	...TF4V0519007D TIALN-LW	.....B14	3123468	...3EL36W TN6025	.....A182
2953286	...123567340 TN6030	.....A84	2968763	...S1212LSER3	.....A170	3118181	...TF4V0510004A TIALN-LT	.....B13	3123601	...3IL14W TN6025	.....A183
2953289	...123567320 TN6030	.....A84	2968764	...S1620LSEL3	.....A170	3118182	...TF4V0510004B TIALN-LT	.....B13	3124269	...3IL035ISO TN6025	.....A177
2953291	...123567230 TN6030	.....A84	2968765	...S1620LSER3	.....A170	3118234	...2EL05ISO TN6025	.....A176	3124271	...3IL04ISO TN6025	.....A177
2953663	...123567440 TN6030	.....A84	2968845	...32251221200	.....A76	3118236	...2EL06ISO TN6025	.....A176	3124272	...3IL05ISO TN6025	.....A177
2953666	...123567380 TN6030	.....A84	2968846	...32251221600	.....A76	3118238	...2EL075ISO TN6025	.....A176	3124274	...3IL06ISO TN6025	.....A177

Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
3124276	...3IL07ISO TN6025	.....A177	3538765	...206505	.....A94	3539541	...338127	.....A113	3539881	...435181	.....A89
3124546	...TF4V0513015A TIALN-LW	.....B13	3538775	...218121	.....A119	3539542	...338128	.....A113	3539916	...440202	.....A112
3124547	...TF4V0513015B TIALN-LW	.....B13	3538776	...218122	.....A119	3539543	...338129	.....A113	3539917	...440203	.....A112
3125352	...TF4V0513015C TIALN-LW	.....B13	3538777	...218123	.....A119	3539544	...338130	.....A113	3539918	...440204	.....A112
3125353	...TF4V0513015E TIALN-LW	.....B13	3538778	...218124	.....A119	3539545	...338131	.....A112	3539919	...440205	.....A113
3133063	...TF4V0525008B TIALN-LW	.....B15	3538779	...218125	.....A119	3539546	...338132	.....A112	3539920	...440206	.....A113
3133064	...TF4V0525008C TIALN-LW	.....B15	3538780	...218126	.....A119	3539795	...409182	.....A94	3539921	...440207	.....A113
3320426	...TF4V2510004 TIALN-LT	.....B13	3538794	...235101	.....A111	3539796	...409183	.....A94	3539922	...440208	.....A113
3321278	...TF4V0505000B TIALN-LT	.....B12	3538796	...235103	.....A111	3539797	...409184	.....A94	3539923	...440209	.....A113
3321279	...TF4V0507002B TIALN-LT	.....B12	3538797	...235104	.....A111	3539799	...409187	.....A94	3539924	...440211	.....A112
3321280	...TF4V0510004D TIALN-LT	.....B13	3538798	...235105	.....A111	3539825	...435101	.....A92	3539925	...4402122	.....A112
3321281	...TF4V0519007C TIALN-LW	.....B14	3538800	...235107	.....A111	3539826	...435102	.....A92	3539955	...446101	.....A25
3396984	...MS2085	.....C10-C12	3538801	...235108	.....A111	3539827	...435103	.....A93	3539956	...446102	.....A25
3538658	...206113	.....A92	3538802	...235109	.....A111	3539828	...435104	.....A92	3539957	...446103	.....A25-A26
3538659	...206114	.....A92	3538803	...235110	.....A111	3539829	...435105	.....A92	3539958	...446104	.....A25-A26
3538660	...206115	.....A93	3539143	...250175	.....A22	3539830	...435106	.....A93	3539978	...606167	.....A90
3538661	...206116	.....A93	3539144	...250176	.....A23	3539831	...435107	.....A93	3539979	...606171	.....A92-A93
3538662	...206118	.....A92	3539145	...250177	.....A22	3539832	...435108	.....A93	3539981	...606190	.....A119
3538663	...206119	.....A93	3539323	...252111	.....A26	3539833	...435109	.....A92	3539998	...606218	.....A111
3538665	...206123	.....A92	3539324	...252112	.....A26	3539834	...435110	.....A92	3539999	...606219	.....A112-A113
3538667	...206128	.....A92	3539325	...252117	.....A26	3539837	...435116	.....A92	3540021	...606249	.....A22-A24
3538668	...206136	.....A92	3539327	...252119	.....A26	3539838	...435117	.....A92	3540036	...613135	.....A111
3538669	...206141	.....A91	3539328	...252120	.....A26	3539841	...435126	.....A89	3540038	...613137	.....A111
3538670	...206143	.....A91	3539332	...252128	.....A26	3539842	...435127	.....A89	3540039	...613139	.....A94
3538672	...206145	.....A89	3539428	...309105	.....A93	3539843	...435128	.....A91	3540054	...619112	.....A92-A93
3538673	...206146	.....A89	3539429	...309106	.....A93	3539844	...435129	.....A91	3540060	...619120	.....A89
3538679	...206167	.....A89	3539432	...309111	.....A93	3539845	...435130	.....A89	3540061	...619121	.....A91
3538680	...206168	.....A89	3539439	...310102	.....A92	3539846	...435131	.....A89	3540062	...619122	.....A89
3538681	...206169	.....A89	3539440	...310108	.....A92	3539849	...435136	.....A93	3540063	...619123	.....A89
3538682	...206170	.....A89	3539441	...310109	.....A92	3539850	...435137	.....A93	3540064	...619124	.....A90
3538683	...206171	.....A89	3539504	...331101	.....A91	3539851	...435140	.....A89	3540084	...619155	.....A111
3538684	...206172	.....A89	3539505	...331102	.....A91	3539852	...435141	.....A89	3540090	...619164	.....A89
3538685	...206173	.....A89	3539506	...331103	.....A91	3539853	...435142	.....A91	3540093	...619168	.....A22-A23, A25-A26
3538686	...206174	.....A89	3539507	...331104	.....A91	3539854	...435143	.....A91	3540093	...619168	.....A22-A27
3538687	...206175	.....A89	3539510	...331118	.....A91	3539859	...435148	.....A92	3540098	...619174	.....A94
3538688	...206176	.....A89	3539515	...333101	.....A90	3539860	...435149	.....A92	3540099	...619175	.....A94
3538689	...206178	.....A90	3539516	...333102	.....A90	3539861	...435150	.....A92	3540100	...619176	.....A94
3538744	...206420	.....A89	3539517	...333103	.....A90	3539862	...435151	.....A92	3540101	...619177	.....A94
3538745	...206421	.....A89	3539518	...333104	.....A90	3539863	...435152	.....A89	3540117	...619205	.....A22-A23, A25
3538746	...206422	.....A89	3539535	...338121	.....A112	3539864	...435153	.....A89	3540396	...506101 M43	.....A116
3538747	...206423	.....A89	3539536	...338122	.....A112	3539865	...435154	.....A90	3540398	...506101 C2	.....A116
3538760	...206500	.....A94	3539537	...338123	.....A112	3539866	...435155	.....A90	3540399	...506101 GC	.....A116
3538761	...206501	.....A94	3539538	...338124	.....A112	3539867	...435156	.....A90	3540400	...506101 M40	.....A116
3538762	...206502	.....A94	3539539	...338125	.....A113	3539868	...435157	.....A90	3540407	...506102 C2	.....A116
3538764	...206504	.....A94	3539540	...338126	.....A113	3539880	...435180	.....A89	3540408	...506102 GC	.....A116

Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
3540409	...506102 M40	.....A116	3540562	...507146 M40	.....A104	3540784	...507257 M45	.....A105	3540885	...507310 M93	.....A102
3540412	...506103 M43	.....A116	3540585	...507151 M43	.....A104	3540803	...507275 M43	.....A103	3540907	...507329 M433B	.....A103
3540414	...506103 C2	.....A116	3540587	...507151 M45	.....A104	3540805	...507275 M45	.....A103	3540908	...507330 M433B	.....A103
3540415	...506103 GC	.....A116	3540589	...507151 M40	.....A104	3540806	...507275 M93	.....A103	3540909	...507331 M433B	.....A103
3540421	...506104 C2	.....A116	3540594	...507152 M40	.....A104	3540807	...507275 M40	.....A103	3540910	...507332 M433B	.....A103
3540423	...506104 M40	.....A116	3540597	...507154 M45	.....A104	3540808	...507276 M43	.....A103	3540911	...507333 M433B	.....A103
3540429	...506105 C2	.....A116	3540598	...507154 M40	.....A104	3540810	...507276 M45	.....A103	3540912	...507334 M433B	.....A103
3540430	...506105 M40	.....A116	3540602	...507155 M45	.....A104	3540811	...507276 M93	.....A103	3540926	...507354 M433B	.....A102
3540435	...506106 M40	.....A116	3540603	...507155 M40	.....A104	3540812	...507276 M40	.....A103	3540927	...507355 M433B	.....A102
3540440	...506107 M40	.....A116	3540612	...507161 M45	.....A104	3540815	...507277 M45	.....A103	3540928	...507356 M433B	.....A102
3540444	...506108 M40	.....A116	3540613	...507161 M40	.....A104	3540816	...507277 M93	.....A103	3540929	...507357 M433B	.....A102
3540446	...507116 GC	.....A104	3540628	...507171 M40	.....A104	3540818	...507278 M43	.....A103	3540930	...507358 M433B	.....A102
3540447	...507116 M45	.....A104	3540633	...507176 M45	.....A104	3540820	...507278 M45	.....A103	3540931	...507359 M433B	.....A102
3540449	...507116 M40	.....A104	3540634	...507176 M40	.....A104	3540821	...507278 M93	.....A103	3541618	...510101 M40	.....A122
3540452	...507116 C5	.....A104	3540663	...507196 M45	.....A104	3540822	...507278 M40	.....A103	3541622	...510102 M40	.....A122
3540456	...507117 C2	.....A104	3540664	...507196 M40	.....A104	3540823	...507279 M43	.....A103	3541624	...510103 C2	.....A123
3540458	...507117 GC	.....A104	3540665	...507197 M45	.....A104	3540825	...507279 M45	.....A103	3541625	...510103 GC	.....A123
3540459	...507117 M45	.....A104	3540666	...507197 M40	.....A104	3540826	...507279 M93	.....A103	3541626	...510103 M40	.....A123
3540460	...507117 M93	.....A104	3540685	...507207 M45	.....A104	3540827	...507279 M40	.....A103	3541627	...510103 C5	.....A123
3540461	...507117 M40	.....A104	3540690	...507213 M40	.....A104	3540830	...507280 M45	.....A103	3541630	...510104 M40	.....A122
3540468	...507118 GC	.....A104	3540691	...507214 M45	.....A104	3540832	...507280 M40	.....A103	3541636	...510106 C2	.....A123
3540476	...507124 GC	.....A104	3540692	...507214 M40	.....A104	3540833	...507281 M43	.....A103	3541638	...510106 M40	.....A123
3540477	...507124 M45	.....A104	3540698	...507224 M45	.....A104	3540835	...507281 M45	.....A103	3541642	...510107 M40	.....A123
3540478	...507124 M93	.....A104	3540700	...507224 M40	.....A104	3540836	...507281 M93	.....A103	3541644	...510108 C2	.....A123
3540479	...507124 M40	.....A104	3540743	...507240 M45	.....A105	3540838	...507282 M43	.....A103	3541646	...510108 M40	.....A123
3540479	...507124 C2	.....A104	3540744	...507240 M40	.....A105	3540840	...507282 M45	.....A103	3541648	...510113 M40	.....A122
3540487	...507125 M40	.....A104	3540746	...507241 M45	.....A105	3540841	...507282 M93	.....A103	3541649	...510114 M40	.....A122
3540490	...507126 C2	.....A104	3540747	...507241 M40	.....A105	3540845	...507283 M45	.....A103	3541650	...510115 M40	.....A122
3540493	...507128 C2	.....A104	3540749	...507242 M45	.....A105	3540846	...507283 M93	.....A103	3541651	...510116 M40	.....A122
3540495	...507128 GC	.....A104	3540750	...507242 M40	.....A105	3540866	...507298 M43	.....A103	3541652	...510117 M40	.....A122
3540496	...507128 M45	.....A104	3540752	...507243 M45	.....A105	3540867	...507298 M45	.....A103	3541653	...510118 M40	.....A122
3540497	...507128 M93	.....A104	3540753	...507243 M40	.....A105	3540868	...507298 M93	.....A103	3541654	...510119 M40	.....A122
3540498	...507128 M40	.....A104	3540755	...507244 M45	.....A105	3540870	...507301 M45	.....A103	3541655	...510120 M40	.....A122
3540509	...507129 M45	.....A104	3540756	...507244 M40	.....A105	3540872	...507305 M45	.....A102	3541656	...510121 M40	.....A122
3540510	...507129 M40	.....A104	3540758	...507245 M45	.....A105	3540873	...507305 M93	.....A102	3541657	...510122 M40	.....A122
3540528	...507140 M45	.....A104	3540759	...507245 M40	.....A105	3540874	...507306 M45	.....A102	3541658	...510123 M40	.....A122
3540529	...507140 M93	.....A104	3540761	...507246 M45	.....A105	3540875	...507306 M93	.....A102	3541659	...510124 M40	.....A122
3540530	...507140 M40	.....A104	3540762	...507246 M40	.....A105	3540876	...507307 M45	.....A102	3541663	...510128 M40	.....A122
3540539	...507143 C2	.....A104	3540763	...507247 M45	.....A105	3540877	...507307 M93	.....A102	3541667	...510132 M40	.....A122
3540542	...507143 M45	.....A104	3540764	...507247 M40	.....A105	3540878	...507308 M43	.....A102	3541669	...510134 M40	.....A122
3540543	...507143 M93	.....A104	3540773	...507252 M45	.....A105	3540879	...507308 M45	.....A102	3541672	...510135 M40	.....A123
3540544	...507143 M40	.....A104	3540774	...507252 M40	.....A105	3540880	...507308 M93	.....A102	3541673	...510135 C5	.....A123
3540553	...507144 M45	.....A104	3540776	...507253 M45	.....A105	3540882	...507309 M45	.....A102	3541674	...510136 C2	.....A123
3540554	...507144 M40	.....A104	3540777	...507253 M40	.....A105	3540883	...507309 M93	.....A102	3541675	...510136 GC	.....A123
3540560	...507146 M45	.....A104	3540781	...507255 M40	.....A105	3540884	...507310 M45	.....A102	3541676	...510136 M40	.....A123

Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
3541677	....510136 C5	.....A123	3552615	....TM5VOS05000B ALTIN-MT	.....B30	3606674	....NG3M225RK TN6010	.....A52	3606938	....NGD2M200RK TN6010	.....A55
3541680	....510137 M40	.....A123	3552616	....TM5VOS07002S ALTIN-MT	.....B30	3606676	....NG2M300RK TN6010	.....A52	3606939	....NGD2M250RK TN6010	.....A55
3541683	....510138 M40	.....A123	3552617	....TM5VOS07002A ALTIN-MT	.....B30	3606677	....NG3M275RK TN6010	.....A52	3606940	....NGD3M400RK TN6010	.....A55
3552488	....TM5VNS07012A ALTIN-MT	.....B34	3552618	....TM5VOS07002B ALTIN-MT	.....B30	3606678	....NG3M400RK TN6010	.....A53	3606941	....NGD3M200LK TN6010	.....A55
3552489	....TM5VNS10014A ALTIN-MT	.....B34	3552619	....TM5VOS13015S ALTIN-MT	.....B30	3606679	....NG2M120RK TN6010	.....A52	3606942	....NGD3M250LK TN6010	.....A55
3552490	....TM5VNS13005BW ALTIN-MT	.....B34	3552620	....TM5VOS13015A ALTIN-MT	.....B30	3606680	....NG2M300LK TN6010	.....A53	3606943	....NGD3M300LK TN6010	.....A55
3552491	....TM5VNS19017BW ALTIN-MT	.....B34	3552621	....TM5VOS13015B ALTIN-MT	.....B30	3606827	....NG2M120LK TN6010	.....A53	3606944	....NGD3M350LK TN6010	.....A55
3552492	....TM5VNS25018BW ALTIN-MT	.....B34	3552622	....TM5VOS13015E ALTIN-MT	.....B30	3606828	....NG2M225RK TN6010	.....A52	3606945	....NGD3M200RK TN6010	.....A55
3552533	....TM5VNS16006BW ALTIN-MT	.....B34	3553457	....TM5VOT19007S ALTIN-MT	.....B33	3606829	....NG2M195RK TN6010	.....A52	3606946	....NGD3M250RK TN6010	.....A55
3552537	....TM5VOS19007SW ALTIN-MT	.....B31	3553458	....TM5VOT19007B ALTIN-MT	.....B33	3606830	....NG4M500RK TN6010	.....A53	3606947	....NGD3M350RK TN6010	.....A55
3552538	....TM5VOS19007BW ALTIN-MT	.....B31	3553459	....TM5VOT19007E ALTIN-MT	.....B33	3606831	....NG3M275LK TN6010	.....A54	3606948	....NR2M050L TN6010	.....A59
3552539	....TM5VOS19007CW	.....B31	3553460	....TM5VOT25008S ALTIN-MT	.....B33	3606832	....NG4M500LK TN6010	.....A54	3606949	....NR3M100L TN6010	.....A59
3552540	....TM5VOS19007DW ALTIN-MT	.....B31	3553461	....TM5VOT25008B ALTIN-MT	.....B33	3606903	....NG2M080RK TN6010	.....A52	3606950	....NR3M125L TN6010	.....A59
3552541	....TM5VOS19007EW ALTIN-MT	.....B31	3553462	....TM5VOT25008E ALTIN-MT	.....B33	3606904	....NG2M140LK TN6010	.....A53	3606951	....NR3M150L TN6010	.....A59
3552542	....TM5VOS25008SW ALTIN-MT	.....B31	3553463	....TM5VOT16006S ALTIN-MT	.....B33	3606905	....NG2M170LK TN6010	.....A53	3606952	....NR3M175L TN6010	.....A59
3552573	....TM5VOS25008BW ALTIN-MT	.....B31	3553464	....TM5VOT16006B ALTIN-MT	.....B33	3606906	....NG3M400LK TN6010	.....A54	3606953	....NR3M200L TN6010	.....A59
3552574	....TM5VOS25008CW	.....B31	3553465	....TM5VOT16006SW ALTIN-MT	.....B33	3606907	....NG2M225LK TN6010	.....A53	3606954	....NR4M200L TN6010	.....A59
3552575	....TM5VOS25008DW ALTIN-MT	.....B31	3553466	....TM5VOT16006BW ALTIN-MT	.....B33	3606908	....NG4M400RK TN6010	.....A53	3606955	....NR4M225L TN6010	.....A59
3552576	....TM5VOS25008EW ALTIN-MT	.....B31	3553467	....TM5VOT13015S ALTIN-MT	.....B32	3606909	....NG3M225LK TN6010	.....A54	3606956	....NR4M250L TN6010	.....A59
3552577	....TM5VOS16006SW ALTIN-MT	.....B31	3553468	....TM5VOT13015A ALTIN-MT	.....B32	3606910	....NG2M195LK TN6010	.....A53	3606957	....NR2M050R TN6010	.....A58
3552578	....TM5VOS16006BW ALTIN-MT	.....B30	3553469	....TM5VOT13015B ALTIN-MT	.....B32	3606911	....NG2M080LK TN6010	.....A53	3606958	....NR3M100R TN6010	.....A58
3552579	....TM5VOS13015SW ALTIN-MT	.....B30	3553470	....TM5VOT13015E ALTIN-MT	.....B32	3606912	....NG4M400LK TN6010	.....A54	3606959	....NR3M125R TN6010	.....A58
3552580	....TM5VOS13015AW ALTIN-MT	.....B30	3553471	....TM5VOT13015SW ALTIN-MT	.....B32	3606913	....NG2M275LK TN6010	.....A53	3606960	....NR3M150R TN6010	.....A58
3552581	....TM5VOS13015BW ALTIN-MT	.....B30	3553472	....TM5VOT13015AW ALTIN-MT	.....B32	3606914	....NG3M425RK TN6010	.....A53	3606961	....NR3M175R TN6010	.....A58
3552582	....TM5VOS13015EW ALTIN-MT	.....B30	3553473	....TM5VOT13015BW ALTIN-MT	.....B32	3606915	....NG3M120RK TN6010	.....A52	3606962	....NR3M200R TN6010	.....A58
3552585	....TM5VOS08003A ALTIN-MT	.....B30	3553474	....TM5VOT13015EW ALTIN-MT	.....B32	3606916	....NG2M275RK TN6010	.....A52	3606963	....NR3M225R TN6010	.....A58
3552586	....TM5VOS08003S ALTIN-MT	.....B30	3553475	....TM5VOT19007SW ALTIN-MT	.....B33	3606917	....NG3M120LK TN6010	.....A53	3606964	....NR4M200R TN6010	.....A58
3552587	....TM5VOS08003B ALTIN-MT	.....B30	3553476	....TM5VOT19007BW ALTIN-MT	.....B33	3606918	....NG3M425LK TN6010	.....A54	3606965	....NR4M225R TN6010	.....A58
3552588	....TM5VOS10004S ALTIN-MT	.....B30	3553477	....TM5VOT19007EW ALTIN-MT	.....B33	3606921	....NGD3M400LK TN6010	.....A55	3606966	....NR4M250R TN6010	.....A58
3552589	....TM5VOS10004A ALTIN-MT	.....B30	3553478	....TM5VOT25008SW ALTIN-MT	.....B33	3606922	....NGD3M300RK TN6010	.....A55	3606967	....NGP2M150L TN6010	.....A56
3552590	....TM5VOS10004B ALTIN-MT	.....B30	3553479	....TM5VOT25008BW ALTIN-MT	.....B33	3606923	....NGD4M400LK TN6010	.....A55	3606968	....NGP2M200L TN6010	.....A56
3552591	....TM5VOS19007S ALTIN-MT	.....B31	3553480	....TM5VOT25008EW ALTIN-MT	.....B33	3606924	....NR2M075L TN6010	.....A59	3606969	....NGP2M250L TN6010	.....A56
3552592	....TM5VOS19007B ALTIN-MT	.....B31	3562029	....606266	.....A22-A24	3606925	....NR2M100L TN6010	.....A59	3606970	....NGP2M300L TN6010	.....A56
3552603	....TM5VOS19007C ALTIN-MT	.....B31	3563591	....331117	.....A91	3606926	....NR2M125L TN6010	.....A59	3606971	....NGP3M150L TN6010	.....A56
3552604	....TM5VOS19007D ALTIN-MT	.....B31	3563786	....206142	.....A91	3606927	....NR2M150L TN6010	.....A59	3606972	....NGP3M200L TN6010	.....A56
3552605	....TM5VOS19007E ALTIN-MT	.....B31	3563787	....206139	.....A89	3606928	....NR2M175L TN6010	.....A59	3606973	....NGP3M250L TN6010	.....A56
3552606	....TM5VOS25008S ALTIN-MT	.....B31	3563798	....206108	.....A92	3606929	....NR2M075R TN6010	.....A58	3606974	....NGP3M300L TN6010	.....A56
3552607	....TM5VOS25008B ALTIN-MT	.....B31	3563799	....206110	.....A93	3606930	....NR2M100R TN6010	.....A58	3606975	....NGP2M150R TN6010	.....A56
3552608	....TM5VOS25008C ALTIN-MT	.....B31	3563800	....206140	.....A89	3606931	....NR2M125R TN6010	.....A58	3606976	....NGP2M200R TN6010	.....A56
3552609	....TM5VOS25008D ALTIN-MT	.....B31	3563801	....206179	.....A90	3606932	....NR2M150R TN6010	.....A58	3606977	....NGP2M250R TN6010	.....A56
3552610	....TM5VOS25008E ALTIN-MT	.....B31	3587587	....206121	.....A93	3606933	....NR2M175R TN6010	.....A58	3606978	....NGP2M300R TN6010	.....A56
3552611	....TM5VOS16006S ALTIN-MT	.....B31	3597589	....MS2219	.....C4-C6	3606934	....NR3M225L TN6010	.....A59	3606979	....NGP3M150R TN6010	.....A56
3552612	....TM5VOS16006B ALTIN-MT	.....B30	3606522	....NG3M300LK TN6010	.....A54	3606935	....NGD2M150LK TN6010	.....A55	3606980	....NGP3M200R TN6010	.....A56
3552613	....TM5VOS05000S ALTIN-MT	.....B30	3606660	....NG3094RK TN6010	.....A52	3606936	....NGD2M200LK TN6010	.....A55	3606981	....NGP3M250R TN6010	.....A56
3552614	....TM5VOS05000A ALTIN-MT	.....B30	3606673	....NG2M170RK TN6010	.....A52	3606937	....NGD2M150RK TN6010	.....A55	3606982	....NGP3M300R TN6010	.....A56



Index

Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
3606983	...NGD4M450LK TN6010	A55	3607051	...NGP3M250R THM	A56	3607124	...NRD3062L TN6010	A60	3607169	...NR3094L TN6010	A59
3606984	...NGD4M500LK TN6010	A55	3607052	...NGP3M300R THM	A56	3607125	...NR3031R TN6010	A58	3607170	...NGD3189RK TN6010	A55
3606985	...NGD4M550LK TN6010	A55	3607055	...NG3062RK TN6010	A52	3607126	...NG2062LK TN6010	A53	3607171	...NR3062L TN6010	A59
3606986	...NGD4M400RK TN6010	A55	3607056	...NR3062RK TN6010	A60	3607127	...NG3156RK TN6010	A52	3607172	...NR3078LK TN6010	A60
3606987	...NGD4M450RK TN6010	A55	3607057	...NG3125RK TN6010	A52	3607128	...NGP2062R TN6010	A56	3607173	...NRD4062R TN6010	A60
3606988	...NGD4M500RK TN6010	A55	3607058	...NG3094LK TN6010	A54	3607129	...NG2M100RK TN6010	A52	3607174	...NR2031R TN6010	A58
3606989	...NGD4M550RK TN6010	A55	3607061	...NG3125LK TN6010	A54	3607130	...NR4125R TN6010	A58	3607175	...NG4250L TN6010	A51
3606990	...NG2M050LK TN6010	A53	3607062	...NR3031RK TN6010	A60	3607131	...NR3062R TN6010	A58	3607176	...NR2031L TN6010	A59
3606991	...NG2M050RK TN6010	A52	3607064	...NB2R THM	A61	3607132	...NGD4125LK TN6010	A55	3607177	...NG3156LK TN6010	A54
3606992	...NGD2M250LK TN6010	A55	3607068	...NG3125RK TN6025	A52	3607133	...NGD4125RK TN6010	A55	3607178	...NGD4250LK TN6010	A55
3607014	...NG3062R THM	A51	3607069	...NG3094RK TN6025	A52	3607134	...NGD4250RK TN6010	A55	3607179	...NG3047L TN6010	A51
3607015	...NR3031R THM	A58	3607070	...NG3062RK TN6025	A52	3607135	...NR3047L TN6010	A59	3607180	...NR3094R TN6010	A58
3607016	...NB2L THM	A61	3607071	...NG2M200RK TN6025	A52	3607136	...NP2002RK TN6010	A58	3607181	...NR4125L TN6010	A59
3607017	...NB3L THM	A61	3607072	...NG3M300RK TN6025	A52	3607137	...NG3094R TN6010	A51	3607182	...NGP2062L TN6010	A56
3607018	...NG3094R THM	A51	3607083	...NGD3094RK TN6010	A55	3607138	...NG3M300RK TN6010	A52	3607183	...NG4125LK TN6010	A54
3607019	...NB3R THM	A61	3607084	...NG3047RK TN6010	A52	3607139	...NR3031L TN6010	A59	3607184	...NG3072LK TN6010	A54
3607020	...NG3125R THM	A51	3607085	...NRD3031L TN6010	A60	3607140	...NG4189LK TN6010	A54	3607185	...NRD4125R TN6010	A60
3607021	...NG3047R THM	A51	3607086	...NR3047RK TN6010	A60	3607141	...NR4125RK TN6010	A60	3607186	...NRD4125L TN6010	A60
3607022	...NG3125L THM	A51	3607087	...NRD3031R TN6010	A60	3607142	...NG4250LK TN6010	A54	3607203	...NG3125LK TN6025	A54
3607025	...NG3094L THM	A51	3607088	...NGD3125RK TN6010	A55	3607143	...NG4250R TN6010	A51	3607204	...NG3094LK TN6025	A54
3607026	...NR3062R THM	A58	3607089	...NG2062RK TN6010	A52	3607144	...NG2M200LK TN6010	A53	3607205	...NGD3094RK TN6025	A55
3607027	...NG2062R THM	A51	3607090	...NG2031RK TN6010	A52	3607145	...NG3072RK TN6010	A52	3607206	...NR3031RK TN6025	A60
3607028	...NR3047L THM	A59	3607091	...NR3062LK TN6010	A60	3607146	...NG2094RK TN6010	A52	3607207	...NG2M200LK TN6025	A53
3607029	...NGD3094RK THM	A55	3607092	...NG3062LK TN6010	A53	3607147	...NGD4189LK TN6010	A55	3607208	...NG3M200RK TN6025	A52
3607030	...NG2031R THM	A51	3607093	...NR3047R TN6010	A58	3607148	...NGD3189LK TN6010	A55	3607209	...NGD3125LK TN6025	A55
3607031	...NR3047R THM	A58	3607094	...NR3078RK TN6010	A60	3607149	...NG2094LK TN6010	A53	3607210	...NGD3125RK TN6025	A55
3607032	...NR3062L THM	A59	3607095	...NR3031LK TN6010	A60	3607150	...NR4094LK TN6010	A60	3607211	...NG3M200LK TN6025	A54
3607033	...NG3062L THM	A51	3607096	...NGD3094LK TN6010	A55	3607151	...NG2M140RK TN6010	A52	3607212	...NG3M300LK TN6025	A54
3607034	...NR3031L THM	A59	3607097	...NGD3125LK TN6010	A55	3607152	...NG3125L TN6010	A51	3607213	...NG3062LK TN6025	A53
3607035	...NGD3094LK THM	A55	3607098	...NGD3062LK TN6010	A55	3607153	...NG2031R TN6010	A51	3607214	...NR3047RK TN6025	A60
3607036	...NG3047L THM	A51	3607099	...NRD3062R TN6010	A60	3607154	...NP3002RK TN6010	A58	3607215	...NG2062RK TN6025	A52
3607037	...NGP2M150L THM	A56	3607100	...NG2M200RK TN6010	A52	3607155	...NG2125RK TN6010	A52	3607216	...NR3062LK TN6025	A60
3607038	...NGP2M200L THM	A56	3607101	...NR4094RK TN6010	A60	3607156	...NR4062LK TN6010	A60	3607217	...NG3M250RK TN6025	A52
3607039	...NGP2M250L THM	A56	3607102	...NR3047LK TN6010	A60	3607157	...NG3047R TN6010	A51	3607218	...NG2M100RK TN6025	A52
3607040	...NGP2M300L THM	A56	3607103	...NG4189RK TN6010	A53	3607158	...NG3062L TN6010	A51	3607219	...NG3M100RK TN6025	A52
3607041	...NGP3M150L THM	A56	3607104	...NGD3062RK TN6010	A55	3607159	...NG2M100LK TN6010	A53	3607220	...NG4189RK TN6025	A53
3607042	...NGP3M200L THM	A56	3607105	...NG3047LK TN6010	A53	3607160	...NG3094L TN6010	A51	3607221	...NG3M150RK TN6025	A52
3607043	...NGP3M250L THM	A56	3607106	...NG3078LK TN6010	A54	3607161	...NGD4189RK TN6010	A55	3607222	...NR3031LK TN6025	A60
3607044	...NGP3M300L THM	A56	3607107	...NG3189LK TN6010	A54	3607162	...NRD4062L TN6010	A60	3607223	...NGD3062RK TN6025	A55
3607045	...NGP2M150R THM	A56	3607108	...NG3189RK TN6010	A53	3607163	...NG4125RK TN6010	A53	3607234	...NG2M150RK TN6025	A52
3607046	...NGP2M200R THM	A56	3607109	...NG3062R TN6010	A51	3607164	...NR4062RK TN6010	A60	3607235	...NG3M400RK TN6025	A53
3607047	...NGP2M250R THM	A56	3607110	...NG3125R TN6010	A51	3607165	...NG2125LK TN6010	A53	3607236	...NR3062RK TN6025	A60
3607048	...NGP2M300R THM	A56	3607111	...NG3078RK TN6010	A52	3607166	...NR4125LK TN6010	A60	3607237	...NG3M400LK TN6025	A54
3607049	...NGP3M150R THM	A56	3607112	...NG2031LK TN6010	A53	3607167	...NG2062R TN6010	A51	3607238	...NG3047RK TN6025	A52
3607050	...NGP3M200R THM	A56	3607123	...NG2047RK TN6010	A52	3607168	...NG4250RK TN6010	A53	3607239	...NG2M100LK TN6025	A53

Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
3607240	...NGD3094LK TN6025	.....A55	3607333	...NF3156LK TN6025	.....A57	3607400	...NGD3M300LK TN6025	.....A55	3607445	...NG3125L TN6025	.....A51
3607241	...NF3125RK TN6025	.....A57	3607334	...NG2M120LK TN6025	.....A53	3607401	...NR2M050L TN6025	.....A59	3607446	...NR2047L TN6025	.....A59
3607242	...NG2M170RK TN6025	.....A52	3607335	...NG3156LK TN6025	.....A54	3607402	...NGD2M150LK TN6025	.....A55	3607447	...NG4M500RK TN6025	.....A53
3607291	...NG2M080RK TN6025	.....A52	3607336	...NG3M220RK TN6025	.....A52	3607403	...NG3062R TN6025	.....A51	3607448	...NG4125LK TN6025	.....A54
3607292	...NG2M275LK TN6025	.....A53	3607337	...NG3M275RK TN6025	.....A52	3607404	...NG2047RK TN6025	.....A52	3607449	...NG4125RK TN6025	.....A53
3607293	...NFD3125LK TN6025	.....A57	3607338	...NG2M140LK TN6025	.....A53	3607405	...NR4062LK TN6025	.....A60	3607450	...NG2058R TN6025	.....A51
3607294	...NG2M150LK TN6025	.....A53	3607339	...NR3094L TN6025	.....A59	3607406	...NG3094R TN6025	.....A51	3607451	...NGD3062LK TN6025	.....A55
3607295	...NRD4062L TN6025	.....A60	3607340	...NG2M300RK TN6025	.....A52	3607407	...NR3078RK TN6025	.....A60	3607452	...NR4094LK TN6025	.....A60
3607296	...NFD3125RK TN6025	.....A57	3607362	...NG3M450RK TN6025	.....A53	3607408	...NR3047LK TN6025	.....A60	3607453	...NG2062R TN6025	.....A51
3607297	...NG3M275LK TN6025	.....A54	3607363	...NG4M400LK TN6025	.....A54	3607409	...NG2M275RK TN6025	.....A52	3607454	...NG3072LK TN6025	.....A54
3607298	...NRD4125L TN6025	.....A60	3607364	...NG4M400RK TN6025	.....A53	3607410	...NGD3189LK TN6025	.....A55	3607455	...NRD3031L TN6025	.....A60
3607299	...NG2M120RK TN6025	.....A52	3607365	...NG3M320RK TN6025	.....A52	3607411	...NG2M225RK TN6025	.....A52	3607456	...NG3156RK TN6025	.....A52
3607300	...NG3M250LK TN6025	.....A54	3607366	...NG4M550LK TN6025	.....A54	3607412	...NG3M120RK TN6025	.....A52	3607457	...NRD3031R TN6025	.....A60
3607301	...NR2031R TN6025	.....A58	3607367	...NG2M220LK TN6025	.....A53	3607413	...NG2M225LK TN6025	.....A53	3607458	...NR4125LK TN6025	.....A60
3607302	...NG3M350RK TN6025	.....A52	3607368	...NG2M325LK TN6025	.....A53	3607414	...NGD4250RK TN6025	.....A55	3607459	...NG3062L TN6025	.....A51
3607303	...NR4125RK TN6025	.....A60	3607369	...NG3M450LK TN6025	.....A54	3607415	...NFD4189LK TN6025	.....A57	3607460	...NG3078LK TN6025	.....A54
3607304	...NG4250RK TN6025	.....A53	3607370	...NG4M350RK TN6025	.....A53	3607416	...NG3047R TN6025	.....A51	3607461	...NR4062RK TN6025	.....A60
3607305	...NG3189RK TN6025	.....A53	3607371	...NG4M350LK TN6025	.....A54	3607417	...NG2M195RK TN6025	.....A52	3607462	...NRD3062L TN6025	.....A60
3607306	...NR3078LK TN6025	.....A60	3607372	...NG3M320LK TN6025	.....A54	3607418	...NG3M175RK TN6025	.....A52	3607463	...NG2M050LK TN6025	.....A53
3607307	...NG2062LK TN6025	.....A53	3607373	...NGD3189RK TN6025	.....A55	3607419	...NG3M100LK TN6025	.....A53	3607464	...NFD3M300LK TN6025	.....A57
3607308	...NG3M150LK TN6025	.....A53	3607374	...NG3047LK TN6025	.....A53	3607420	...NG2M195LK TN6025	.....A53	3607465	...NGD2M200RK TN6025	.....A55
3607309	...NG3078RK TN6025	.....A52	3607375	...NG3125R TN6025	.....A51	3607421	...NG2M175LK TN6025	.....A53	3607466	...NR4M200L TN6025	.....A59
3607310	...NG3M225RK TN6025	.....A52	3607376	...NG2047LK TN6025	.....A53	3607422	...NGD4250LK TN6025	.....A55	3607467	...NR4M225L TN6025	.....A59
3607311	...NG4250LK TN6025	.....A54	3607377	...NG4189LK TN6025	.....A54	3607423	...NGD3M250LK TN6025	.....A55	3607468	...NR4M250L TN6025	.....A59
3607312	...NGD4125RK TN6025	.....A55	3607378	...NFD4250RK TN6025	.....A57	3607424	...NGD3M400LK TN6025	.....A55	3607469	...NR2M075R TN6025	.....A58
3607313	...NG2031RK TN6025	.....A52	3607379	...NG2M175RK TN6025	.....A52	3607425	...NGD3M250RK TN6025	.....A55	3607470	...NR2M100R TN6025	.....A58
3607314	...NGD4189LK TN6025	.....A55	3607380	...NG2094LK TN6025	.....A53	3607426	...NGD3M300RK TN6025	.....A55	3607471	...NR2M125R TN6025	.....A58
3607315	...NG3M325LK TN6025	.....A54	3607381	...NG2125RK TN6025	.....A52	3607427	...NGD3M400RK TN6025	.....A55	3607472	...NR2M150R TN6025	.....A58
3607316	...NGD4125LK TN6025	.....A55	3607382	...NG4250R TN6025	.....A51	3607428	...NF3M200LK TN6025	.....A57	3607473	...NR3062R TN6025	.....A58
3607317	...NG2094RK TN6025	.....A52	3607383	...NG4M550RK TN6025	.....A53	3607429	...NF3M300LK TN6025	.....A57	3607474	...NRD3062R TN6025	.....A60
3607318	...NG2M140RK TN6025	.....A52	3607384	...NG3M120LK TN6025	.....A53	3607430	...NR2M075L TN6025	.....A59	3607475	...NR3031R TN6025	.....A58
3607319	...NR2031L TN6025	.....A59	3607385	...NG4M600RK TN6025	.....A53	3607431	...NR2M100L TN6025	.....A59	3607476	...NR3094R TN6025	.....A58
3607320	...NG3189LK TN6025	.....A54	3607386	...NG4M300LK TN6025	.....A54	3607432	...NR2M125L TN6025	.....A59	3607477	...NP2002RK TN6025	.....A58
3607321	...NGD4189RK TN6025	.....A55	3607387	...NG4M600LK TN6025	.....A54	3607433	...NR2M150L TN6025	.....A59	3607478	...NR3031L TN6025	.....A59
3607322	...NF3125LK TN6025	.....A57	3607388	...NG4M300RK TN6025	.....A53	3607434	...NR2M175L TN6025	.....A59	3607479	...NR3047L TN6025	.....A59
3607323	...NG3094L TN6025	.....A51	3607389	...NG4M450LK TN6025	.....A54	3607435	...NR3M125L TN6025	.....A59	3607480	...NR4094RK TN6025	.....A60
3607324	...NG2M250RK TN6025	.....A52	3607390	...NG4M450RK TN6025	.....A53	3607436	...NR3M150L TN6025	.....A59	3607481	...NG2062L TN6025	.....A51
3607325	...NFD4189RK TN6025	.....A57	3607391	...NGD2M250LK TN6025	.....A55	3607437	...NR3M175L TN6025	.....A59	3607482	...NG2031L TN6025	.....A51
3607326	...NG2M300LK TN6025	.....A53	3607393	...NR2M050R TN6025	.....A58	3607438	...NR3M225L TN6025	.....A59	3607483	...NR2M175R TN6025	.....A58
3607327	...NG2M170LK TN6025	.....A53	3607394	...NG2M050RK TN6025	.....A52	3607439	...NR3M125R TN6025	.....A58	3607484	...NR4M200R TN6025	.....A58
3607328	...NP3012RK TN6025	.....A58	3607395	...NR3M100L TN6025	.....A59	3607440	...NR3M150R TN6025	.....A58	3607485	...NR4M225R TN6025	.....A58
3607329	...NG3M225LK TN6025	.....A54	3607396	...NR3M200L TN6025	.....A59	3607441	...NR3M175R TN6025	.....A58	3607486	...NR4M250R TN6025	.....A58
3607330	...NG2041R TN6025	.....A51	3607397	...NR3M100R TN6025	.....A58	3607442	...NR3M225R TN6025	.....A58	3607487	...NGD3M200LK TN6025	.....A55
3607331	...NG3M175LK TN6025	.....A53	3607398	...NR3M200R TN6025	.....A58	3607443	...NG2031LK TN6025	.....A53	3607488	...NGD3M350LK TN6025	.....A55
3607332	...NG3072RK TN6025	.....A52	3607399	...NGD2M200LK TN6025	.....A55	3607444	...NG2125LK TN6025	.....A53	3607489	...NGD4M400LK TN6025	.....A55



Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
3607490	...NGD4M450LK TN6025	.....A55	3607643	...NT3RK TN6010	.....A147	3607692	...NR3M200L TN7110	.....A59	3607848	...NA3R4 TN6025	.....A155
3607491	...NGD4M500LK TN6025	.....A55	3607644	...NTP3R TN6010	.....A148	3607693	...NR3M225L TN7110	.....A59	3607849	...NT4L TN6025	.....A148
3607492	...NGD4M550LK TN6025	.....A55	3607645	...NT3LK TN6010	.....A147	3607694	...NR4M200L TN7110	.....A59	3607850	...NJP3014R12 TN6025	.....A152
3607493	...NP3002RK TN6025	.....A58	3607646	...NTK2R TN6010	.....A150	3607695	...NR4M225L TN7110	.....A59	3607851	...NA3R6 TN6025	.....A155
3607494	...NR2047R TN6025	.....A58	3607647	...NT2R TN6010	.....A148	3607696	...NR4M250L TN7110	.....A59	3607852	...NTF2R TN6025	.....A149
3607495	...NG2031R TN6025	.....A51	3607648	...NJK3008R20 TN6010	.....A152	3607697	...NR2M050R TN7110	.....A58	3607853	...NTK3L TN6025	.....A150
3607496	...NRD4125R TN6025	.....A60	3607649	...NT3RCK TN6010	.....A149	3607698	...NR2M075R TN7110	.....A58	3607854	...NA3R8 TN6025	.....A155
3607497	...NR3062L TN6025	.....A59	3607650	...NTP3L TN6010	.....A148	3607699	...NR2M100R TN7110	.....A58	3607855	...NA3L8 TN6025	.....A155
3607498	...NG2058L TN6025	.....A51	3607651	...NT2RK TN6010	.....A147	3607700	...NR2M125R TN7110	.....A58	3607856	...NAS3R8 TN6025	.....A156
3607499	...NRD4062R TN6025	.....A60	3607652	...NTF3L TN6010	.....A149	3607701	...NR2M150R TN7110	.....A58	3616753	...409186	.....A94
3607500	...NR4125R TN6025	.....A58	3607653	...NG4M350LK TN7110	.....A54	3607702	...NR2M175R TN7110	.....A58	3616754	...440201M	.....A112
3607501	...NG3047L TN6025	.....A51	3607654	...NG3M300LK TN7110	.....A54	3607703	...NR3M100R TN7110	.....A58	3616762	...606164	.....A91
3607502	...NR3047R TN6025	.....A58	3607655	...NG3M300RK TN7110	.....A52	3607704	...NR3M125R TN7110	.....A58	3632113	...A16NER3	.....A44, A143
3607503	...NGD2M150RK TN6025	.....A55	3607656	...NG3M400LK TN7110	.....A54	3607705	...NR3M150R TN7110	.....A58	3632114	...A10NER2	.....A44, A143
3607504	...NGD2M250RK TN6025	.....A55	3607657	...NG4M600RK TN7110	.....A53	3607706	...NR3M175R TN7110	.....A58	3632115	...A24NER3	.....A44, A143
3607505	...NGD3M200RK TN6025	.....A55	3607658	...NG4M350RK TN7110	.....A53	3607707	...NR3M200R TN7110	.....A58	3632116	...A20NER3	.....A44, A143
3607506	...NGD3M350RK TN6025	.....A55	3607659	...NG3M225LK TN7110	.....A54	3607708	...NR3M225R TN7110	.....A58	3632117	...A08NER2	.....A44, A143
3607507	...NGD4M400RK TN6025	.....A55	3607660	...NG3M250LK TN7110	.....A54	3607709	...NR4M200R TN7110	.....A58	3632118	...A12NER2	.....A44, A143
3607508	...NGD4M450RK TN6025	.....A55	3607661	...NG4M500RK TN7110	.....A53	3607710	...NR4M225R TN7110	.....A58	3632119	...A08NER1	.....A45, A144
3607509	...NGD4M500RK TN6025	.....A55	3607662	...NG3M200RK TN7110	.....A52	3607711	...NR4M250R TN7110	.....A58	3632120	...A16NEL3	.....A44, A143
3607510	...NGD4M550RK TN6025	.....A55	3607663	...NG3M150LK TN7110	.....A53	3607823	...NTP3R TN6025	.....A148	3632121	...A06NER1	.....A45, A144
3607511	...NF3M200RK TN6025	.....A57	3607664	...NG3M250RK TN7110	.....A52	3607824	...NT3RK TN6025	.....A147	3632122	...A32NER3	.....A44, A143
3607512	...NF3M300RK TN6025	.....A57	3607665	...NG4M500LK TN7110	.....A54	3607824	...NT4RK TN6025	.....A147	3632123	...A28NER4	.....A44, A143
3607513	...NG4250L TN6025	.....A51	3607666	...NG3M200LK TN7110	.....A54	3607825	...NT3R TN6025	.....A148	3632124	...A20NEL3	.....A44, A143
3607514	...NR4125L TN6025	.....A59	3607667	...NG4M400RK TN7110	.....A53	3607826	...NT3L TN6025	.....A148	3632125	...A32NER4	.....A44, A143
3607515	...NG3M325RK TN6025	.....A52	3607668	...NG3M150RK TN7110	.....A52	3607827	...NTK3R TN6025	.....A150	3632126	...A12NEL2	.....A44, A143
3607516	...NG3M220LK TN6025	.....A54	3607669	...NG3M400RK TN7110	.....A53	3607828	...NT3LK TN6025	.....A147	3632127	...A10NEL2	.....A44, A143
3607517	...NG3M425RK TN6025	.....A53	3607670	...NG4M400LK TN7110	.....A54	3607829	...NAS3L6 TN6025	.....A156	3632128	...A24NEL3	.....A44, A143
3607518	...NG2M250LK TN6025	.....A53	3607671	...NG4M600LK TN7110	.....A54	3607830	...NTF3R TN6025	.....A149	3632129	...A16TNSR3	.....A45
3607519	...NG3M350LK TN6025	.....A54	3607672	...NR2M050L TN7110	.....A59	3607831	...NTP3L TN6025	.....A148	3632130	...A16NER2	.....A44, A143
3607520	...NG3M425LK TN6025	.....A54	3607673	...NTF2R TN6010	.....A149	3607832	...NTF3L TN6025	.....A149	3632131	...A08NEL2	.....A44, A143
3607521	...NG2M220RK TN6025	.....A52	3607674	...NT2LK TN6010	.....A147	3607833	...NT2LK TN6025	.....A147	3632132	...A28NER3	.....A44, A143
3607522	...NG4M500LK TN6025	.....A54	3607675	...NT2L TN6010	.....A148	3607834	...NT4R TN6025	.....A148	3632133	...NER123B	.....A43
3607523	...NFD3M300RK TN6025	.....A57	3607676	...NT4R TN6010	.....A148	3607835	...NT2L TN6025	.....A148	3632134	...A24UNSR3	.....A45
3607528	...NTK3R TN6010	.....A150	3607677	...NTP2R TN6010	.....A148	3607836	...NTK2R TN6025	.....A150	3632135	...A20UNSR3	.....A45
3607530	...NT3R TN6010	.....A148	3607678	...NTP2L TN6010	.....A148	3607837	...NT2RK TN6025	.....A147	3632136	...A40NER4	.....A44, A143
3607531	...NTF3R TN6010	.....A149	3607683	...NR2M075L TN7110	.....A59	3607838	...NT3RCK TN6025	.....A149	3632137	...A16TNSL3	.....A45
3607532	...NT3L TN6010	.....A148	3607684	...NR2M100L TN7110	.....A59	3607839	...NTP4R TN6025	.....A148	3632138	...NSL162C	.....A40, A136
3607533	...NG2M325RK TN6025	.....A52	3607685	...NR2M125L TN7110	.....A59	3607840	...NTP2L TN6025	.....A148	3632139	...A32NEL3	.....A44, A143
3607534	...NG2M080LK TN6025	.....A53	3607686	...NR2M150L TN7110	.....A59	3607841	...NTP2R TN6025	.....A148	3632140	...NASR062D	.....A42, A138
3607628	...NG3062RK TN7110	.....A52	3607687	...NR2M175L TN7110	.....A59	3607842	...NA3L4 TN6025	.....A155	3632141	...A28NEL4	.....A44, A143
3607629	...NG3189LK TN7110	.....A54	3607688	...NR3M100L TN7110	.....A59	3607843	...NT2R TN6025	.....A148	3632142	...A16NEL2	.....A44, A143
3607630	...NG3189RK TN7110	.....A53	3607689	...NR3M125L TN7110	.....A59	3607844	...NAS3L12 TN6025	.....A156	3632143	...A32NER6	.....A44, A143
3607631	...NG3062LK TN7110	.....A53	3607690	...NR3M150L TN7110	.....A59	3607845	...NAS3L8 TN6025	.....A156	3632144	...NEL123B	.....A43
3607632	...NG3M225RK TN7110	.....A52	3607691	...NR3M175L TN7110	.....A59	3607847	...NA3L6 TN6025	.....A155	3632145	...NSL122B	.....A40, A136

Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
3632146	...A40NER3	.....A44, A143	3636872	...218119	.....A119	3637533	...NSL244E	.....A41, A137	3640344	...TM4V0510004S ALTIN-MT	.....B13
3632147	...NSR062	.....A40, A136	3637472	...NSR206D	.....A41, A137	3637534	...NSR864E	.....A41, A137	3640345	...TM4V0510004B ALTIN-MT	.....B13
3632148	...A10NER1	.....A45, A144	3637485	...NSL082V	.....A40, A136	3637535	...NSR243E	.....A40, A136	3640346	...TM4V1510004S ALTIN-MT	.....B13
3632149	...A32NEL4	.....A44, A143	3637486	...NER162C	.....A43	3637536	...NSL205D	.....A40, A136	3640347	...TM4V4513005 ALTIN-MW	.....B13
3632150	...NER203D	.....A139	3637488	...A24UNSL3	.....A45	3637537	...NEL243D	.....A43	3640348	...TM4V4513005S ALTIN-MW	.....B13
3632151	...NSL164C	.....A41, A137	3637489	...NASL102B	.....A42, A138	3637538	...NEL853D	.....A43	3640349	...TM4V0513005 ALTIN-MW	.....B13
3632152	...NSL123A	.....A40, A136	3637490	...A28NEL3	.....A44, A143	3637539	...NSR168D	.....A41, A137	3640350	...TM4V0513005S ALTIN-MW	.....B13
3632153	...NSR166D	.....A41, A137	3637491	...A40NEL4	.....A44, A143	3637540	...NSR245D	.....A40, A136	3640351	...TM4V0513015 ALTIN-MW	.....B13
3632154	...NEL203D	.....A43	3637492	...NER164C	.....A43	3637541	...NSL854D	.....A41, A137	3640352	...TM4V0513015S ALTIN-MW	.....B13
3632155	...NEL163C	.....A43	3637494	...NER082V	.....A139	3637542	...NER205D	.....A43	3640353	...TM4V0513015B ALTIN-MW	.....B13
3632156	...NER122B	.....A43	3637495	...A20UNSL3	.....A45	3637543	...NEL244D	.....A139	3640354	...TM4V6513015 ALTIN-MW	.....B14
3632157	...NER204D	.....A43	3637496	...NSR853D	.....A40, A136	3637544	...NER206D	.....A43	3640355	...TM4V6513015S ALTIN-MW	.....B13
3632158	...NEL082V	.....A139	3637497	...NASL083D	.....A42, A138	3637545	...NSUR164D	.....A140	3640356	...TM4V1513005S ALTIN-MW	.....B14
3632159	...NEL204D	.....A43	3637498	...A40NER6	.....A44, A143	3637546	...NSL246D	.....A41, A137	3640357	...TM4V0516006 ALTIN-MW	.....B14
3632160	...A32VNSR3	.....A45	3637500	...NEL162C	.....A43	3637547	...NSRDH122B	.....A42, A138	3640358	...TM4V0516006B ALTIN-MW	.....B14
3632161	...NSL062	.....A40, A136	3637501	...NSR244E	.....A41, A137	3637548	...NSL243E	.....A40, A136	3640359	...TM4V4519007 ALTIN-MW	.....B14
3632162	...NEL164D	.....A43	3637502	...A32VNSL3	.....A45	3637549	...NEL205D	.....A43	3640360	...TM4V4519007S ALTIN-MW	.....B14
3636524	...NASL103B	.....A42, A138	3637503	...NEL122B	.....A43	3638591	...NSR163D	.....A40, A136	3640361	...TM4V0519007 ALTIN-MW	.....B14
3636529	...NASR082D	.....A42, A138	3637504	...A40NEL3	.....A44, A143	3638592	...NSR163C	.....A40, A136	3640362	...TM4V0519007S ALTIN-MW	.....B14
3636532	...NASR103B	.....A42, A138	3637505	...NSL244D	.....A41, A137	3639023	...NSR123B	.....A40, A136	3640363	...TM4V0519007B ALTIN-MW	.....B14
3636534	...NASL082D	.....A42, A138	3637506	...NSR243D	.....A40, A136	3639024	...NSL163D	.....A40, A136	3640364	...TM4V0519007C ALTIN-MW	.....B14
3636548	...NDC88VR75M TN6010	.....A153	3637507	...NSL206D	.....A41, A137	3639025	...NSR162C	.....A40, A136	3640365	...TM4V0519007D ALTIN-MW	.....B14
3636549	...NTC3R12E TN6010	.....A151	3637508	...NSL853D	.....A40, A136	3639026	...NSR122B	.....A40, A136	3640366	...TM4V0519007E ALTIN-MW	.....B14
3636550	...NDC3115VR75 TN6010	.....A153	3637509	...NSR205D	.....A40, A136	3639027	...NSR123A	.....A40, A136	3640367	...TM4V1519007 ALTIN-MW	.....B15
3636551	...NT1L TN6010	.....A147	3637510	...NSL102B	.....A40, A136	3639028	...NSR203D	.....A40, A136	3640368	...TM4V1519007S ALTIN-MW	.....B15
3636552	...NDC8115VR75M TN6010	.....A153	3637511	...NSRDH203D	.....A42, A138	3639029	...NSL163C	.....A40, A136	3640369	...TM4V6519007S ALTIN-MW	.....B15
3636553	...NTC3R16E TN6010	.....A151	3637512	...A32NEL6	.....A44, A143	3639031	...NSR164C	.....A41, A137	3640370	...TM4V0525008 ALTIN-MW	.....B15
3636554	...NTC3R14E TN6010	.....A151	3637513	...A40VNSR3	.....A45	3639032	...NSL123B	.....A40, A136	3640371	...TM4V0525008S ALTIN-MW	.....B15
3636555	...NT1L TN6025	.....A147	3637514	...A32NER5	.....A44, A143	3639033	...NSR164D	.....A41, A137	3640372	...TM4V0525008B ALTIN-MW	.....B15
3636556	...NTC3L12I TN6025	.....A151	3637515	...NSL243D	.....A40, A136	3639035	...NSR082V	.....A40, A136	3640373	...TM4V0525008C ALTIN-MW	.....B15
3636557	...NTC3R16E TN6025	.....A151	3637516	...A28UNSR3	.....A45	3639036	...NSL204D	.....A41, A137	3640374	...TM4V0525008D ALTIN-MW	.....B15
3636558	...NDC38RDR75 TN6025	.....A154	3637517	...NER102B	.....A43	3639037	...NSL203D	.....A40, A136	3640375	...TM4V0525008E ALTIN-MW	.....B15
3636559	...NDC38RDL75 TN6025	.....A154	3637518	...NSLDH203D	.....A42, A138	3639038	...NER163C	.....A43	3640376	...TM4V1525008S ALTIN-MW	.....B15
3636560	...NA4L4 TN6025	.....A155	3637520	...NSR246D	.....A41, A137	3639039	...NASR102B	.....A42, A138	3640377	...TM4V6525028S ALTIN-MW	.....B15
3636561	...NA6L3 TN6025	.....A155	3637521	...NER062	.....A43	3639040	...NSL164D	.....A41, A137	3641697	...NEL206D	.....A43
3636562	...NTC3R12E TN6025	.....A151	3637522	...NER244D	.....A43	3639041	...NEL163D	.....A43	3641698	...NSUR124C	.....A140
3636563	...NTB3LB TN6025	.....A156	3637523	...NER853D	.....A43	3639042	...NASR083D	.....A42, A138	3641699	...NSL204C	.....A41, A137
3636564	...NA6R3 TN6025	.....A155	3637524	...NER243D	.....A43	3639043	...NER164D	.....A43	3641700	...NSL864E	.....A41, A137
3636565	...NDC310RDL75 TN6025	.....A154	3637525	...NEL062	.....A43	3639044	...NSR102B	.....A40, A136	3641701	...NSUL164D	.....A140
3636566	...NA4R4 TN6025	.....A155	3637526	...NSR854D	.....A41, A137	3640227	...TM4V4507002 ALTIN-MT	.....B12	3655888	...250109	.....A22
3636567	...NA6R2 TN6025	.....A155	3637527	...A32NEL5	.....A44, A143	3640228	...TM4V4507002S ALTIN-MT	.....B12	3655889	...250110	.....A23
3636568	...NA6L2 TN6025	.....A155	3637528	...NSRDH163D	.....A42, A138	3640229	...TM4V0507002 ALTIN-MT	.....B12	3655892	...250-111	.....A22
3636569	...NG1062L TN6025	.....A51	3637529	...NSR204C	.....A41, A137	3640230	...TM4V0507002S ALTIN-MT	.....B12	3655893	...250112	.....A23
3636570	...NG1094L TN6025	.....A51	3637530	...NSRDH204D	.....A42, A138	3640231	...TM4V4510004 ALTIN-MT	.....B13	3655894	...250-113	.....A22
3636571	...NG1047L TN6025	.....A51	3637531	...NASL062D	.....A42, A138	3640232	...TM4V4510004S ALTIN-MT	.....B13	3655895	...250-114	.....A23
3636572	...NG5M500L TN6025	.....A51	3637532	...NEL102B	.....A139	3640343	...TM4V0510004 ALTIN-MT	.....B13	3655896	...250-115	.....A22

Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
3655897	...250-116A23	3655944	...250307A22	3660388	...TM5V0S16006C ALTIN-MTB31	3704306	...TF4V2510004B TIALN-LTB13
3655898	...250117A22	3655945	...250308A23	3660389	...TM5V0S16006D ALTIN-MTB31	3704307	...TF4V2510004C TIALN-LTB13
3655899	...250118A23	3655946	...250309A22	3660390	...TM5V0S13015CWB30	3704308	...TF4V4513005B TIALN-LWB13
3655900	...250119A22	3655947	...250310A23	3660391	...TM5V0S13015DW ALTIN-MTB30	3704309	...TF4V4513005C TIALN-LWB13
3655901	...250120A23	3655948	...250311A24	3660392	...TM5V0S16006CWB31	3704310	...TF4V6513015B TIALN-LWB13
3655902	...250123A22	3655949	...250313A24	3660393	...TM5V0S16006DW ALTIN-MTB31	3704311	...TF4V6513015C TIALN-LWB13
3655903	...250124A23	3656101	...250314A24	3663032	...TM5V0T07002S ALTIN-MTB32	3704312	...TF4V1513005B TIALN-LWB14
3655904	...250125A22	3656133	...250315A24	3663053	...TM5V0T07002A ALTIN-MTB32	3704323	...TF4V1513005C TIALN-LWB14
3655905	...250126A23	3656134	...250316A24	3663054	...TM5V0T07002B ALTIN-MTB32	3704324	...TF4V6513025B TIALN-LWB14
3655907	...250128A23	3656135	...250317A24	3663056	...TM5V0T07002C ALTIN-MTB32	3704325	...TF4V6513025C TIALN-LWB14
3655908	...250129A22	3656136	...250318A24	3663057	...TM5V0T08003S ALTIN-MTB32	3704326	...TF4V2513005B TIALN-LWB14
3655909	...250130A23	3656137	...250319A22	3663058	...TM5V0T08003A ALTIN-MTB32	3704327	...TF4V2513005C TIALN-LWB14
3655910	...250133A22	3656138	...250320A23	3663059	...TM5V0T08003B ALTIN-MTB32	3704328	...TF4V4516006C TIALN-LWB14
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Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
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Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)			
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								508671006ASML1C05170MD73-D74D73-D74	5090058HSK100ASFTT16100MD59
								508671108ASML1C06180MD73-D74D73-D74	5090059HSK100ASFTT18100MD59
												5090210HSK100ASFTT20105MD59
												5090211HSK100ASFTT25115MD59

Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
5090212	...HSK100ASFHDTT16100M	.....D60	5090279	...BT50BSFTT16100M	.....D62	5276198	...RNPJ10T3M0SMM WP20CM	....C22	5329555	...621E3800ACW	.....B50
5090213	...HSK100ASFHDTT20100M	.....D60	5090280	...BT50BSFTT18100M	.....D62	5276199	...RNPJ10T3M0SMH WP35CM	....C22	5329556	...625E51022CW	.....B50
5090214	...HSK100ASFHDTT25110M	.....D60	5090281	...BT50BSFTT20100M	.....D62	5276240	...RNPJ10T3M0SMH WP25PM	....C22	5329557	...625E51032CW	.....B50
5090215	...HSK100ASFHDTT32110M	.....D60	5090282	...BT50BSFTT25100M	.....D62	5276241	...RNPJ10T3M0SMH WP20CM	....C22	5329558	...625E51042CW	.....B50
5090216	...HSK100ASFHDTT40140M	.....D60	5095167	...TM5W1S07002S ALTIN-MT	.....B40	5276243	...RNPJ10T3M0SMH WK15CM	....C22	5329559	...625E51062CW	.....B50
5090217	...HSK100ASFHDTT50140M	.....D60	5095168	...TM5W1S07002A ALTIN-MT	.....B40	5276360	...RNPJ1204M0SMM WP35CM	....C28	5331093	...WMTS125I3P08PH WU25PT	.....A19
5090218	...HSK63ASFTT12070M	.....D58	5095169	...TM5W1S07002B ALTIN-MT	.....B40	5276361	...RNPJ1204M0SMM WP25PM	....C28	5331095	...WMTS188I5P03PH WU25PT	.....A19
5090219	...HSK63ASFTT14075M	.....D58	5095340	...TM5W1S08003S ALTIN-MT	.....B40	5276362	...RNPJ1204M0SMM WP20CM	....C28	5331097	...WMTS188I5P08PH WU25PT	.....A19
5090220	...HSK63ASFTT16075M	.....D58	5095341	...TM5W1S08003A ALTIN-MT	.....B40	5276363	...RNPJ1204M0SMH WP35CM	....C28	5337697	...KM4X100MSDNN19	.....D30
5090221	...HSK63ASFTT18075M	.....D58	5095342	...TM5W1S08003B ALTIN-MT	.....B40	5276364	...RNPJ1204M0SMH WP25PM	....C28	5337698	...KM4X100MSDNN25	.....D30
5090222	...HSK63ASFTT20075M	.....D58	5095343	...TM5W1S10004S ALTIN-MT	.....B40	5276365	...RNPJ1204M0SMH WP20CM	....C28	5337711	...KM4X100MSKNR19	.....D31
5090223	...HSK63ASFTT25085M	.....D58	5095345	...TM5W1S10004A ALTIN-MT	.....B40	5276366	...RNPJ1204M0SMH WK15CM	....C28	5337713	...KM4X100MSRNL19	.....D32
5090224	...HSK63ASFTT32085M	.....D58	5095346	...TM5W1S10004B ALTIN-MT	.....B40	5283432	...M200D100Z03M12RN10	.....C18	5337714	...KM4X100MSRNL25	.....D32
5090225	...HSK100ASFTT050374	.....D59	5095347	...TM5W1S10004C ALTIN-MT	.....B40	5283433	...M200D125Z03M16RN10	.....C18	5337715	...KM4X100MSRNR19	.....D32
5090226	...HSK100ASFTT062394D59	5095348	...TM5W1S13005S ALTIN-MTB40	5283434	...M200D125Z04M16RN10C18	5337716	...KM4X100MSRNR25D32
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5090228	...HSK100ASFTT100453D59	5095421	...TM5W1S13005B ALTIN-MTB40	5283436	...M200D100Z03W100RN10C19	5337718	...KM4X100MTJNR33D32
5090229	...HSK100ASFHDTT100433	.....D60	5095422	...TM5W1S13005C ALTIN-MT	.....B40	5283437	...M200D125Z03W125RN10	.....C19	5337719	...KM4X100MTJNL27	.....D32
5090230	...HSK100ASFHDTT125433	.....D60	5095423	...TM5W1S16006S ALTIN-MT	.....B40	5283438	...M200D100Z03C100RN10L600	.....C20	5337730	...KM4X100MTJNL33	.....D32
5090231	...HSK100ASFHDTT150551	.....D60	5095425	...TM5W1S16006A ALTIN-MT	.....B40	5283439	...M200D100Z03C100RN10L800	.....C20	5337731	...KM4X100MVUNL16	.....D33
5090232	...HSK100ASFHDTT200551	.....D60	5095426	...TM5W1S16006B ALTIN-MT	.....B40	5283480	...M200D125Z03C125RN10L900	.....C20	5337732	...KM4X100MVUNR16	.....D33
5090233	...HSK63ASFTT050276	.....D58	5095427	...TM5W1S16006C ALTIN-MT	.....B40	5283481	...M200D150Z03S050RN10	.....C21	5337734	...KM4X100MRGMR12	.....D29
5090234	...HSK63ASFTT062295D58	5095428	...TM5W1S16006D ALTIN-MTB40	5283482	...M200D150Z05S050RN10C21	5337735	...KM4X100MRGMR19D29
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5090236	...HSK63ASFTT100335D58	5123869	...RNGJ1204M0SMM WP35CMC28	5283484	...M200D200Z06S075RN10C21	5337737	...KM4X100MRGMR12D29
5090237	...HSK63ASFTT125335D58	5129960	...BT40BSFTT050276D61	5283488	...M200D200Z04S075RN10C21	5337738	...KM4X100MRGMR19D29
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5090260	...DV40BSFTT18065MD66	5129963	...BT40BSFTT075295D61	5283521	...M200D200Z04S075RN16C30	5337750	...KM4X100PRDCN20D33
5090261	...DV40BSFTT20065M	.....D66	5129964	...BT40BSFTT100335	.....D61	5283522	...M200D250Z05S100RN16	.....C30	5337751	...KM4X100PRDCN25	.....D33
5090262	...DV40BSFTT25075M	.....D66	5129965	...BT50BSFTT050394	.....D62	5283523	...M200D300Z05S100RN16	.....C30	5337752	...KM4X100PRDCN32	.....D33
5090263	...DV40BSFTT32080MD66	5129966	...BT50BSFTT062394D62	5283524	...M200D300Z07S100RN16C30	5337754	...KM4X100NEL3D34
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5090265	...BT40BSFTT14075MD61	5129968	...BT50BSFTT100394D62	5283526	...M200D400Z08S150RN16C30	5337756	...KM4X100NEL5D34
5090266	...BT40BSFTT16075M	.....D61	5129969	...DV40BSFTT12065M	.....D66	5291300	...WMTS125I3P03PH WU25PT	.....A19	5337757	...KM4X100NEL6	.....D34
5090267	...BT40BSFTT18075M	.....D61	5129970	...DV40BSFTT14065M	.....D66	5326071	...KM4X100NCADS85	.....D24	5337758	...KM4X100NER3	.....D34
5090268	...BT40BSFTT20075M	.....D61	5176974	...RDPT1204M0SMMX TN6540	....C38	5327620	...WMTS250I6P03PH WU25PT	.....A19	5337759	...KM4X100NER4	.....D34
5090269	...BT40BSFTT25085MD61	5274455	...RNGJ10T3M0EML WP35CMC22	5327621	...WMTS250I6P08PH WU25PTA19	5337770	...KM4X100NER5D34
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5090271	...DV50BSFTT12080MD67	5274457	...RNGJ10T3M0EML WU35PMC22	5329388	...623E32009CWB50	5337777	...KM4X100ETAL20D37
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5090275	...DV50BSFTT20080MD67	5274561	...RNGJ1605M0EML WP25PMC31	5329552	...621E38009CWB50	5337781	...KM4X100STAL3232MD36
5090276	...DV50BSFTT25100M	.....D67	5274562	...RNGJ1605M0EML WU35PM	....C31	5329553	...620E3800ACW	.....B50	5337782	...KM4X100STAR20	.....D36
5090277	...BT50BSFTT12100M	.....D62	5276196	...RNPJ10T3M0SMM WP35CM	....C22	5329554	...623E3800ACW	.....B50	5337783	...KM4X100STAR24	.....D36
5090278	...BT50BSFTT14100M	.....D62	5276197	...RNPJ10T3M0SMM WP25PM	....C22	5329554	...623E3800ACW	.....B50	5337784	...KM4X100STAR2525M	.....D36

Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
5337785	...KM4X100STAR3232M	.....D36	5346399	...WMTS405M4U06PH WU25PT	..A19	5352393	...M370D150Z02M16W012	.....C10	5357439	...TM5V1E10004B ALTIN-MT	.....B44
5337806	...KM4X100MCKNL19	.....D28	5346400	...WMTS505M5U03PH WU10PT	..A19	5352394	...M370D150Z02C125W012L600		5357470	...TM5V1E10004S ALTIN-MT	.....B44
5337807	...KM4X100MCKNR19D28	5346401	...WMTS505M5U03PH WU25PT	..A19	C11		5357471	...TM5V0E13015AV ALTIN-MVB44
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5337809	...KM4X100MCLNL25D28	5346403	...WMTS505M5U06PH WU25PT	..A19	C11		5357473	...TM5V0E13015CV ALTIN-MVB44
5337810	...KM4X100MCLNR19	.....D28	5346404	...WMTS605M6U03PH WU10PT	..A19	5352396	...M370D200Z03S075W012	.....C12	5357474	...TM5V0E13015DV ALTIN-MV	.....B44
5337811	...KM4X100MCLNR25	.....D28	5346405	...WMTS605M6U03PH WU25PT	..A19	5352397	...M370D200Z04S075W012	.....C12	5357475	...TM5V0E13015EV ALTIN-MV	.....B44
5337812	...KM4X100MCRNL19D29	5346406	...WMTS605M6U06PH WU10PT	..A19	5352398	...M370D250Z05S075W012C12	5357476	...TM5V0E13015SV ALTIN-MVB44
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5337814	...KM4X100MCRNR19D29	5346408	...WMTS805M8U06PH WU10PT	..A19	5352420	...M370D300Z06S100W012C12	5357478	...TM5V0E13015BW ALTIN-MWB44
5337815	...KM4X100MCRNR25	.....D29	5346409	...WMTS805M8U06PH WU25PT	..A19	5352421	...M370D300Z05S125W012	.....C12	5357479	...TM5V0E13015CW ALTIN-MW	.....B44
5338818	...W0EJ120712SRMH WP25PM	..C13	5346410	...WMTS805M8U03PH WU10PT	..A19	5352422	...M370D300Z06S125W012	.....C12	5357480	...TM5V0E13015DW ALTIN-MW	..B44
5338819	...W0EJ120712SRMH WU35PM	..C13	5346411	...WMTS805M8U03PH WU25PT	..A19	5352423	...M370D400Z06S150W012	.....C12	5357481	...TM5V0E13015EW ALTIN-MW	.....B44
5338860	...W0EJ120712SRMH WK15CM	..C13	5346412	...WMTS300M3P03PH WU10PT	..A19	5352424	...M370D400Z08S150W012	.....C12	5357482	...TM5V0E13015SW ALTIN-MW	.....B44
5338861	...W0EJ120712SRMH WP20CM	..C13	5346413	...WMTS300M3P03PH WU25PT	..A19	5352425	...M370D500Z07S150W012	.....C12	5357483	...TM5VNE13005BV ALTIN-MV	.....B45
5338862	...W0EJ120712SRMH WP35CM	..C13	5346414	...WMTS300M3P03PH WU10HT	..A19	5352426	...M370D500Z09S150W012	.....C12	5357484	...TM5VNE13005BW ALTIN-MW	..B45
5345265	...KM4X100DCLNL12KC04	.....D26	5346415	...WMTS300M3P06PH WU10PT	..A19	5356850	...TM5V0E19007BV ALTIN-MV	.....B44	5357485	...TM5V0E16006BV ALTIN-MV	.....B44
5345266	...KM4X100DCLNL16KC06	.....D26	5346416	...WMTS300M3P06PH WU25PT	..A19	5356851	...TM5V0E19007CV ALTIN-MV	.....B44	5357486	...TM5V0E16006CV ALTIN-MV	.....B44
5345267	...KM4X100DCLNR12KC04D26	5346417	...WMTS300M3P06PH WU10HT	..A19	5356852	...TM5V0E19007DV ALTIN-MVB44	5357487	...TM5V0E16006SV ALTIN-MVB44
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5345310	...KM4X100DDJNR15KC06D26	5346420	...WMTS400M4P03PH WU10HT	..A19	5356855	...TM5V0E19007BW ALTIN-MWB44	5357490	...TM5V0E16006SW ALTIN-MWB44
5345314	...KM4X100DDUNL15KC06D27	5346421	...WMTS400M4P06PH WU10PT	..A19	5356856	...TM5V0E19007CW ALTIN-MWB44	5357491	...TM5VNE16006BV ALTIN-MVB45
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5345914	...WMTS125I3P03PH WU10PTA19	5346423	...WMTS400M4P06PH WU10HT	..A19	5356858	...TM5V0E19007EW ALTIN-MWB44	5359120	...WMTWGML117SA29
5345915	...WMTS125I3P08PH WU10PT	.....A19	5346424	...WMTS500M5P03PH WU10PT	..A19	5356859	...TM5V0E19007SW ALTIN-MW	.....B44	5359121	...WMTWGML217S	.....A29
5345916	...WMTS156I4P03PH WU10PT	.....A19	5346425	...WMTS500M5P03PH WU25PT	..A19	5356870	...TM5VNE19017BV ALTIN-MV	.....B45	5359122	...WMTWGML2B19S	.....A29
5345917	...WMTS156I4P03PH WU25PT	.....A19	5346426	...WMTS500M5P03PH WU10HT	..A19	5356871	...TM5VNE19017BW ALTIN-MW	..B45	5359123	...WMTWGML322S	.....A29
5345918	...WMTS156I4P08PH WU10PT	.....A19	5346427	...WMTS500M5P06PH WU10PT	..A19	5356872	...TM5V0E25008BV ALTIN-MV	.....B44	5359124	...WMTWGML422S	.....A29
5345919	...WMTS156I4P08PH WU25PT	.....A19	5346428	...WMTS500M5P06PH WU25PT	..A19	5356873	...TM5V0E25008CV ALTIN-MV	.....B44	5359125	...WMTWGML525S	.....A29
5345980	...WMTS188I5P03PH WU10PT	.....A19	5346429	...WMTS500M5P06PH WU10HT	..A19	5356874	...TM5V0E25008EV ALTIN-MV	.....B44	5359126	...WMTWGML625S	.....A29
5345981	...WMTS188I5P08PH WU10PT	.....A19	5346430	...WMTS600M6P03PH WU10PT	..A19	5356875	...TM5V0E25008FV ALTIN-MV	.....B44	5359127	...WMTWGMR117S	.....A29
5345983	...WMTS250I6P03PH WU10PT	.....A19	5346431	...WMTS600M6P03PH WU25PT	..A19	5356876	...TM5V0E25008SV ALTIN-MV	.....B44	5359128	...WMTWGMR217S	.....A29
5345984	...WMTS250I6P08PH WU10PT	.....A19	5346432	...WMTS600M6P06PH WU10PT	..A19	5356877	...TM5V0E25008BW ALTIN-MW	.....B44	5359129	...WMTWGMR2B19S	.....A29
5345985	...WMTS312I8P03PH WU10PT	.....A19	5346433	...WMTS600M6P06PH WU25PT	..A19	5356878	...TM5V0E25008CW ALTIN-MW	.....B44	5359130	...WMTWGMR322S	.....A29
5345986	...WMTS312I8P03PH WU25PT	.....A19	5346434	...WMTS800M8P06PH WU10PT	..A19	5356879	...TM5V0E25008EW ALTIN-MW	.....B44	5359131	...WMTWGMR422S	.....A29
5345987	...WMTS312I8P08PH WU10PT	.....A19	5346435	...WMTS800M8P06PH WU25PT	..A19	5356890	...TM5V0E25008FW ALTIN-MW	.....B44	5359132	...WMTWGMR525S	.....A29
5345988	...WMTS312I8P08PH WU25PT	.....A19	5346436	...WMTS800M8P03PH WU10PT	..A19	5356891	...TM5V0E25008SW ALTIN-MW	.....B44	5359133	...WMTWGMR625S	.....A29
5346392	...WMTS305M3U03PH WU10PT	..A19	5346437	...WMTS800M8P03PH WU25PT	..A19	5356892	...TM5VNE25018BV ALTIN-MV	.....B45	5359134	...WMTWGML313B038-052	.....A30
5346393	...WMTS305M3U03PH WU25PT	..A19	5349609	...WGMSL12	.....A28	5356893	...TM5VNE25018BW ALTIN-MW	..B45	5359135	...WMTWGML316B052-070	.....A30
5346394	...WMTS305M3U06PH WU10PT	..A19	5349620	...WGMSL16	.....A28	5357434	...TM5V0E10004A ALTIN-MT	.....B44	5359136	...WMTWGML316B070-100	.....A30
5346395	...WMTS305M3U06PH WU25PT	..A19	5349621	...WGMSR12	.....A28	5357435	...TM5V0E10004B ALTIN-MT	.....B44	5359137	...WMTWGML319100-205	.....A30
5346396	...WMTS405M4U03PH WU10PT	..A19	5349622	...WGMSR16	.....A28	5357436	...TM5V0E10004S ALTIN-MT	.....B44	5359138	...WMTWGML413B038-052	.....A30
5346397	...WMTS405M4U03PH WU25PT	..A19	5349623	...WGMSL20	.....A28	5357437	...TM5VNE10014A ALTIN-MT	.....B45	5359139	...WMTWGML416B052-070	.....A30
5346398	...WMTS405M4U06PH WU10PT	..A19	5349624	...WGMSR20	.....A28	5357438	...TM5V1E10004A ALTIN-MT	.....B44	5359140	...WMTWGML416B070-100	.....A30

Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)	Order No.	Catalog No.	Page(s)
5359141	...WMTWGML419B100-205	.....A30	5423871	...A24TWMTELO522N	.....A27	4160317	...KM4X100SMC150400	.....D49	4161856	...KM4X100KM32075M	.....D50
5359142	...WMTWGML516B038-052	.....A30	5423872	...A20SWMTELO619N	.....A27	4160318	...KM4X100SMC150600	.....D49	4161858	...KM4X100KM40080M	.....D50
5359143	...WMTWGML519B052-070	.....A30	5423873	...A24TWMTELO622N	.....A27	4160319	...KM4X100SMC200400	.....D49	4161859	...KM4X100KM40100M	.....D50
5359144	...WMTWGML519B070-100	.....A30	5476633	...RNPJ10T3M0SMH WU35PM	...C22	4160320	...KM4X100SMC200600	.....D49	4161860	...KM4X100KM40150M	.....D50
5359145	...WMTWGML525B100-205	.....A30	5476634	...RNPJ1204M0SMH WU35PM	...C28	4160321	...KM4X100SMC250400	.....D49	4161861	...KM4X100KM50100M	.....D50
5359146	...WMTWGML616B038-052	.....A30	5476635	...RNPJ1204M0SMH WU35PM	...C28	4160322	...KM4X100SMC250600	.....D49	4161862	...KM4X100KM50150M	.....D50
5359147	...WMTWGML619B052-070	.....A30	1017278	...ISSN432	.....D6	4160335	...KM4X100SMC22050M	.....D48	4161863	...KM4X100KM50200M	.....D50
5359148	...WMTWGML619B070-100	.....A30	1131888	...571.060	.....D44, D46	4160337	...KM4X100SMC22100M	.....D48	4161864	...KM4X100KM63100M	.....D50
5359149	...WMTWGML625B100-205	.....A30	1135984	...170.008	.....D45	4160338	...KM4X100SMC22160M	.....D48	4161865	...KM4X100KM63150M	.....D50
5359150	...WMTWGM313B038-052	.....A30	1140176	...571.067	.....D44	4160340	...KM4X100SMC27050M	.....D48	4161866	...KM4X100KM63200M	.....D50
5359151	...WMTWGM316B052-070	.....A30	1140179	...571.068	.....D44	4160341	...KM4X100SMC27100M	.....D48	4161867	...KM4X100KM80100M	.....D50
5359152	...WMTWGM316B070-100	.....A30	1140182	...571.069	.....D44	4160342	...KM4X100SMC27160M	.....D48	4161868	...KM4X100KM80150M	.....D50
5359153	...WMTWGM319B100-205	.....A30	1245641	...571.074	.....D44	4160343	...KM4X100SMC32050M	.....D48	4161869	...KM4X100KM80200M	.....D50
5359154	...WMTWGM416B052-070	.....A30	1245643	...571.076	.....D44	4160344	...KM4X100SMC32100M	.....D48	4169583	...KM4X100TDSMC22260M	.....D47
5359155	...WMTWGM416B070-100	.....A30	1245644	...571.077	.....D44	4160345	...KM4X100SMC32160M	.....D48	4169584	...KM4X100TDSMC27320M	.....D47
5359156	...WMTWGM419B100-205	.....A30	2012594	...RDMW1204M0TX TN2510	.....C38	4160346	...KM4X100SMC40060M	.....D48	4169585	...KM4X100TDSMC32330M	.....D47
5359157	...WMTWGM525B100-205	.....A30	2020741	...RDMW1204M0TX TN7535	.....C38	4160347	...KM4X100SMC40100M	.....D48	4169586	...KM4X100TDSMC0751050	.....D47
5359158	...WMTWGM625B100-205	.....A30	2020763	...RDMT1204M0TX TN7525	.....C38	4160348	...KM4X100SMC40160M	.....D48	4169587	...KM4X100TDSMC1001250	.....D47
5408797	...2699630	.....D25	2109440	...RDMW1204M0TX TN7525	.....C38	4160350	...KM4X100SMC50070M	.....D48	4169588	...KM4X100TDSMC1251300	.....D47
5408798	...2404270	.....D25	2109542	...RDMT1204M0TX TN7535	.....C38	4160351	...KM4X100SMC50100M	.....D48	5005145	...XPHT160416ERGE TN5515	.....C8
5408799	...2404272	.....D25	2109552	...RDMT1204M0TX TN2510	.....C38	4160352	...KM4X100SMC50160M	.....D48	5005146	...XPHT160416ERGE TN6520	.....C8
5408990	...(M16 x 2,0)	.....D25	2957430	...RDMT1204M0TX TN6525	.....C38	4160353	...KM4X100SMC60070M	.....D48	5005147	...XPHT160416ERGE TN6525	.....C8
5413539	...LMB200025	.....D25	2957432	...RDMT1204M0TX TN6540	.....C38	4160354	...KM4X100SMC60100M	.....D48	5005210	...XPHT160416ERGE TN6540	.....C8
5413740	...OR01109139V75	.....D25	3353281	...RDMW1204M0TX TN6540	.....C38	4160355	...KM4X100SMC60160M	.....D48	5005211	...XPHT160416ERGE TN7535	.....C8
5413741	...OR01046139V75	.....D25	3960760	...SS03M030	.....D46	4160510	...KM4X100EM06080M	.....D46	5123863	...RNGJ1204M0EML WP25PM	...C28
5413742	...BUR135V90	.....D25	3996499	...SS03M032	.....D46	4160511	...KM4X100EM08080M	.....D46	5123864	...RNGJ1204M0EML WU35PM	...C28
5413743	...OR01925103V75	.....D25	4052410	...WOEJ080412SRMH TN6540	.....C7	4160512	...KM4X100EM10080M	.....D46	5123865	...RNGJ1204M0EML WP35CM	...C28
5413744	...S-1786	.....D25	4052411	...WOEJ080412SRMH TN6525	.....C7	4160518	...KM4X100EM025300	.....D46	5123866	...RNGJ1204M0SMM WK15PM	...C28
5413745	...2699631	.....D25	4068517	...WOEJ080412SRMH TN7535	.....C7	4160519	...KM4X100EM038300	.....D46	5123867	...RNGJ1204M0SMM WP25PM	...C28
5419648	...WOEJ120712SRMM WP25PM	...C13	4113892	...WOEJ080412SRMM TN6525	.....C7	4160520	...KM4X100EM050325	.....D46	5123868	...RNGJ1204M0SMM WU35PM	...C28
5419649	...WOEJ120712SRMM WU35PM	...C13	4113915	...WOEJ080412SRMM TN6540	.....C7	4160521	...KM4X100EM062375	.....D46	5123900	...RNGJ1204M0SMH WK15PM	...C28
5419790	...WOEJ120712SRMM WP20CM	...C13	4113916	...WOEJ080412SRMM TN7535	.....C7	4160522	...KM4X100EM075375	.....D46	5123901	...RNGJ1204M0SMH WP25PM	...C28
5419791	...WOEJ120712SRMM WP35CM	...C13	4136480	...WOEJ080412SRMH TN6520	.....C7	4160533	...KM4X100EM12080M	.....D46	5123902	...RNGJ1204M0SMH WU35PM	...C28
5423448	...A16RWMTER0316N	.....A27	4136905	...WOEJ080412SRMM TN6520	.....C7	4160534	...KM4X100EM14080M	.....D46	5123903	...RNGJ1204M0SMH WP35CM	...C28
5423449	...A20SWMTER0319N	.....A27	4159439	...KM4X100HTS40085M	.....D45	4160535	...KM4X100EM16100M	.....D46	5276470	...RNPJ1605M0SMM WP35CM	...C31
5423840	...A16RWMTER0416N	.....A27	4159440	...KM4X100HTS50090M	.....D45	4160536	...KM4X100EM18100M	.....D46	5276471	...RNPJ1605M0SMM WP25PM	...C31
5423841	...A20SWMTER0419N	.....A27	4160286	...KM4X100SMC075400	.....D49	4160537	...KM4X100EM20100M	.....D46	5276472	...RNPJ1605M0SMM WP20CM	...C31
5423842	...A20SWMTER0519N	.....A27	4160287	...KM4X100SMC075400	.....D49	4160538	...KM4X100EM25100M	.....D46	5276473	...RNPJ1605M0SMH WP35CM	...C31
5423843	...A24TWMTER0522N	.....A27	4160289	...KM4X100SMC075600	.....D49	4160539	...KM4X100EM32100M	.....D46	5276474	...RNPJ1605M0SMH WP25PM	...C31
5423844	...A20SWMTER0619N	.....A27	4160290	...KM4X100SMC075600	.....D49	4160540	...KM4X100EM40120M	.....D46	5276475	...RNPJ1605M0SMH WP20CM	...C31
5423845	...A24TWMTER0622N	.....A27	4160291	...KM4X100SMC100400	.....D49	4160541	...KM4X100EM50130M	.....D46	5276476	...RNPJ1605M0SMH WK15CM	...C31
5423846	...A16RWMTLO316N	.....A27	4160292	...KM4X100SMC2C100400	.....D49	4160573	...KM4X100EM100425	.....D46	5476636	...RNPJ1605M0SMH WU35PM	...C31
5423847	...A20SWMTELO319N	.....A27	4160313	...KM4X100SMC100600	.....D49	4160574	...KM4X100EM125425	.....D46	5476637	...RNPJ1605M0SMM WU35PM	...C31
5423848	...A16RWMTLO416N	.....A27	4160314	...KM4X100SMC2C100600	.....D49	4160575	...KM4X100EM150450	.....D46			
5423849	...A20SWMTELO419N	.....A27	4160315	...KM4X100SMC125400	.....D49	4160576	...KM4X100EM200550	.....D46			
5423870	...A20SWMTELO519N	.....A27	4160316	...KM4X100SMC125600	.....D49	4160577	...KM4X100EM250575	.....D46			

Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
125.63	A76	250136	A23	250323	A24	435116	A92
170.025	C18-C21, C24, C27, C30	250137	A22	250324	A24	435117	A92
191.848	C18-C21	250138	A23	250325	A24	435130	A89
193.343	C30	250141	A22	250326	A24	435136	A93
193.492	C24-C27	250142	A23	250327	A24	435137	A93
571.067	D44	250144	A23	250328	A24	435148	A92
571.068	D44	250145	A22	251117	A25	435149	A92
571.069	D44	250146	A23	251119	A25	435150	A92
571.074	D44	250147	A22	251121	A25	435151	A92
571.076	D44	250148	A23	251122	A25	446101	A25
571.077	D44	250149	A22	251123	A25	446102	A25
206108	A92	250150	A23	251124	A25	446103	A25-A26
206110	A93	250151	A22	251133	A25	446104	A25-A26
206113	A92	250152	A23	251134	A25	606171	A92-A93
206114	A92	250153	A22	251135	A25	606249	A22-24
206115	A93	250154	A23	251136	A25	606266	A22-A24
206116	A93	250181	A22	251137	A25	613139	A94
206118	A92	250183	A22	251150	A25	619112	A92-A93
206119	A93	250184	A23	251151	A25	619168	A22-A23, A25-A26
206121	A93	250189	A22	251152	A25	619168	A22-A27
206123	A92	250190	A23	251153	A25	619174	A94
206128	A92	250193	A22	251154	A25	619175	A94
206136	A92	250194	A23	251155	A25	619176	A94
206139	A89	250301	A22	251156	A25	619177	A94
206500	A94	250302	A23	309105	A93	619205	A22-A23, A25
206501	A94	250303	A22	309106	A93	2404270	D25
206502	A94	250304	A23	309111	A93	2404272	D25
206504	A94	250305	A22	310102	A92	2699630	D25
206505	A94	250306	A23	310108	A92	2699631	D25
250109	A22	250307	A22	310109	A92	12146003800	A76
250110	A23	250308	A23	409182	A94	12146009500	A76
250112	A23	250309	A22	409183	A94	12148000600	C36-C37
250117	A22	250310	A23	409184	A94	12148021100	A78
250118	A23	250311	A24	409186	A94	12148021900	A78
250119	A22	250312	A24	409187	A94	12148024100	A78
250120	A23	250313	A24	435101	A92	12148024200	A78
250123	A22	250314	A24	435102	A92	12148024500	A78
250125	A22	250315	A24	435103	A93	12148024800	A78
250126	A23	250316	A24	435104	A92	12148031686	A78
250128	A23	250317	A24	435105	A92	12148032086	A78
250129	A22	250318	A24	435106	A93	12148038800	C36
250130	A23	250319	A22	435107	A93	12148041100	A78
250133	A22	250320	A23	435108	A93	12148041200	A75, A78
250134	A23	250321	A24	435109	A92	12148041300	A76
250135	A22	250322	A24	435110	A92	12148580011	A78

Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
12148580411.....	A78	32250111000.....	A77	123567360 THM.....	A84	123567804 TN7525	A85
12148580511.....	A78	32251221200.....	A76	123567360 TN6030	A84	123567805 TN7525	A85
12148580611.....	A78	32251221600.....	A76	123567360 TN7525	A84	123567806 TN7525	A85
12148582511.....	A78	32251222000.....	A76	123567360 TN7535	A84	123568080 THM.....	A86
12148583800.....	A78	(M16 x 2,0).....	D25	123567360 TN8025	A84	123568080 TN7525	A86
12148586000.....	A78	06ASML1C05170M	D73–D74	123567380 THM.....	A84	123568080 TN7535	A86
12148586611.....	A78	08ASML1C06180M	D73–D74	123567380 TN6030	A84	123568080 TTM	A86
12148586900.....	A78	10ASML1C08180M	D73–D74	123567380 TN7525	A84	123568081 THM.....	A86
12148587011.....	A78	118.404	D33	123567380 TN7535	A84	123568100 THM.....	A86
12148587111.....	A78	118.604	D33	123567380 TN8025	A84	123568100 TN7525	A86
12148588211.....	A78	119.073	D33	123567420 TN6030	A84	123568100 TN7535	A86
12148588311.....	A78	121.030	D33	123567420 TN7525	A84	123568120 THM.....	A86
12148588411.....	A78	121.820	D33	123567420 TN7535	A84	123568120 TN7525	A86
12148589200.....	A78	12148031686 TTR	A78	123567430 TN6030	A84	123568120 TN7535	A86
12148589300.....	A78	123567230 TN6030	A84	123567430 TN7525	A84	123568121 THM.....	A86
12148589800.....	A78	123567230 TN7525	A84	123567430 TN7535	A84	123568140 THM.....	A86
12148591011.....	A78	123567230 TN7535	A84	123567440 TN6030	A84	123568140 TN7525	A86
12148591111.....	A78	123567231 TN6030	A84	123567440 TN7525	A84	123568140 TN7535	A86
12148596200.....	A75	123567231 TN7525	A84	123567440 TN7535	A84	123568160 TN7525	A86
12191061900.....	A78	123567231 TN7535	A84	123567450 TN6030	A84	123568160 TN7535	A86
12191062086.....	A78	123567240 TN6030	A84	123567450 TN7525	A84	123568160 TTM	A86
12191062586.....	A78	123567240 TN7525	A84	123567450 TN7535	A84	123568161 THM.....	A86
12191062686.....	A78	123567240 TN7535	A84	123567460 TN6030	A84	125.625	A76
12191063286.....	A78	123567241 TN6030	A84	123567460 TN7525	A84	12ASML1C10180M	D73–D74
12250023000.....	A75	123567241 TN7525	A84	123567460 TN7535	A84	14ASML1C10195M	D73–D74
12250023100.....	A75	123567241 TN7535	A84	123567480 TN6030	A84	169.333	D33
12250023200.....	A75	123567320 THM.....	A84	123567480 TN7525	A84	169.337	D33
12250025200.....	A75	123567320 TN6030	A84	123567480 TN7535	A84	169.339	D33
12251332000.....	A76	123567320 TN7525	A84	123567702 TN7535	A85	16ASML1C10220M	D73–D74
12251342000.....	A76	123567320 TN7535	A84	123567702 TN8025	A85	170.002	D72
12251343000.....	A76	123567320 TN8025	A84	123567703 TN7535	A85	170.003	D72
12251344000.....	A76	123567330 THM.....	A84	123567704 TN7535	A85	170.004	D72
12251352000.....	A76	123567330 TN6030	A84	123567704 TN8025	A85	170.005	D72
12251353000.....	A76	123567330 TN7525	A84	123567720 TN7535	A85	170.008	D45
12251354000.....	A76	123567330 TN7535	A84	123567720 TN8025	A85	170.135	D72
12251355000.....	A76	123567330 TN8025	A84	123567721 TN7535	A85	170.136	D72
12251356000.....	A76	123567340 THM.....	A84	123567721 TN8025	A85	18ASML1C10220M	D73–D74
12251358000.....	A76	123567340 TN6030	A84	123567730 TN7535	A85	206140.....	A89
12251368000.....	A76	123567340 TN7525	A84	123567730 TN8025	A85	206141.....	A91
32250110100.....	A77	123567340 TN7535	A84	123567731 TN7535	A85	206142.....	A91
32250110200.....	A77	123567350 THM.....	A84	123567731 TN8025	A85	206143.....	A91
32250110500.....	A77	123567350 TN6030	A84	123567740 TN7535	A85	206145.....	A89
32250110600.....	A77	123567350 TN7525	A84	123567740 TN8025	A85	206146.....	A89
32250110700.....	A77	123567350 TN7535	A84	123567741 TN8025	A85	206167.....	A89
32250110800.....	A77	123567350 TN8025	A84	123567803 TN7525	A85	206168.....	A89



Index

Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
206169.....	A89	252128.....	A26	338124.....	A112	3ER15ISO TN6025	A176
206170.....	A89	25ASML1C10275M	D73-D74	338125.....	A113	3ER15TR TN6025	A186
206171.....	A89	2EL05ISO TN6025	A176	338126.....	A113	3ER16PG TN6025	A184
206172.....	A89	2EL06ISO TN6025	A176	338127.....	A113	3ER16UN TN6025	A178
206173.....	A89	2EL075ISO TN6025	A176	338128.....	A113	3ER16W TN6025	A182
206174.....	A89	2EL07ISO TN6025	A176	338129.....	A113	3ER175ISO TN6025	A176
206175.....	A89	2EL08ISO TN6025	A176	338130.....	A113	3ER18NPT TN6025	A180
206176.....	A89	2EL10ISO TN6025	A176	338131.....	A112	3ER18PG TN6025	A184
206178.....	A90	2EL125ISO TN6025	A176	338132.....	A112	3ER18UN TN6025	A178
206179.....	A90	2EL15ISO TN6025	A176	3EL035ISO TN6025	A176	3ER18W TN6025	A182
206420.....	A89	2EL175ISO TN6025	A176	3EL045ISO TN6025	A176	3ER19W TN6025	A182
206421.....	A89	2ELA60 TN6025	A173	3EL04ISO TN6025	A176	3ER20ISO TN6025	A176
206422.....	A89	2ER15ISO TN6025	A176	3EL06ISO TN6025	A176	3ER20UN TN6025	A178
206423.....	A89	2ERA60 TN6025	A173	3EL10ISO TN6025	A176	3ER24UN TN6025	A178
20ASML1C10235M	D73-D74	2IL035ISO TN6025	A177	3EL10UN TN6025	A178	3ER24W TN6025	A182
218119.....	A119	2IL04ISO TN6025	A177	3EL11UN TN6025	A178	3ER25ISO TN6025	A176
218121.....	A119	2IL05ISO TN6025	A177	3EL11W TN6025.....	A182	3ER27NPT TN6025	A180
218122.....	A119	2IL06ISO TN6025	A177	3EL12UN TN6025	A178	3ER28UN TN6025.....	A178
218123.....	A119	2IL075ISO TN6025	A177	3EL12W TN6025.....	A182	3ER28W TN6025	A182
218124.....	A119	2IL07ISO TN6025	A177	3EL13UN TN6025	A178	3ER2TR TN6025	A186
218125.....	A119	2IL08ISO TN6025	A177	3EL15ISO TN6025	A176	3ER30ISO TN6025	A176
218126.....	A119	2IL125ISO TN6025	A177	3EL175ISO TN6025	A176	3ER32UN TN6025.....	A178
235101.....	A111	2IL15ISO TN6025	A177	3EL20ISO TN6025	A176	3ER32W TN6025	A182
235103.....	A111	2IR10ISO TN6025	A177	3EL25ISO TN6025	A176	3ER36UN TN6025.....	A178
235104.....	A111	2IR14W TN6025	A183	3EL2TR TN6025	A186	3ER3TR TN6025	A186
235105.....	A111	2IR15ISO TN6025	A177	3EL30ISO TN6025	A176	3ER40UN TN6025.....	A178
235107.....	A111	2IR16UN TN6025	A179	3EL36W TN6025.....	A182	3ER48UN TN6025.....	A178
235108.....	A111	2IR18UN TN6025	A179	3EL3TR TN6025	A186	3ER8NPT TN6025	A180
235109.....	A111	2IR19W TN6025	A183	3EL8UN TN6025	A178	3ER8RD TN6025.....	A185
235110.....	A111	2IRA55 TN6025	A181	3ELAG60 TN6025	A173	3ER8UN TN6025.....	A178
250-111	A22	2IRA60 TN6025	A174	3ELG60 TN6025	A173	3ER8W TN6025	A182
250-113	A22	32ASML1C10305M	D73-D74	3ER05ISO TN6025	A176	3ERA55 TN6025	A181
250-114	A23	331101.....	A91	3ER075ISO TN6025	A176	3ERA60 TN6025	A173
250-115	A22	331102.....	A91	3ER07ISO TN6025	A176	3ERAG55 TN6025	A181
250-116	A23	331103.....	A91	3ER08ISO TN6025	A176	3ERAG60 TN6025	A173
250124.....	A23	331104.....	A91	3ER10ISO TN6025	A176	3ERG55 TN6025	A181
250175.....	A22	331117.....	A91	3ER10UN TN6025	A178	3ERG60 TN6025	A173
250176.....	A23	331118.....	A91	3ER10W TN6025	A182	3IL035ISO TN6025	A177
250177.....	A22	333101.....	A90	3ER115NPT TN6025	A180	3IL04ISO TN6025	A177
250182.....	A23	333102.....	A90	3ER11UN TN6025	A178	3IL05ISO TN6025	A177
252111.....	A26	333103.....	A90	3ER11W TN6025	A182	3IL06ISO TN6025	A177
252112.....	A26	333104.....	A90	3ER125ISO TN6025	A176	3IL07ISO TN6025	A177
252117.....	A26	338121.....	A112	3ER12UN TN6025	A178	3IL10ISO TN6025	A177
252119.....	A26	338122.....	A112	3ER14NPT TN6025	A180	3IL14NPT TN6025.....	A180
252120.....	A26	338123.....	A112	3ER14W TN6025	A182	3IL14W TN6025	A183

Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
3IL15ISO TN6025	A177	3IRAG55 TN6025	A181	4ER50ISO TN6025	A176	507117 M40	A104
3IL20ISO TN6025	A177	3IRAG60 TN6025	A174	4ER5TR TN6025	A186	507117 M45	A104
3IL25ISO TN6025	A177	3IRG55 TN6025	A181	4ER5W TN6025	A182	507117 M93	A104
3IL30ISO TN6025	A177	3IRG60 TN6025	A174	4ER6RD TN6025	A185	507118 GC	A104
3IL56UN TN6025	A179	435126	A89	4ERN55 TN6025	A181	507124 C2	A104
3IL64UN TN6025	A179	435127	A89	4ERN60 TN6025	A173	507124 GC	A104
3IL6RD TN6025	A186	435128	A91	4IL35ISO TN6025	A177	507124 M40	A104
3IL8RD TN6025	A186	435129	A91	4IL40ISO TN6025	A177	507124 M45	A104
3IL8UN TN6025	A179	435131	A89	4IL45ISO TN6025	A177	507124 M93	A104
3IL9UN TN6025	A179	435140	A89	4IR35ISO TN6025	A177	507125 M40	A104
3ILA55 TN6025	A181	435141	A89	4IR40ISO TN6025	A177	507126 C2	A104
3ILAG55 TN6025	A181	435142	A91	4IR45ISO TN6025	A177	507128 C2	A104
3ILAG60 TN6025	A174	435143	A91	4IR4RD TN6025	A186	507128 GC	A104
3IR10APIRD TN6025	A184	435152	A89	4IR4TR TN6025	A187	507128 M40	A104
3IR10ISO TN6025	A177	435153	A89	4IR50ISO TN6025	A177	507128 M45	A104
3IR115NPT TN6025	A180	435154	A90	4IR5TR TN6025	A187	507128 M93	A104
3IR11UN TN6025	A179	435155	A90	4IR5W TN6025	A183	507129 M40	A104
3IR11W TN6025	A183	435156	A90	4IR6RD TN6025	A186	507129 M45	A104
3IR125ISO TN6025	A177	435157	A90	4IR6W TN6025	A183	507140 M40	A104
3IR12UN TN6025	A179	435180	A89	4IR7W TN6025	A183	507140 M45	A104
3IR14UN TN6025	A179	435181	A89	4IRN55 TN6025	A181	507140 M93	A104
3IR14W TN6025	A183	440201M	A112	4IRN60 TN6025	A174	507143 C2	A104
3IR15ISO TN6025	A177	440202	A112	506101 C2	A116	507143 M40	A104
3IR16PG TN6025	A185	440203	A112	506101 GC	A116	507143 M45	A104
3IR16UN TN6025	A179	440204	A112	506101 M40	A116	507143 M93	A104
3IR16W TN6025	A183	440205	A113	506101 M43	A116	507144 M40	A104
3IR175ISO TN6025	A177	440206	A113	506102 C2	A116	507144 M45	A104
3IR18PG TN6025	A185	440207	A113	506102 GC	A116	507146 M40	A104
3IR18UN TN6025	A179	440208	A113	506102 M40	A116	507146 M45	A104
3IR18W TN6025	A183	440209	A113	506103 C2	A116	507151 M40	A104
3IR19W TN6025	A183	440210M	A113	506103 GC	A116	507151 M43	A104
3IR20ISO TN6025	A177	440211	A112	506103 M43	A116	507151 M45	A104
3IR20UN TN6025	A179	4402122	A112	506104 C2	A116	507152 M40	A104
3IR24UN TN6025	A179	44315900 PN120	A175	506104 M40	A116	507154 M40	A104
3IR25ISO TN6025	A177	44315900 TTS	A175	506105 C2	A116	507154 M45	A104
3IR28UN TN6025	A179	44315901 PN120	A175	506105 M40	A116	507155 M40	A104
3IR30ISO TN6025	A177	44315901 TTS	A175	506106 M40	A116	507155 M45	A104
3IR32UN TN6025	A179	4EL40ISO TN6025	A176	506107 M40	A116	507161 M40	A104
3IR3TR TN6025	A187	4EL4TR TN6025	A186	506108 M40	A116	507161 M45	A104
3IR8NPT TN6025	A180	4EL50ISO TN6025	A176	507116 C5	A104	507171 M40	A104
3IR8RD TN6025	A186	4ER35ISO TN6025	A176	507116 GC	A104	507176 M40	A104
3IR8UN TN6025	A179	4ER40ISO TN6025	A176	507116 M40	A104	507176 M45	A104
3IR8W TN6025	A183	4ER45ISO TN6025	A176	507116 M45	A104	507196 M40	A104
3IRA55 TN6025	A181	4ER4RD TN6025	A185	507117 C2	A104	507196 M45	A104
3IRA60 TN6025	A174	4ER4TR TN6025	A186	507117 GC	A104	507197 M40	A104

Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
507197 M45.....	A104	507279 M45.....	A103	510103 GC.....	A123	5EL4RD TN6025.....	A185
507207 M45.....	A104	507279 M93.....	A103	510103 M40.....	A123	5EL4W TN6025.....	A182
507213 M40.....	A104	507280 M40.....	A103	510104 M40.....	A122	5EL6TR.....	A186
507214 M40.....	A104	507280 M45.....	A103	510106 C2.....	A123	5ER55ISO TN6025.....	A176
507214 M45.....	A104	507281 M43.....	A103	510106 M40.....	A123	5ER60ISO TN6025.....	A176
507224 M40.....	A104	507281 M45.....	A103	510107 M40.....	A123	5ER6TR TN6025.....	A186
507224 M45.....	A104	507281 M93.....	A103	510108 C2.....	A123	5ERQ60 TN6025.....	A173
507240 M40.....	A105	507282 M43.....	A103	510108 M40.....	A123	5IL45W TN6025.....	A183
507240 M45.....	A105	507282 M45.....	A103	510113 M40.....	A122	5IL4RD TN6025.....	A186
507241 M40.....	A105	507282 M93.....	A103	510114 M40.....	A122	5IL4W TN6025.....	A183
507241 M45.....	A105	507283 M45.....	A103	510115 M40.....	A122	5IL55ISO TN6025.....	A177
507242 M40.....	A105	507283 M93.....	A103	510116 M40.....	A122	5IL60ISO TN6025.....	A177
507242 M45.....	A105	507298 M43.....	A103	510117 M40.....	A122	5IR55ISO TN6025.....	A177
507243 M40.....	A105	507298 M45.....	A103	510118 M40.....	A122	5IR60ISO TN6025.....	A177
507243 M45.....	A105	507298 M93.....	A103	510119 M40.....	A122	5IR6TR TN6025.....	A187
507244 M40.....	A105	507301 M45.....	A103	510120 M40.....	A122	606164.....	A91
507244 M45.....	A105	507305 M45.....	A102	510121 M40.....	A122	606167.....	A90
507245 M40.....	A105	507305 M93.....	A102	510122 M40.....	A122	606190.....	A119
507245 M45.....	A105	507306 M45.....	A102	510123 M40.....	A122	606218.....	A111
507246 M40.....	A105	507306 M93.....	A102	510124 M40.....	A122	606219.....	A112-A113
507246 M45.....	A105	507307 M45.....	A102	510128 M40.....	A122	613135.....	A111
507247 M40.....	A105	507307 M93.....	A102	510132 M40.....	A122	613137.....	A111
507247 M45.....	A105	507308 M43.....	A102	510134 M40.....	A122	619120.....	A89
507252 M40.....	A105	507308 M45.....	A102	510135 C5.....	A123	619121.....	A91
507252 M45.....	A105	507308 M93.....	A102	510135 M40.....	A123	619122.....	A89
507253 M40.....	A105	507309 M45.....	A102	510136 C2.....	A123	619123.....	A89
507253 M45.....	A105	507309 M93.....	A102	510136 C5.....	A123	619124.....	A90
507255 M40.....	A105	507310 M45.....	A102	510136 GC.....	A123	619155.....	A111
507257 M45.....	A105	507310 M93.....	A102	510136 M40.....	A123	619164.....	A89
507275 M40.....	A103	507329 M433B.....	A103	510137 M40.....	A123	620E32009CW.....	B50
507275 M43.....	A103	507330 M433B.....	A103	510138 M40.....	A123	620E38009CW.....	B50
507275 M45.....	A103	507331 M433B.....	A103	511.018.....	D12	620E3800ACW.....	B50
507275 M93.....	A103	507332 M433B.....	A103	511.023.....	D10	621E32009CW.....	B50
507276 M40.....	A103	507333 M433B.....	A103	511.060.....	D10-D11	621E38009CW.....	B50
507276 M43.....	A103	507334 M433B.....	A103	512.060.....	D10-D11	621E3800ACW.....	B50
507276 M45.....	A103	507354 M433B.....	A102	512.112.....	D10	623E32009CW.....	B50
507276 M93.....	A103	507355 M433B.....	A102	512.134.....	D12	623E38009CW.....	B50
507277 M45.....	A103	507356 M433B.....	A102	513.018.....	D12	623E3800ACW.....	B50
507277 M93.....	A103	507357 M433B.....	A102	513.023.....	D10	625E51022CW.....	B50
507278 M40.....	A103	507358 M433B.....	A102	513.060.....	D10-D11	625E51032CW.....	B50
507278 M43.....	A103	507359 M433B.....	A102	514.118.....	D10-D12	625E51042CW.....	B50
507278 M45.....	A103	510101 M40.....	A122	514.123.....	D10	625E51062CW.....	B50
507278 M93.....	A103	510102 M40.....	A122	515.018.....	D10-D12	A06NER1.....	A45, A144
507279 M40.....	A103	510103 C2.....	A123	571.060.....	D44, D46	A08NEL2.....	A44, A143
507279 M43.....	A103	510103 C5.....	A123	5EL45W TN6025.....	A182	A08NER1.....	A45, A144

Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
A08NER2	A44, A143	A32NER3	A44, A143	CM109	A45, A144	CV50ZBSFTT062315	D64
A10NEL2	A44, A143	A32NER4	A44, A143	CM113	D17–D18	CV50ZBSFTT075315	D64
A10NER1	A45, A144	A32NER5	A44, A143	CM114	D17–D18	CV50ZBSFTT100394	D64
A10NER2	A44, A143	A32NER6	A44, A143	CM120	A41, A43–A44, A137, A143, D34	CV50ZBSFTT12M315	D64
A12NEL2	A44, A143	A32VNSL3	A45	CM121	A41, A43–A44, A137, A143, D34	CV50ZBSFTT14M315	D64
A12NER2	A44, A143	A32VNSR3	A45	CM144	A41, A137	CV50ZBSFTT16M315	D64
A16NEL2	A44, A143	A40NEL3	A44, A143	CM146	A44, A143	CV50ZBSFTT18M315	D64
A16NEL3	A44, A143	A40NEL4	A44, A143	CM147	A44, A143	CV50ZBSFTT20M315	D64
A16NER2	A44, A143	A40NER3	A44, A143	CM158	D17	CV50ZBSFTT25M394	D64
A16NER3	A44, A143	A40NER4	A44, A143	CM182	A42, A138	DT15IP	C10–C12
A16RWMTEL0316N	A27	A40NER6	A44, A143	CM183	A42, A138	DV40BSFTT12065M	D66
A16RWMTEL0416N	A27	A40VNSR3	A45	CM184LP	A42, A138	DV40BSFTT14065M	D66
A16RWMTER0316N	A27	BT40BSFTT050276	D61	CM185	A42	DV40BSFTT16065M	D66
A16RWMTER0416N	A27	BT40BSFTT062295	D61	CM185LP	A42, A138	DV40BSFTT18065M	D66
A16TNSL3	A45	BT40BSFTT075295	D61	CM234R ASSY	D26–D27	DV40BSFTT20065M	D66
A16TNSR3	A45	BT40BSFTT100335	D61	CM209R ASSY	D26	DV40BSFTT25075M	D66
A20NEL3	A44, A143	BT40BSFTT12070M	D61	CM68	D16	DV40BSFTT32080M	D66
A20NER3	A44, A143	BT40BSFTT14075M	D61	CM71	D15	DV50BSFTT12080M	D67
A20SWMTEL0319N	A27	BT40BSFTT16075M	D61	CM72	D19, D34	DV50BSFTT14080M	D67
A20SWMTEL0419N	A27	BT40BSFTT18075M	D61	CM72LP	A40–A45, A136–A138, A140, A143,	DV50BSFTT16080M	D67
A20SWMTEL0519N	A27	BT40BSFTT20075M	D61	CM73	D18–D19, D34	DV50BSFTT18080M	D67
A20SWMTEL0619N	A27	BT40BSFTT25085M	D61	CM73LP	A40–A45, A136–A138, A140, A143,	DV50BSFTT20080M	D67
A20SWMTER0319N	A27	BT40BSFTT32085M	D61	CM74	A40, A42–A44, A136, A138, A143, D19	DV50BSFTT25100M	D67
A20SWMTER0419N	A27	BT50BSFTT050394	D62	CM75	A40, A42–A44, A136,	E06LSEL2	A170
A20SWMTER0519N	A27	BT50BSFTT062394	D62		A138, A143, D18–D19	E06LSE2	A170
A20SWMTER0619N	A27	BT50BSFTT075394	D62	CM79	D15	E08LSEL2	A170
A20UNSL3	A45	BT50BSFTT100394	D62	CM80	A40, A43–A44, A136, A143, D34	E08LSE2	A170
A20UNSR3	A45	BT50BSFTT12100M	D62	CM81	A40, A43–A44, A136, A143, D34	E10LSEL3	A170
A24NEL3	A44, A143	BT50BSFTT14100M	D62	CV40ZBSFTT050256	D63	E10LSE3	A170
A24NER3	A44, A143	BT50BSFTT16100M	D62	CV40ZBSFTT062256	D63	E12LSEL3	A170
A24TWMTEL0522N	A27	BT50BSFTT18100M	D62	CV40ZBSFTT075256	D63	E12LSE3	A170
A24TWMTEL0622N	A27	BT50BSFTT20100M	D62	CV40ZBSFTT100295	D63	ELS025025	D46
A24TWMTER0522N	A27	BT50BSFTT25100M	D62	CV40ZBSFTT12M256	D63	ELS038031	D46
A24TWMTER0622N	A27	BUR135V90	D25	CV40ZBSFTT16M256	D63	ELS044038	D46
A24UNSL3	A45	CKC3	A167, A170, D20–D21	CV40ZBSFTT20M256	D63	ELS056050	D46
A24UNSR3	A45	CKC4	A167	CV40ZBSFTT25M295	D63	ELS062050	D46
A28NEL3	A44, A143	CKM12	D28–D32	CV50ZBSFHDTT100354	D65	ELS075056	D46
A28NEL4	A44, A143	CKM20	D29	CV50ZBSFHDTT125354	D65	ELS075062	D46
A28NER3	A44, A143	CKM20LP	D4–D6, D9	CV50ZBSFHDTT150394	D65	ELS075069	D46
A28NER4	A44, A143	CKM22	D33	CV50ZBSFHDTT200551	D65	ELS100088	D46
A28UNSR3	A45	CKM23LP	D5–D6, D8–D9	CV50ZBSFHDTT25M354	D65	ER25WWM	D43
A32NEL3	A44, A143	CKM24	D28–D30, D32	CV50ZBSFHDTT32M354	D65	ER32WWM	D43
A32NEL4	A44, A143	CKM37	D15	CV50ZBSFHDTT40M394	D65	ER40WWM	D43
A32NEL5	A44, A143	CKM7LP	D7	CV50ZBSFHDTT50M551	D65	HSK100AFPMQL1C080175M	D74
A32NEL6	A44, A143	CKM9	D29	CV50ZBSFTT050315	D64	HSK100ASFHDTT100433	D60

Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
HSK100ASFHDTT125433	D60	HSK63ASFTT075295	D58	KLS20	D49	KM32TSNVHBR11	D17
HSK100ASFHDTT150551	D60	HSK63ASFTT100335	D58	KLS50M	D48	KM32TSNVJCL16	D17
HSK100ASFHDTT16100M	D60	HSK63ASFTT12070M	D58	KLSS27M	D47-D48	KM32TSNVJCR16	D17
HSK100ASFHDTT200551	D60	HSK63ASFTT125335	D58	KLSS32M	D47-D48	KM32TSNVUCL16	D18
HSK100ASFHDTT20100M	D60	HSK63ASFTT14075M	D58	KLSS40M	D48	KM32TSNVUCR16	D18
HSK100ASFHDTT25110M	D60	HSK63ASFTT16075M	D58	KM32PKGS	D50	KM32TSPCLNL12	D10
HSK100ASFHDTT32110M	D60	HSK63ASFTT18075M	D58	KM32TSCCLPL12	D15	KM32TSPCLNR12	D10
HSK100ASFHDTT40140M	D60	HSK63ASFTT20075M	D58	KM32TSLSEL16E	D20	KM32TSPDJNL11	D10
HSK100ASFHDTT50140M	D60	HSK63ASFTT25085M	D58	KM32TSLSER16N	D20	KM32TSPDJNR11	D10
HSK100ASFTT050374	D59	HSK63ASFTT32085M	D58	KM32TSLSSL16	D21	KM32TSPDQNR11	D11
HSK100ASFTT062394	D59	HSK80AFPMQL1C080155M	D74	KM32TSLSSR16	D21	KM32TSPDUNL11	D11
HSK100ASFTT075413	D59	HSW34M	D42	KM32TSMCLNL12	D4	KM32TSPDUNR11	D11
HSK100ASFTT100453	D59	HSW45M	D42	KM32TSMCLNR12	D4	KM32TSPWLNLO6	D12
HSK100ASFTT12095M	D59	HSW58M	D42	KM32TSMDJNL1504	D4	KM32TSPWLNRO6	D12
HSK100ASFTT14095M	D59	HSW80M	D42	KM32TSMDJNL1506	D4	KM32TSSCLCLO9	D12
HSK100ASFTT16100M	D59	ICSN432	D4	KM32TSMDJNR1504	D4	KM32TSSCLCL12	D12
HSK100ASFTT18100M	D59	ICSN443	D26	KM32TSMDJNR1506	D4	KM32TSSCLCR09	D12
HSK100ASFTT20105M	D59	ICSN543	D26	KM32TSMDPNN1504	D5	KM32TSSCLCR12	D12
HSK100ASFTT25115M	D59	ICSN633	D28-D29	KM32TSMDPNN1506	D5	KM32TSSDJCL11	D13
HSK100ASM50070M	D47-D49	ICSN846	D28-D29	KM32TSMQNL1506	D5	KM32TSSDJCR11	D13
HSK40AFPMQL1C050095M	D74	IDSN432	D4-D6	KM32TSMQNR1506	D5	KM32TSSDNCN11	D13
HSK50AFPMQL1C064115M	D74	IDSN433	D26-D27	KM32TSMQNL1506	D6	KM32TSSDQCL11	D14
HSK63AFPMQL1C080135M	D74	IDSN442	D4-D5	KM32TSMQNR1506	D6	KM32TSSDQCR11	D14
HSK63AHCTMQL1C06080M	D72	IDSN443	D27	KM32TSMQDNL1506	D6	KM32TSSDUCL11	D14
HSK63AHCTMQL1C08080M	D72	IRSN43	D29	KM32TSMQNR1506	D7	KM32TSSDUJCR11	D14
HSK63AHCTMQL1C10085M	D72	IRSN63	D29	KM32TSMTUNR16	D7	KM40PKGS	D50
HSK63AHCTMQL1C12090M	D72	IRSN84	D29	KM32TSMVHNL16	D8	KM4X100DCLNL12KC04	D26
HSK63AHCTMQL1C14090M	D72	ISSN432	D6	KM32TSMVHNR16	D8	KM4X100DCLNL16KC06	D26
HSK63AHCTMQL1C16095M	D72	ISSN633	D30-D32	KM32TSMVJNL16	D8	KM4X100DCLNR12KC04	D26
HSK63AHCTMQL1C18095M	D72	ISSN846	D30, D32	KM32TSMVJNR16	D8	KM4X100DCLNR16KC06	D26
HSK63AHCTMQL1C20100M	D72	ITSN322	D7	KM32TSMVUNL16	D9	KM4X100DDJNL15KC06	D26
HSK63AHCTMQL1C25120M	D72	IVSN322	D8-D9, D33	KM32TSMVUNR16	D9	KM4X100DDJNR15KC06	D26
HSK63AHCTMQL1C32125M	D72	IWSN433	D9	KM32TSMWLNLO8	D9	KM4X100DDUNL15KC06	D27
HSK63AHPVTMQL1C06080M	D73	KLC46L	D5	KM32TSMWLNRO8	D9	KM4X100DDUNR15KC06	D27
HSK63AHPVTMQL1C08080M	D73	KLM34L	D7-D9, D33	KM32TSNER2	D18	KM4X100EM025300	D46
HSK63AHPVTMQL1C10085M	D73	KLM46	D4, D6, D9, D29	KM32TSNER3	D18	KM4X100EM038300	D46
HSK63AHPVTMQL1C12090M	D73	KLM46L	D4-D6	KM32TSNKJCL11	D15	KM4X100EM050325	D46
HSK63AHPVTMQL1C14090M	D73	KLM58	D32	KM32TSNKJCR11	D15	KM4X100EM06080M	D46
HSK63AHPVTMQL1C16095M	D73	KLM68	D28-D32	KM32TSNKUCL11	D16	KM4X100EM062375	D46
HSK63AHPVTMQL1C18095M	D73	KLM68L	D32	KM32TSNKUCR11	D16	KM4X100EM075375	D46
HSK63AHPVTMQL1C20100M	D73	KLM810	D28-D30, D32	KM32TSNKXCL11	D16	KM4X100EM08080M	D46
HSK63AHPVTMQL1C25115M	D73	KLS07	D47, D49	KM32TSNSL2	D19	KM4X100EM100425	D46
HSK63AHPVTMQL1C32120M	D73	KLS10	D47, D49	KM32TSNSL3	D19	KM4X100EM10080M	D46
HSK63ASFTT050276	D58	KLS12	D47, D49	KM32TSNSR2	D19	KM4X100EM12080M	D46
HSK63ASFTT062295	D58	KLS15	D49	KM32TSNSR3	D19	KM4X100EM125425	D46

Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
KM4X100EM14080M	D46	KM4X100HPVTT125630	D39	KM4X100KM63200M	D50	KM4X100SM2C075400	D49
KM4X100EM150450	D46	KM4X100HPVTT14095M	D38	KM4X100KM80100M	D50	KM4X100SM2C075600	D49
KM4X100EM16100M	D46	KM4X100HPVTT14160M	D38	KM4X100KM80150M	D50	KM4X100SM2C100400	D49
KM4X100EM18100M	D46	KM4X100HPVTT150531	D39	KM4X100KM80200M	D50	KM4X100SM2C100600	D49
KM4X100EM200550	D46	KM4X100HPVTT16100M	D38	KM4X100MCKNL19	D28	KM4X100SMC075400	D49
KM4X100EM20100M	D46	KM4X100HPVTT16160M	D38	KM4X100MCKNR19	D28	KM4X100SMC075600	D49
KM4X100EM250575	D46	KM4X100HPVTT18100M	D38	KM4X100MCLNL19	D28	KM4X100SMC100400	D49
KM4X100EM25100M	D46	KM4X100HPVTT18160M	D38	KM4X100MCLNL25	D28	KM4X100SMC100600	D49
KM4X100EM32100M	D46	KM4X100HPVTT20105M	D38	KM4X100MCLNR19	D28	KM4X100SMC125400	D49
KM4X100EM40120M	D46	KM4X100HPVTT20160M	D38	KM4X100MCLNR25	D28	KM4X100SMC125600	D49
KM4X100EM50130M	D46	KM4X100HPVTT25115M	D38	KM4X100MCRNL19	D29	KM4X100SMC150400	D49
KM4X100ER16100M	D43	KM4X100HPVTT25160M	D38	KM4X100MCRNL25	D29	KM4X100SMC150600	D49
KM4X100ER16160M	D43	KM4X100HPVTT32120M	D38	KM4X100MCRNR19	D29	KM4X100SMC200400	D49
KM4X100ER20100M	D43	KM4X100HPVTT32160M	D38	KM4X100MCRNR25	D29	KM4X100SMC200600	D49
KM4X100ER25100M	D43	KM4X100HPVTTHT050374	D41	KM4X100MRGNL12	D29	KM4X100SMC22050M	D48
KM4X100ER32100M	D43	KM4X100HPVTTHT050630	D41	KM4X100MRGNL19	D29	KM4X100SMC22100M	D48
KM4X100ER32160M	D43	KM4X100HPVTTHT062394	D41	KM4X100MRGNL25	D29	KM4X100SMC22160M	D48
KM4X100ER40120M	D43	KM4X100HPVTTHT062630	D41	KM4X100MRGnr12	D29	KM4X100SMC250400	D49
KM4X100ETAL20	D37	KM4X100HPVTTHT075413	D41	KM4X100MRGnr19	D29	KM4X100SMC250600	D49
KM4X100ETAR20	D37	KM4X100HPVTTHT075630	D41	KM4X100MRGnr25	D29	KM4X100SMC27050M	D48
KM4X100HPVTT025335	D39	KM4X100HPVTTHT088413	D41	KM4X100MSDNN19	D30	KM4X100SMC27100M	D48
KM4X100HPVTT025630	D39	KM4X100HPVTTHT088630	D41	KM4X100MSDNN25	D30	KM4X100SMC27160M	D48
KM4X100HPVTT031335	D39	KM4X100HPVTTHT100453	D41	KM4X100MSKnr19	D31	KM4X100SMC32050M	D48
KM4X100HPVTT031630	D39	KM4X100HPVTTHT100630	D41	KM4X100MSRNL19	D32	KM4X100SMC32100M	D48
KM4X100HPVTT038354	D39	KM4X100HPVTTHT12095M	D40	KM4X100MSRNL25	D32	KM4X100SMC32160M	D48
KM4X100HPVTT038630	D39	KM4X100HPVTTHT125472	D41	KM4X100MSRnr19	D32	KM4X100SMC40060M	D48
KM4X100HPVTT050374	D39	KM4X100HPVTTHT125630	D41	KM4X100MSRnr25	D32	KM4X100SMC40100M	D48
KM4X100HPVTT050630	D39	KM4X100HPVTTHT14095M	D40	KM4X100MTJNL27	D32	KM4X100SMC40160M	D48
KM4X100HPVTT06085M	D38	KM4X100HPVTTHT150531	D41	KM4X100MTJNL33	D32	KM4X100SMC50070M	D48
KM4X100HPVTT06160M	D38	KM4X100HPVTTHT16100M	D40	KM4X100MTJNR27	D32	KM4X100SMC50100M	D48
KM4X100HPVTT062394	D39	KM4X100HPVTTHT18100M	D40	KM4X100MTJNR33	D32	KM4X100SMC50160M	D48
KM4X100HPVTT062630	D39	KM4X100HPVTTHT20105M	D40	KM4X100MVUNL16	D33	KM4X100SMC60070M	D48
KM4X100HPVTT075413	D39	KM4X100HPVTTHT25115M	D40	KM4X100MVUNR16	D33	KM4X100SMC60100M	D48
KM4X100HPVTT075630	D39	KM4X100HPVTTHT32120M	D40	KM4X100NCADS85	D24	KM4X100SMC60160M	D48
KM4X100HPVTT08085M	D38	KM4X100HTS40085M	D45	KM4X100NEL3	D34	KM4X100STAL24	D36
KM4X100HPVTT08160M	D38	KM4X100HTS50090M	D45	KM4X100NEL4	D34	KM4X100STAL2525M	D36
KM4X100HPVTT088413	D39	KM4X100KM32075M	D50	KM4X100NEL5	D34	KM4X100STAL3232M	D36
KM4X100HPVTT088630	D39	KM4X100KM40080M	D50	KM4X100NEL6	D34	KM4X100STAR20	D36
KM4X100HPVTT100453	D39	KM4X100KM40100M	D50	KM4X100NER3	D34	KM4X100STAR24	D36
KM4X100HPVTT100630	D39	KM4X100KM40150M	D50	KM4X100NER4	D34	KM4X100STAR2525M	D36
KM4X100HPVTT10090M	D38	KM4X100KM50100M	D50	KM4X100NER5	D34	KM4X100STAR3232M	D36
KM4X100HPVTT10160M	D38	KM4X100KM50150M	D50	KM4X100NER6	D34	KM4X100TDSMC0751050	D47
KM4X100HPVTT12095M	D38	KM4X100KM50200M	D50	KM4X100PRDCN20	D33	KM4X100TDSMC1001250	D47
KM4X100HPVTT12160M	D38	KM4X100KM63100M	D50	KM4X100PRDCN25	D33	KM4X100TDSMC1251300	D47
KM4X100HPVTT125472	D39	KM4X100KM63150M	D50	KM4X100PRDCN32	D33	KM4X100TDSMC22260M	D47



Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
KM4X100TDSMC27320M	D47	LSASR203	A167	M200D150Z05M16RN10	C18	M370D400Z08S150W012	C12
KM4X100TDSMC32330M	D47	LSASR83	A167	M200D150Z05S050RN10	C21	M370D500Z07S150W012	C12
KM4X100TG050105M	D42	LSSL123D	A167	M200D200Z04S075RN10	C21	M370D500Z09S150W012	C12
KM4X100TG050160M	D42	LSSL163D	A167	M200D200Z04S075RN12	C27	MS109	D15
KM4X100TG075120M	D42	LSSL164D	A167	M200D200Z04S075RN16	C30	MS1156	D12-D14
KM4X100TG100140M	D42	LSSR123D	A167	M200D200Z05S075RN12	C27	MS1158	D12
KM4X100TG150165M	D42	LSSR163D	A167	M200D200Z06S075RN10	C21	MS1162	A28
KM4X100WN06090M	D44	LSSR164D	A167	M200D250Z05S100RN16	C30	MS1220	D15-D16
KM4X100WN08090M	D44	LSSR203D	A167	M200D250Z07S075RN12	C27	MS1234	D47-D48
KM4X100WN10090M	D44	M100D100Z02C100RD12L478	C37	M200D300Z05S100RN16	C30	MS1375	D17
KM4X100WN12100M	D44	M100D100Z02C125RD12L715	C37	M200D300Z07S100RN16	C30	MS1488	D18-D19
KM4X100WN14100M	D44	M100D100Z02M12RD12	C36	M200D300Z08S100RN12	C27	MS1489	D18-D19, D34
KM4X100WN16100M	D44	M100D100Z02W100RD12	C36	M200D400Z06S150RN16	C30	MS1489PKG	D17
KM4X100WN18100M	D44	M100D100Z02W100RD12L553	C36	M200D400Z08S150RN16	C30	MS1490	D34
KM4X100WN20110M	D44	M100D100Z02W125RD12	C36	M200D400Z09S150RN12	C27	MS2002	A28
KM4X100WN25120M	D44	M100D100Z02W125RD12L705	C36	M370D100Z02C100W008L600	C5	MS2085	C10-C12
KM4X100WN32120M	D44	M100D100Z02W125RD12L715	C36	M370D100Z02C100W008L800	C5	MS2219	C4-C6
KM50PKGS	D50	M100D125Z02M16RD12	C36	M370D100Z02M12W008	C4	MS326	A26
KM63PKGS	D50	M100D125Z02W125RD12	C36	M370D100Z03C100W008L600	C5	MS959	D15-D18
KM63TSDQNL15KC04	D27	M100D125Z02W125RD12L615	C36	M370D100Z03M12W008	C4	NA3L4 TN6025	A155
KM63TSDQNL15KC06	D27	M100D125Z02W150RD12	C36	M370D125Z02M16W008	C4	NA3L6 TN6025	A155
KM63TSDQNR15KC04	D27	M100D125Z02W150RD12L800	C36	M370D125Z03C125W008L600	C5	NA3L8 TN6025	A155
KM63TSDQNR15KC06	D27	M100D150Z02M16RD12	C36	M370D125Z03C125W008L800	C5	NA3R4 TN6025	A155
KM80PKGS	D50	M100D150Z03W125RD12	C36	M370D125Z03M16W008	C4	NA3R6 TN6025	A155
KMSP415IP	D26-D27	M100D150Z03W125RD12L715	C36	M370D150Z02C125W012L600	C11	NA3R8 TN6025	A155
KMSP515IP	D26	M100D200Z04S075RD12	C37	M370D150Z02C150W012L1000	C11	NA4L4 TN6025	A155
LMB200025	D25	M100D200Z05S075RD12	C37	M370D150Z02M16W012	C10	NA4R4 TN6025	A155
LNA050M	D42	M100D250Z06S100RD12	C37	M370D150Z03C125W008L600	C5	NA6L2 TN6025	A155
LNA075M	D42	M100D300Z07S100RD12	C37	M370D150Z03C125W008L800	C5	NA6L3 TN6025	A155
LNA100M	D42	M200D100Z03C100RN10L600	C20	M370D150Z03M16W008	C4	NA6R2 TN6025	A155
LNA150M	D42	M200D100Z03C100RN10L800	C20	M370D150Z04C150W008L600	C5	NA6R3 TN6025	A155
LNHSER16M	D43	M200D100Z03M12RN10	C18	M370D150Z04M16W008	C4	NAS3L12 TN6025	A156
LNHSER20M	D43	M200D100Z03W100RN10	C19	M370D150Z04S050W008	C6	NAS3L6 TN6025	A156
LNSER25M	D43	M200D125Z02C125RN12L900	C26	M370D200Z03S075W012	C12	NAS3L8 TN6025	A156
LNSER32M	D43	M200D125Z02W125RN12	C25	M370D200Z04S075W012	C12	NAS3R8 TN6025	A156
LNSER40M	D43	M200D125Z03C125RN10L900	C20	M370D200Z05S075W008	C6	NASL062D	A42, A138
LSASL103	A167	M200D125Z03M16RN10	C18	M370D200Z07S075W008	C6	NASL082D	A42, A138
LSASL123	A167	M200D125Z03M16RN12	C24	M370D250Z05S075W012	C12	NASL083D	A42, A138
LSASL163	A167	M200D125Z03W125RN10	C19	M370D250Z05S100W012	C12	NASL102B	A42, A138
LSASL164	A167	M200D125Z04M16RN10	C18	M370D250Z07S075W008	C6	NASL103B	A42, A138
LSASL83	A167	M200D150Z03C150RN12L900	C26	M370D300Z05S125W012	C12	NASR062D	A42, A138
LSASR103	A167	M200D150Z03M16RN12	C24	M370D300Z06S100W012	C12	NASR082D	A42, A138
LSASR123	A167	M200D150Z03S050RN10	C21	M370D300Z06S125W012	C12	NASR083D	A42, A138
LSASR163	A167	M200D150Z04M16RN12	C24	M370D300Z08S100W008	C6	NASR102B	A42, A138
LSASR164	A167	M200D150Z04S050RN12	C27	M370D400Z06S150W012	C12	NASR103B	A42, A138

Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
NB2L THM	A61	NF3M200LK TN6025	A57	NG2M050LK TN6025	A53	NG2M275RK TN6010	A52
NB2R THM	A61	NF3M200RK TN6025	A57	NG2M050RK TN6010	A52	NG2M275RK TN6025	A52
NB3L THM	A61	NF3M300LK TN6025	A57	NG2M050RK TN6025	A52	NG2M300LK TN6010	A53
NB3R THM	A61	NF3M300RK TN6025	A57	NG2M080LK TN6010	A53	NG2M300LK TN6025	A53
NDC310RDL75 TN6025	A154	NFD3125LK TN6025	A57	NG2M080LK TN6025	A53	NG2M300RK TN6010	A52
NDC3115VR75 TN6010	A153	NFD3125RK TN6025	A57	NG2M080RK TN6010	A52	NG2M300RK TN6025	A52
NDC38RDL75 TN6025	A154	NFD3M300LK TN6025	A57	NG2M080RK TN6025	A52	NG2M325LK TN6025	A53
NDC38RDR75 TN6025	A154	NFD3M300RK TN6025	A57	NG2M100LK TN6010	A53	NG2M325RK TN6025	A52
NDC8115VR75M TN6010	A153	NFD4189LK TN6025	A57	NG2M100LK TN6025	A53	NG3047L THM	A51
NDC88VR75M TN6010	A153	NFD4189RK TN6025	A57	NG2M100RK TN6010	A52	NG3047L TN6010	A51
NEL062	A43	NFD4250RK TN6025	A57	NG2M100RK TN6025	A52	NG3047L TN6025	A51
NEL082V	A139	NG1047L TN6025	A51	NG2M120LK TN6010	A53	NG3047LK TN6010	A53
NEL102B	A139	NG1062L TN6025	A51	NG2M120LK TN6025	A53	NG3047LK TN6025	A53
NEL122B	A43	NG1094L TN6025	A51	NG2M120RK TN6010	A52	NG3047R THM	A51
NEL123B	A43	NG2031L TN6025	A51	NG2M120RK TN6025	A52	NG3047R TN6010	A51
NEL162C	A43	NG2031LK TN6010	A53	NG2M140LK TN6010	A53	NG3047R TN6025	A51
NEL163C	A43	NG2031LK TN6025	A53	NG2M140LK TN6025	A53	NG3047RK TN6010	A52
NEL163D	A43	NG2031R THM	A51	NG2M140RK TN6010	A52	NG3047RK TN6025	A52
NEL164D	A43	NG2031R TN6010	A51	NG2M140RK TN6025	A52	NG3062L THM	A51
NEL203D	A43	NG2031R TN6025	A51	NG2M150LK TN6025	A53	NG3062L TN6010	A51
NEL204D	A43	NG2031RK TN6010	A52	NG2M150RK TN6025	A52	NG3062L TN6025	A51
NEL205D	A43	NG2031RK TN6025	A52	NG2M170LK TN6010	A53	NG3062LK TN6010	A53
NEL206D	A43	NG2041R TN6025	A51	NG2M170LK TN6025	A53	NG3062LK TN6025	A53
NEL243D	A43	NG2047LK TN6025	A53	NG2M170RK TN6010	A52	NG3062LK TN7110	A53
NEL244D	A139	NG2047RK TN6010	A52	NG2M170RK TN6025	A52	NG3062R THM	A51
NEL853D	A43	NG2047RK TN6025	A52	NG2M175LK TN6025	A53	NG3062R TN6010	A51
NER062	A43	NG2058L TN6025	A51	NG2M175RK TN6025	A52	NG3062R TN6025	A51
NER082V	A139	NG2058R TN6025	A51	NG2M195LK TN6010	A53	NG3062RK TN6010	A52
NER102B	A43	NG2062L TN6025	A51	NG2M195LK TN6025	A53	NG3062RK TN6025	A52
NER122B	A43	NG2062LK TN6010	A53	NG2M195RK TN6010	A52	NG3062RK TN7110	A52
NER123B	A43	NG2062LK TN6025	A53	NG2M195RK TN6025	A52	NG3072LK TN6010	A54
NER162C	A43	NG2062R THM	A51	NG2M200LK TN6010	A53	NG3072LK TN6025	A54
NER163C	A43	NG2062R TN6010	A51	NG2M200LK TN6025	A53	NG3072RK TN6010	A52
NER164C	A43	NG2062R TN6025	A51	NG2M200RK TN6010	A52	NG3072RK TN6025	A52
NER164D	A43	NG2062RK TN6010	A52	NG2M200RK TN6025	A52	NG3078LK TN6010	A54
NER203D	A139	NG2062RK TN6025	A52	NG2M220LK TN6025	A53	NG3078LK TN6025	A54
NER204D	A43	NG2094LK TN6010	A53	NG2M220RK TN6025	A52	NG3078RK TN6010	A52
NER205D	A43	NG2094LK TN6025	A53	NG2M225LK TN6010	A53	NG3078RK TN6025	A52
NER206D	A43	NG2094RK TN6010	A52	NG2M225LK TN6025	A53	NG3094L THM	A51
NER243D	A43	NG2094RK TN6025	A52	NG2M225RK TN6010	A52	NG3094L TN6010	A51
NER244D	A43	NG2125LK TN6010	A53	NG2M225RK TN6025	A52	NG3094L TN6025	A51
NER853D	A43	NG2125LK TN6025	A53	NG2M250LK TN6025	A53	NG3094LK TN6010	A54
NF3125LK TN6025	A57	NG2125RK TN6010	A52	NG2M250RK TN6025	A52	NG3094LK TN6025	A54
NF3125RK TN6025	A57	NG2125RK TN6025	A52	NG2M275LK TN6010	A53	NG3094R THM	A51
NF3156LK TN6025	A57	NG2M050LK TN6010	A53	NG2M275LK TN6025	A53	NG3094R TN6010	A51



Index

Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
NG3094R TN6025	A51	NG3M225RK TN6025	A52	NG4250LK TN6025	A54	NGD3062LK TN6025	A55
NG3094RK TN6010	A52	NG3M225RK TN7110	A52	NG4250R TN6010	A51	NGD3062RK TN6010	A55
NG3094RK TN6025	A52	NG3M250LK TN6025	A54	NG4250R TN6025	A51	NGD3062RK TN6025	A55
NG3125L THM	A51	NG3M250LK TN7110	A54	NG4250RK TN6010	A53	NGD3094LK THM	A55
NG3125L TN6010	A51	NG3M250RK TN6025	A52	NG4250RK TN6025	A53	NGD3094LK TN6010	A55
NG3125L TN6025	A51	NG3M250RK TN7110	A52	NG4M300LK TN6025	A54	NGD3094LK TN6025	A55
NG3125LK TN6010	A54	NG3M275LK TN6010	A54	NG4M300RK TN6025	A53	NGD3094RK THM	A55
NG3125LK TN6025	A54	NG3M275LK TN6025	A54	NG4M350LK TN6025	A54	NGD3094RK TN6010	A55
NG3125R THM	A51	NG3M275RK TN6010	A52	NG4M350LK TN7110	A54	NGD3094RK TN6025	A55
NG3125R TN6010	A51	NG3M275RK TN6025	A52	NG4M350RK TN6025	A53	NGD3125LK TN6010	A55
NG3125R TN6025	A51	NG3M300LK TN6010	A54	NG4M350RK TN7110	A53	NGD3125LK TN6025	A55
NG3125RK TN6010	A52	NG3M300LK TN6025	A54	NG4M400LK TN6010	A54	NGD3125RK TN6010	A55
NG3125RK TN6025	A52	NG3M300LK TN7110	A54	NG4M400LK TN6025	A54	NGD3125RK TN6025	A55
NG3156LK TN6010	A54	NG3M300RK TN6010	A52	NG4M400LK TN7110	A54	NGD3189LK TN6010	A55
NG3156LK TN6025	A54	NG3M300RK TN6025	A52	NG4M400RK TN6010	A53	NGD3189LK TN6025	A55
NG3156RK TN6010	A52	NG3M300RK TN7110	A52	NG4M400RK TN6025	A53	NGD3189RK TN6010	A55
NG3156RK TN6025	A52	NG3M320LK TN6025	A54	NG4M400RK TN7110	A53	NGD3189RK TN6025	A55
NG3189LK TN6010	A54	NG3M320RK TN6025	A52	NG4M450LK TN6025	A54	NGD3M200LK TN6010	A55
NG3189LK TN6025	A54	NG3M325LK TN6025	A54	NG4M450RK TN6025	A53	NGD3M200LK TN6025	A55
NG3189LK TN7110	A54	NG3M325RK TN6025	A52	NG4M500LK TN6010	A54	NGD3M200RK TN6010	A55
NG3189RK TN6010	A53	NG3M350LK TN6025	A54	NG4M500LK TN6025	A54	NGD3M200RK TN6025	A55
NG3189RK TN6025	A53	NG3M350RK TN6025	A52	NG4M500LK TN7110	A54	NGD3M250LK TN6010	A55
NG3189RK TN7110	A53	NG3M400LK TN6010	A54	NG4M500RK TN6010	A53	NGD3M250LK TN6025	A55
NG3M100LK TN6025	A53	NG3M400LK TN6025	A54	NG4M500RK TN6025	A53	NGD3M250RK TN6010	A55
NG3M100RK TN6025	A52	NG3M400LK TN7110	A54	NG4M500RK TN7110	A53	NGD3M250RK TN6025	A55
NG3M120LK TN6010	A53	NG3M400RK TN6010	A53	NG4M550LK TN6025	A54	NGD3M300LK TN6010	A55
NG3M120LK TN6025	A53	NG3M400RK TN6025	A53	NG4M550RK TN6025	A53	NGD3M300LK TN6025	A55
NG3M120RK TN6010	A52	NG3M400RK TN7110	A53	NG4M600LK TN6025	A54	NGD3M300RK TN6010	A55
NG3M120RK TN6025	A52	NG3M425LK TN6010	A54	NG4M600LK TN7110	A54	NGD3M300RK TN6025	A55
NG3M150LK TN6025	A53	NG3M425LK TN6025	A54	NG4M600RK TN6025	A53	NGD3M350LK TN6010	A55
NG3M150LK TN7110	A53	NG3M425RK TN6010	A53	NG4M600RK TN7110	A53	NGD3M350LK TN6025	A55
NG3M150RK TN6025	A52	NG3M425RK TN6025	A53	NG5M500L TN6025	A51	NGD3M350RK TN6010	A55
NG3M150RK TN7110	A52	NG3M450LK TN6025	A54	NGD2M150LK TN6010	A55	NGD3M350RK TN6025	A55
NG3M175LK TN6025	A53	NG3M450RK TN6025	A53	NGD2M150LK TN6025	A55	NGD3M400LK TN6010	A55
NG3M175RK TN6025	A52	NG4125LK TN6010	A54	NGD2M150RK TN6010	A55	NGD3M400LK TN6025	A55
NG3M200LK TN6025	A54	NG4125LK TN6025	A54	NGD2M150RK TN6025	A55	NGD3M400RK TN6010	A55
NG3M200LK TN7110	A54	NG4125RK TN6010	A53	NGD2M200LK TN6010	A55	NGD3M400RK TN6025	A55
NG3M200RK TN6025	A52	NG4125RK TN6025	A53	NGD2M200LK TN6025	A55	NGD4125LK TN6010	A55
NG3M200RK TN7110	A52	NG4189LK TN6010	A54	NGD2M200RK TN6010	A55	NGD4125LK TN6025	A55
NG3M220LK TN6025	A54	NG4189LK TN6025	A54	NGD2M200RK TN6025	A55	NGD4125RK TN6010	A55
NG3M220RK TN6025	A52	NG4189RK TN6010	A53	NGD2M250LK TN6010	A55	NGD4125RK TN6025	A55
NG3M225LK TN6010	A54	NG4189RK TN6025	A53	NGD2M250LK TN6025	A55	NGD4189LK TN6010	A55
NG3M225LK TN6025	A54	NG4250L TN6010	A51	NGD2M250RK TN6010	A55	NGD4189LK TN6025	A55
NG3M225LK TN7110	A54	NG4250L TN6025	A51	NGD2M250RK TN6025	A55	NGD4189RK TN6010	A55
NG3M225RK TN6010	A52	NG4250LK TN6010	A54	NGD3062LK TN6010	A55	NGD4189RK TN6025	A55

Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
NGD4250LK TN6010.....	A55	NGP3M200R TN6010	A56	NR2M125R TN7110	A58	NR3078RK TN6010.....	A60
NGD4250LK TN6025.....	A55	NGP3M250L THM	A56	NR2M150L TN6010	A59	NR3078RK TN6025.....	A60
NGD4250RK TN6010	A55	NGP3M250L TN6010	A56	NR2M150L TN6025	A59	NR3094L TN6010.....	A59
NGD4250RK TN6025	A55	NGP3M250R THM.....	A56	NR2M150L TN7110	A59	NR3094L TN6025	A59
NGD4M400LK TN6010	A55	NGP3M250R TN6010	A56	NR2M150R TN6010	A58	NR3094R TN6010.....	A58
NGD4M400LK TN6025	A55	NGP3M300L THM	A56	NR2M150R TN6025	A58	NR3094R TN6025.....	A58
NGD4M400RK TN6010	A55	NGP3M300L TN6010	A56	NR2M150R TN7110	A58	NR3M100L TN6010	A59
NGD4M400RK TN6025	A55	NGP3M300R THM	A56	NR2M175L TN6010	A59	NR3M100L TN6025	A59
NGD4M450LK TN6010	A55	NGP3M300R TN6010	A56	NR2M175L TN6025	A59	NR3M100L TN7110	A59
NGD4M450LK TN6025	A55	NJK3008R20 TN6010	A152	NR2M175L TN7110	A59	NR3M100R TN6010	A58
NGD4M450RK TN6010	A55	NJP3014R12 TN6025	A152	NR2M175R TN6010	A58	NR3M100R TN6025	A58
NGD4M450RK TN6025	A55	NP2002RK TN6010.....	A58	NR2M175R TN6025	A58	NR3M100R TN7110	A58
NGD4M500LK TN6010	A55	NP2002RK TN6025	A58	NR2M175R TN7110	A58	NR3M125L TN6010	A59
NGD4M500LK TN6025	A55	NP3002RK TN6010.....	A58	NR3031L THM	A59	NR3M125L TN6025	A59
NGD4M500RK TN6010	A55	NP3002RK TN6025	A58	NR3031L TN6010.....	A59	NR3M125L TN7110	A59
NGD4M500RK TN6025	A55	NP3012RK TN6025	A58	NR3031L TN6025	A59	NR3M125R TN6010	A58
NGD4M550LK TN6010	A55	NR2031L TN6010	A59	NR3031LK TN6010.....	A60	NR3M125R TN6025	A58
NGD4M550LK TN6025	A55	NR2031L TN6025	A59	NR3031LK TN6025	A60	NR3M125R TN7110	A58
NGD4M550RK TN6010	A55	NR2031R TN6010.....	A58	NR3031R THM	A58	NR3M150L TN6010	A59
NGD4M550RK TN6025	A55	NR2031R TN6025.....	A58	NR3031R TN6010.....	A58	NR3M150L TN6025	A59
NGP2062L TN6010	A56	NR2047L TN6025.....	A59	NR3031R TN6025.....	A58	NR3M150L TN7110	A59
NGP2062R TN6010.....	A56	NR2047R TN6025.....	A58	NR3031RK TN6010.....	A60	NR3M150R TN6010	A58
NGP2M150L THM	A56	NR2M050L TN6010	A59	NR3031RK TN6025.....	A60	NR3M150R TN6025	A58
NGP2M150L TN6010	A56	NR2M050L TN6025	A59	NR3047L THM	A59	NR3M150R TN7110	A58
NGP2M150R THM	A56	NR2M050L TN7110	A59	NR3047L TN6010	A59	NR3M175L TN6010	A59
NGP2M150R TN6010	A56	NR2M050R TN6010	A58	NR3047L TN6025	A59	NR3M175L TN6025	A59
NGP2M200L THM	A56	NR2M050R TN6025	A58	NR3047LK TN6010.....	A60	NR3M175L TN7110	A59
NGP2M200L TN6010	A56	NR2M050R TN7110	A58	NR3047LK TN6025.....	A60	NR3M175R TN6010	A58
NGP2M200R THM	A56	NR2M075L TN6010	A59	NR3047R THM	A58	NR3M175R TN6025	A58
NGP2M200R TN6010	A56	NR2M075L TN6025	A59	NR3047R TN6010.....	A58	NR3M175R TN7110	A58
NGP2M250L THM	A56	NR2M075L TN7110	A59	NR3047R TN6025.....	A58	NR3M200L TN6010	A59
NGP2M250L TN6010	A56	NR2M075R TN6010	A58	NR3047RK TN6010.....	A60	NR3M200L TN6025	A59
NGP2M250R THM	A56	NR2M075R TN6025	A58	NR3047RK TN6025.....	A60	NR3M200L TN7110	A59
NGP2M250R TN6010	A56	NR2M075R TN7110	A58	NR3062L THM	A59	NR3M200R TN6010	A58
NGP2M300L THM	A56	NR2M100L TN6010	A59	NR3062L TN6010.....	A59	NR3M200R TN6025	A58
NGP2M300L TN6010	A56	NR2M100L TN6025	A59	NR3062L TN6025	A59	NR3M200R TN7110	A58
NGP2M300R THM	A56	NR2M100L TN7110	A59	NR3062LK TN6010.....	A60	NR3M225L TN6010	A59
NGP2M300R TN6010	A56	NR2M100R TN6010	A58	NR3062LK TN6025.....	A60	NR3M225L TN6025	A59
NGP3M150L THM	A56	NR2M100R TN6025	A58	NR3062R THM	A58	NR3M225L TN7110	A59
NGP3M150L TN6010	A56	NR2M100R TN7110	A58	NR3062R TN6010.....	A58	NR3M225R TN6010	A58
NGP3M150R THM	A56	NR2M125L TN6010	A59	NR3062R TN6025.....	A58	NR3M225R TN6025	A58
NGP3M150R TN6010	A56	NR2M125L TN6025	A59	NR3062RK TN6010.....	A60	NR3M225R TN7110	A58
NGP3M200L THM	A56	NR2M125L TN7110	A59	NR3062RK TN6025.....	A60	NR4062LK TN6010.....	A60
NGP3M200L TN6010	A56	NR2M125R TN6010	A58	NR3078LK TN6010.....	A60	NR4062LK TN6025.....	A60
NGP3M200R THM	A56	NR2M125R TN6025	A58	NR3078LK TN6025.....	A60	NR4062RK TN6010.....	A60

Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
NR4062RK TN6025	A60	NRD4125R TN6010	A60	NSR243E	A40, A136	NTF2R TN6010	A149
NR4094LK TN6010	A60	NRD4125R TN6025	A60	NSR244E	A41, A137	NTF2R TN6025	A149
NR4094LK TN6025	A60	NSL062	A40, A136	NSR245D	A40, A136	NTF3L TN6010	A149
NR4094RK TN6010	A60	NSL082V	A40, A136	NSR246D	A41, A137	NTF3L TN6025	A149
NR4094RK TN6025	A60	NSL102B	A40, A136	NSR853D	A40, A136	NTF3R TN6010	A149
NR4125L TN6010	A59	NSL122B	A40, A136	NSR854D	A41, A137	NTF3R TN6025	A149
NR4125L TN6025	A59	NSL123A	A40, A136	NSR864E	A41, A137	NTK2R TN6010	A150
NR4125LK TN6010	A60	NSL123B	A40, A136	NSRDH122B	A42, A138	NTK2R TN6025	A150
NR4125LK TN6025	A60	NSL162C	A40, A136	NSRDH163D	A42, A138	NTK3L TN6025	A150
NR4125R TN6010	A58	NSL163C	A40, A136	NSRDH203D	A42, A138	NTK3R TN6010	A150
NR4125R TN6025	A58	NSL163D	A40, A136	NSRDH204D	A42, A138	NTK3R TN6025	A150
NR4125RK TN6010	A60	NSL164C	A41, A137	NSUL164D	A140	NTP2L TN6010	A148
NR4125RK TN6025	A60	NSL164D	A41, A137	NSUR124C	A140	NTP2L TN6025	A148
NR4M200L TN6010	A59	NSL203D	A40, A136	NSUR164D	A140	NTP2R TN6010	A148
NR4M200L TN6025	A59	NSL204C	A41, A137	NT1L TN6010	A147	NTP2R TN6025	A148
NR4M200L TN7110	A59	NSL204D	A41, A137	NT1L TN6025	A147	NTP3L TN6010	A148
NR4M200R TN6010	A58	NSL205D	A40, A136	NT2L TN6010	A148	NTP3L TN6025	A148
NR4M200R TN6025	A58	NSL206D	A41, A137	NT2L TN6025	A148	NTP3R TN6010	A148
NR4M200R TN7110	A58	NSL243D	A40, A136	NT2LK TN6010	A147	NTP3R TN6025	A148
NR4M225L TN6010	A59	NSL243E	A40, A136	NT2LK TN6025	A147	NTP4R TN6025	A148
NR4M225L TN6025	A59	NSL244D	A41, A137	NT2R TN6010	A148	NTU4L TN6025	A150
NR4M225L TN7110	A59	NSL244E	A41, A137	NT2R TN6025	A148	NTU4R TN6025	A150
NR4M225R TN6010	A58	NSL246D	A41, A137	NT2RK TN6010	A147	NWC3R11E TN6025	A154
NR4M225R TN6025	A58	NSL853D	A40, A136	NT2RK TN6025	A147	NWC3R14E TN6025	A154
NR4M225R TN7110	A58	NSL854D	A41, A137	NT3L TN6010	A148	OEW25M	D43
NR4M250L TN6010	A59	NSL864E	A41, A137	NT3L TN6025	A148	OEW30M	D43
NR4M250L TN6025	A59	NSLDH203D	A42, A138	NT3LK TN6010	A147	OR01046139V75	D25
NR4M250L TN7110	A59	NSR062	A40, A136	NT3LK TN6025	A147	OR01109139V75	D25
NR4M250R TN6010	A58	NSR082V	A40, A136	NT3R TN6010	A148	OR01925103V75	D25
NR4M250R TN6025	A58	NSR102B	A40, A136	NT3R TN6025	A148	PMT04526 KTB	D36-D37
NR4M250R TN7110	A58	NSR122B	A40, A136	NT3RCK TN6010	A149	RDHT1204MOTX TN7525	C38
NRD3031L TN6010	A60	NSR123A	A40, A136	NT3RCK TN6025	A149	RDHW1204MOMH TN2510	C38
NRD3031L TN6025	A60	NSR123B	A40, A136	NT3RK TN6010	A147	RDHW1204MOML TN2510	C38
NRD3031R TN6010	A60	NSR162C	A40, A136	NT3RK TN6025	A147	RDMT1204MOTX TN2510	C38
NRD3031R TN6025	A60	NSR163C	A40, A136	NT4L TN6025	A148	RDMT1204MOTX TN6525	C38
NRD3062L TN6010	A60	NSR163D	A40, A136	NT4R TN6010	A148	RDMT1204MOTX TN6540	C38
NRD3062L TN6025	A60	NSR164C	A41, A137	NT4R TN6025	A148	RDMT1204MOTX TN7525	C38
NRD3062R TN6010	A60	NSR164D	A41, A137	NT4RK TN6025	A147	RDMT1204MOTX TN7535	C38
NRD3062R TN6025	A60	NSR166D	A41, A137	NTB3LB TN6025	A156	RDMW1204MOTX TN2510	C38
NRD4062L TN6010	A60	NSR168D	A41, A137	NTC3L12I TN6025	A151	RDMW1204MOTX TN6540	C38
NRD4062L TN6025	A60	NSR203D	A40, A136	NTC3R12E TN6010	A151	RDMW1204MOTX TN7525	C38
NRD4062R TN6010	A60	NSR204C	A41, A137	NTC3R12E TN6025	A151	RDMW1204MOTX TN7535	C38
NRD4062R TN6025	A60	NSR205D	A40, A136	NTC3R14E TN6010	A151	RDPT1204M0SMMX TN6540	C38
NRD4125L TN6010	A60	NSR206D	A41, A137	NTC3R16E TN6010	A151	RNGJ10T3M0EML WP25PM	C22
NRD4125L TN6025	A60	NSR243D	A40, A136	NTC3R16E TN6025	A151	RNGJ10T3M0EML WP35CM	C22

Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
RNGJ10T3M0EML WU35PM	C22	S0612LSER2	A170	SS03M025	D44, D46	TF4V0507002A TIALN-LT	B12
RNGJ10T3M0SMM WP25PM	C22	S0812LSEL2	A170	SS03M026	D44, D46	TF4V0507002B TIALN-LT	B12
RNGJ10T3M0SMM WU35PM	C22	S0812LSER2	A170	SS03M027	D44, D46	TF4V0507002C TIALN-LT	B12
RNGJ1204M0EML WP25PM	C28	S1012LSEL3	A170	SS03M029	D44, D46	TF4V0507002S TIALN-LT	B12
RNGJ1204M0EML WP35CM	C28	S1012LSER3	A170	SS03M030	D46	TF4V0508003 TIALN-LT	B13
RNGJ1204M0EML WU35PM	C28	S111	A41, A137	SS03M032	D46	TF4V0508003A TIALN-LT	B12
RNGJ1204M0SMH WK15PM	C28	S112	A41, A137	SS044038G	D43	TF4V0508003B TIALN-LT	B12
RNGJ1204M0SMH WP25PM	C28	S1212LSEL3	A170	SS056041G	D42-D43	TF4V0508003C TIALN-LT	B13
RNGJ1204M0SMH WP35CM	C28	S1212LSER3	A170	SS075041G	D43	TF4V0508003S TIALN-LT	B13
RNGJ1204M0SMH WU35PM	C28	S1620LSEL3	A170	SS081041G	D42	TF4V0510004 TIALN-LT	B13
RNGJ1204M0SMM WK15PM	C28	S1620LSER3	A170	SS094041G	D43	TF4V0510004A TIALN-LT	B13
RNGJ1204M0SMM WP25PM	C28	S2020LSER3	A170	SS112041G	D42-D43	TF4V0510004B TIALN-LT	B13
RNGJ1204M0SMM WP35CM	C28	S2112	A40-A45, A136-138, A140	SS162062G	D42	TF4V0510004C TIALN-LT	B13
RNGJ1204M0SMM WU35PM	C28	S304	A45	SSA3T	A167, D20-D21	TF4V0510004D TIALN-LT	B13
RNGJ1605M0EML WP25PM	C31	S310	A40, A42-44, A136, A138	SSA4T	A167	TF4V0510004S TIALN-LT	B13
RNGJ1605M0EML WP35CM	C31	S352	A40, A43-A44, A92-A93	SSN2T	A170	TF4V051101A TIALN-LT	B13
RNGJ1605M0EML WU35PM	C31	S39	A44	SSP025016M	D26-D27	TF4V051101AS TIALN-LT	B13
RNPJ10T3M0SMH WK15CM	C22	S412	A41-A44, A137	SSP025018M	D26	TF4V0513005 TIALN-LW	B13
RNPJ10T3M0SMH WP20CM	C22	S422	A41, A137	SSY3T	A170, D20-D21	TF4V0513005S TIALN-LW	B13
RNPJ10T3M0SMH WP25PM	C22	S445	C12, C30	STCC11	D5	TF4V0513015 TIALN-LW	B13
RNPJ10T3M0SMH WP35CM	C22	S459	C30	STCM11	D4-D6, D8-D9, D15	TF4V0513015A TIALN-LW	B13
RNPJ10T3M0SMH WU35PM	C22	S965	A42, A138	STCM19	D28-D30, D32	TF4V0513015B TIALN-LW	B13
RNPJ10T3M0SMM WP20CM	C22	SKCP343	D12	STCM20	D33	TF4V0513015C TIALN-LW	B13
RNPJ10T3M0SMM WP25PM	C22	SKCP453	D12	STCM4	D28-D32	TF4V0513015D TIALN-LW	B13
RNPJ10T3M0SMM WP35CM	C22	SKDP343	D13-D14	STCM9	D7	TF4V0513015E TIALN-LW	B13
RNPJ1204M0SMH WK15CM	C28	SL344	A41, A137	TF4V0003001 TIALN-LT	B21	TF4V0513015S TIALN-LW	B13
RNPJ1204M0SMH WP20CM	C28	SM416	A41, A137	TF4V0005000 TIALN-LT	B21	TF4V0516006 TIALN-LW	B14
RNPJ1204M0SMH WP25PM	C28	SM419	A41, A137	TF4V0007002 TIALN-LT	B21	TF4V0516006B TIALN-LW	B14
RNPJ1204M0SMH WP35CM	C28	SM420	A41, A137	TF4V0008003 TIALN-LT	B21	TF4V0516006C TIALN-LW	B14
RNPJ1204M0SMH WU35PM	C28	SM812	D17-D18	TF4V0010004 TIALN-LT	B21	TF4V0516006D TIALN-LW	B14
RNPJ1204M0SMM WP20CM	C28	SM813	D17	TF4V001101A TIALN-LT	B21	TF4V0516006E TIALN-LW	B14
RNPJ1204M0SMM WP25PM	C28	SM885	D15-D16	TF4V0013005 TIALN-LW	B21	TF4V0516006G TIALN-LW	B14
RNPJ1204M0SMM WP35CM	C28	SM886	D15-D16	TF4V0013015 TIALN-LW	B21	TF4V0519007 TIALN-LW	B14
RNPJ1204M0SMM WU35PM	C28	SM891	D15	TF4V0016006 TIALN-LW	B21	TF4V0519007B TIALN-LW	B14
RNPJ1605M0SMH WK15CM	C31	SMYE3	A167, A170, D20-D21	TF4V0019007 TIALN-LW	B21	TF4V0519007C TIALN-LW	B14
RNPJ1605M0SMH WP20CM	C31	SMYE4	A167	TF4V0025008 TIALN-LW	B21	TF4V0519007D TIALN-LW	B14
RNPJ1605M0SMH WP25PM	C31	SMY3	A167, A170, D20-D21	TF4V0032009 TIALN-LW	B21	TF4V0519007E TIALN-LW	B14
RNPJ1605M0SMH WP35CM	C31	SMY4	A167	TF4V0503001 TIALN-LT	B12	TF4V0519007S TIALN-LW	B14
RNPJ1605M0SMH WU35PM	C31	SN3TPKG	A170	TF4V0503001A TIALN-LT	B12	TF4V0525008 TIALN-LW	B15
RNPJ1605M0SMM WP20CM	C31	SRS3	D12-D14	TF4V0503001S TIALN-LT	B12	TF4V0525008B TIALN-LW	B15
RNPJ1605M0SMM WP25PM	C31	SRS4	D12	TF4V0505000 TIALN-LT	B12	TF4V0525008C TIALN-LW	B15
RNPJ1605M0SMM WP35CM	C31	SS03M012	D44, D46	TF4V0505000A TIALN-LT	B12	TF4V0525008D TIALN-LW	B15
RNPJ1605M0SMM WU35PM	C31	SS03M014	D44, D46	TF4V0505000B TIALN-LT	B12	TF4V0525008E TIALN-LW	B15
S-1786	D25	SS03M018	D44, D46	TF4V0505000S TIALN-LT	B12	TF4V0525008F TIALN-LW	B15
S0612LSEL2	A170	SS03M023	D44, D46	TF4V0507002 TIALN-LT	B12	TF4V0525008S TIALN-LW	B15



Index

Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
TF4V0532009 TIALN-LW.....	B15	TF4V2525008S TIALN-LW.....	B15	TF4V6525018 TIALN-LW.....	B15	TF4VP516006 TIALN-LT.....	B17
TF4V0532009B TIALN-LW.....	B15	TF4V4503001 TIALN-LT.....	B12	TF4V6525018S TIALN-LW.....	B15	TF4VP516006S TIALN-LT.....	B17
TF4V0532009E TIALN-LW.....	B15	TF4V4503001S TIALN-LT.....	B12	TF4V6525028 TIALN-LW.....	B15	TF4VP516016 TIALN-LT.....	B17
TF4V0532009S TIALN-LW.....	B15	TF4V4505000 TIALN-LT.....	B12	TF4V6525028B TIALN-LW.....	B15	TF4VP516016S TIALN-LT.....	B17
TF4V1507002A TIALN-LT.....	B12	TF4V4505000S TIALN-LT.....	B12	TF4V6525028C TIALN-LW.....	B15	TF4VP516026 TIALN-LT.....	B17
TF4V1507002B TIALN-LT.....	B12	TF4V4507002 TIALN-LT.....	B12	TF4V6525028S TIALN-LW.....	B15	TF4VP516026S TIALN-LT.....	B17
TF4V1507002S TIALN-LT.....	B12	TF4V4507002B TIALN-LT.....	B12	TF4VN507012 TIALN-LT.....	B19	TF4VP519007 TIALN-LT.....	B17
TF4V1508003B TIALN-LT.....	B13	TF4V4507002S TIALN-LT.....	B12	TF4VN507012A TIALN-LT.....	B19	TF4VP519007S TIALN-LT.....	B17
TF4V1508003S TIALN-LT.....	B13	TF4V4508003 TIALN-LT.....	B12	TF4VN507012B TIALN-LT.....	B19	TF4VP519017 TIALN-LT.....	B17
TF4V1510004B TIALN-LT.....	B13	TF4V4508003B TIALN-LT.....	B12	TF4VN510014 TIALN-LT.....	B19	TF4VP519017S TIALN-LT.....	B17
TF4V1510004C TIALN-LT.....	B13	TF4V4508003S TIALN-LT.....	B12	TF4VN510014B TIALN-LT.....	B19	TF4VP519027 TIALN-LT.....	B17
TF4V1510004S TIALN-LT.....	B13	TF4V4510004 TIALN-LT.....	B13	TF4VN510014C TIALN-LT.....	B19	TF4VP519027S TIALN-LT.....	B17
TF4V151100AS TIALN-LT.....	B13	TF4V4510004B TIALN-LT.....	B13	TF4VN513005 TIALN-LW.....	B19	TF4VP525008 TIALN-LT.....	B17
TF4V1513005B TIALN-LW.....	B14	TF4V4510004S TIALN-LT.....	B13	TF4VN513005B TIALN-LW.....	B19	TF4VP525008S TIALN-LT.....	B17
TF4V1513005C TIALN-LW.....	B14	TF4V451101A TIALN-LT.....	B13	TF4VN513005C TIALN-LW.....	B19	TF4VP525018 TIALN-LT.....	B17
TF4V1513005S TIALN-LW.....	B14	TF4V451101AS TIALN-LT.....	B13	TF4VN513005E TIALN-LW.....	B19	TF4VP525018S TIALN-LT.....	B17
TF4V1516006C TIALN-LW.....	B14	TF4V4513005 TIALN-LW.....	B13	TF4VN516006 TIALN-LW.....	B19	TF4VP525028 TIALN-LT.....	B17
TF4V1516006S TIALN-LW.....	B14	TF4V4513005B TIALN-LW.....	B13	TF4VN516006C TIALN-LW.....	B19	TF4VP525028S TIALN-LT.....	B17
TF4V1519007 TIALN-LW.....	B15	TF4V4513005C TIALN-LW.....	B13	TF4VN516006E TIALN-LW.....	B19	TM4V0507002 ALTIN-MT.....	B12
TF4V1519007B TIALN-LW.....	B15	TF4V4513005S TIALN-LW.....	B13	TF4VN516016 TIALN-LW.....	B19	TM4V0507002S ALTIN-MT.....	B12
TF4V1519007C TIALN-LW.....	B15	TF4V4516006 TIALN-LW.....	B14	TF4VN519007 TIALN-LW.....	B19	TM4V0510004 ALTIN-MT.....	B13
TF4V1519007S TIALN-LW.....	B15	TF4V4516006C TIALN-LW.....	B14	TF4VN519017 TIALN-LW.....	B19	TM4V0510004B ALTIN-MT.....	B13
TF4V1525008 TIALN-LW.....	B15	TF4V4516006E TIALN-LW.....	B14	TF4VN519017B TIALN-LW.....	B19	TM4V0510004S ALTIN-MT.....	B13
TF4V1525008B TIALN-LW.....	B15	TF4V4516006S TIALN-LW.....	B14	TF4VN519017C TIALN-LW.....	B19	TM4V0513005 ALTIN-MW.....	B13
TF4V1525008C TIALN-LW.....	B15	TF4V4519007 TIALN-LW.....	B14	TF4VN519017E TIALN-LW.....	B19	TM4V0513005S ALTIN-MW.....	B13
TF4V1525008S TIALN-LW.....	B15	TF4V4519007B TIALN-LW.....	B14	TF4VN525008 TIALN-LW.....	B19	TM4V0513015 ALTIN-MW.....	B13
TF4V2507002A TIALN-LT.....	B12	TF4V4519007C TIALN-LW.....	B14	TF4VN525018 TIALN-LW.....	B19	TM4V0513015B ALTIN-MW.....	B13
TF4V2507002B TIALN-LT.....	B12	TF4V4519007E TIALN-LW.....	B14	TF4VN525018B TIALN-LW.....	B19	TM4V0513015S ALTIN-MW.....	B13
TF4V2507002S TIALN-LT.....	B12	TF4V4519007S TIALN-LW.....	B14	TF4VN525018C TIALN-LW.....	B19	TM4V0516006 ALTIN-MW.....	B14
TF4V2508003S TIALN-LT.....	B13	TF4V6513015 TIALN-LW.....	B14	TF4VN525018E TIALN-LW.....	B19	TM4V0516006B ALTIN-MW.....	B14
TF4V2510004 TIALN-LT.....	B13	TF4V6513015B TIALN-LW.....	B13	TF4VN525028 TIALN-LW.....	B19	TM4V0519007 ALTIN-MW.....	B14
TF4V2510004B TIALN-LT.....	B13	TF4V6513015C TIALN-LW.....	B13	TF4VP007012 TIALN-LT.....	B20	TM4V0519007B ALTIN-MW.....	B14
TF4V2510004C TIALN-LT.....	B13	TF4V6513015S TIALN-LW.....	B14	TF4VP010014 TIALN-LT.....	B20	TM4V0519007C ALTIN-MW.....	B14
TF4V2510004S TIALN-LT.....	B13	TF4V6513025B TIALN-LW.....	B14	TF4VP013005 TIALN-LT.....	B20	TM4V0519007D ALTIN-MW.....	B14
TF4V251100AS TIALN-LT.....	B13	TF4V6513025C TIALN-LW.....	B14	TF4VP016016 TIALN-LT.....	B20	TM4V0519007E ALTIN-MW.....	B14
TF4V2513005B TIALN-LW.....	B14	TF4V6513025S TIALN-LW.....	B14	TF4VP019017 TIALN-LT.....	B20	TM4V0519007S ALTIN-MW.....	B14
TF4V2513005C TIALN-LW.....	B14	TF4V6516016 TIALN-LW.....	B14	TF4VP025018 TIALN-LT.....	B20	TM4V0525008 ALTIN-MW.....	B15
TF4V2513005S TIALN-LW.....	B14	TF4V6516016C TIALN-LW.....	B14	TF4VP507012 TIALN-LT.....	B17	TM4V0525008B ALTIN-MW.....	B15
TF4V2516006S TIALN-LW.....	B14	TF4V6516016S TIALN-LW.....	B14	TF4VP507012S TIALN-LT.....	B17	TM4V0525008C ALTIN-MW.....	B15
TF4V2519007B TIALN-LW.....	B15	TF4V6519007 TIALN-LW.....	B15	TF4VP510014 TIALN-LT.....	B17	TM4V0525008D ALTIN-MW.....	B15
TF4V2519007C TIALN-LW.....	B15	TF4V6519007B TIALN-LW.....	B15	TF4VP510014S TIALN-LT.....	B17	TM4V0525008E ALTIN-MW.....	B15
TF4V2519007S TIALN-LW.....	B15	TF4V6519007C TIALN-LW.....	B15	TF4VP513005 TIALN-LT.....	B17	TM4V0525008S ALTIN-MW.....	B15
TF4V2525008 TIALN-LW.....	B15	TF4V6519007S TIALN-LW.....	B15	TF4VP513005S TIALN-LT.....	B17	TM4V0T13015 ALTIN-MW.....	B16
TF4V2525008B TIALN-LW.....	B15	TF4V6519017 TIALN-LW.....	B15	TF4VP513015 TIALN-LT.....	B17	TM4V0T13015S ALTIN-MW.....	B16
TF4V2525008C TIALN-LW.....	B15	TF4V6519017S TIALN-LW.....	B15	TF4VP513015S TIALN-LT.....	B17	TM4V0T16006 ALTIN-MW.....	B16

Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
TM4V0T16006S ALTIN-MW	B16	TM4VPT19027S ALTIN-MT	B18	TM5V0E25008FW ALTIN-MW	B44	TM5V0S19007EW ALTIN-MT	B31
TM4V0T19007 ALTIN-MW	B16	TM4VPT25008 ALTIN-MT	B18	TM5V0E25008SV ALTIN-MV	B44	TM5V0S19007S ALTIN-MT	B31
TM4V0T19007S ALTIN-MW	B16	TM4VPT25008S ALTIN-MT	B18	TM5V0E25008SW ALTIN-MW	B44	TM5V0S19007SW ALTIN-MT	B31
TM4V0T25008 ALTIN-MW	B16	TM4VPT25018 ALTIN-MT	B18	TM5V0S05000A ALTIN-MT	B30	TM5V0S25008B ALTIN-MT	B31
TM4V0T25008S ALTIN-MW	B16	TM4VPT25018S ALTIN-MT	B18	TM5V0S05000B ALTIN-MT	B30	TM5V0S25008BW ALTIN-MT	B31
TM4V0T32009 ALTIN-MW	B16	TM4VPT25028 ALTIN-MT	B18	TM5V0S05000S ALTIN-MT	B30	TM5V0S25008C ALTIN-MT	B31
TM4V0T32009S ALTIN-MW	B16	TM4VPT25028S ALTIN-MT	B18	TM5V0S07002A ALTIN-MT	B30	TM5V0S25008CW	B31
TM4V1510004S ALTIN-MT	B13	TM5V0E10004A ALTIN-MT	B44	TM5V0S07002B ALTIN-MT	B30	TM5V0S25008D ALTIN-MT	B31
TM4V1513005S ALTIN-MW	B14	TM5V0E10004B ALTIN-MT	B44	TM5V0S07002C ALTIN-MT	B30	TM5V0S25008DW ALTIN-MT	B31
TM4V1519007 ALTIN-MW	B15	TM5V0E10004S ALTIN-MT	B44	TM5V0S07002S ALTIN-MT	B30	TM5V0S25008E ALTIN-MT	B31
TM4V1519007S ALTIN-MW	B15	TM5V0E13015AV ALTIN-MV	B44	TM5V0S08003A ALTIN-MT	B30	TM5V0S25008EW ALTIN-MT	B31
TM4V1525008S ALTIN-MW	B15	TM5V0E13015AW ALTIN-MW	B44	TM5V0S08003B ALTIN-MT	B30	TM5V0S25008S ALTIN-MT	B31
TM4V4507002 ALTIN-MT	B12	TM5V0E13015BV ALTIN-MV	B44	TM5V0S08003C ALTIN-MT	B30	TM5V0S25008SW ALTIN-MT	B31
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TM4V4510004 ALTIN-MT	B13	TM5V0E13015CV ALTIN-MV	B44	TM5V0S10004B ALTIN-MT	B30	TM5V0T07002B ALTIN-MT	B32
TM4V4510004S ALTIN-MT	B13	TM5V0E13015CW ALTIN-MW	B44	TM5V0S10004C ALTIN-MT	B30	TM5V0T07002C ALTIN-MT	B32
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TM4V4513005S ALTIN-MW	B13	TM5V0E13015DW ALTIN-MW	B44	TM5V0S13015A ALTIN-MT	B30	TM5V0T08003A ALTIN-MT	B32
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TM4V4519007S ALTIN-MW	B14	TM5V0E13015EW ALTIN-MW	B44	TM5V0S13015AW ALTIN-MT	B30	TM5V0T08003C ALTIN-MT	B32
TM4V4T13005 ALTIN-MW	B16	TM5V0E13015SV ALTIN-MV	B44	TM5V0S13015B ALTIN-MT	B30	TM5V0T08003S ALTIN-MT	B32
TM4V4T13005S ALTIN-MW	B16	TM5V0E13015SW ALTIN-MW	B44	TM5V0S13015BW ALTIN-MT	B30	TM5V0T10004A ALTIN-MT	B32
TM4V4T16006 ALTIN-MW	B16	TM5V0E16006BV ALTIN-MV	B44	TM5V0S13015C ALTIN-MT	B30	TM5V0T10004B ALTIN-MT	B32
TM4V4T16006S ALTIN-MW	B16	TM5V0E16006BW ALTIN-MW	B44	TM5V0S13015CW	B30	TM5V0T10004C ALTIN-MT	B32
TM4V4T19007 ALTIN-MW	B16	TM5V0E16006CV ALTIN-MV	B44	TM5V0S13015D ALTIN-MT	B30	TM5V0T10004S ALTIN-MT	B32
TM4V4T19007S ALTIN-MW	B16	TM5V0E16006CW ALTIN-MW	B44	TM5V0S13015DW ALTIN-MT	B30	TM5V0T13015A ALTIN-MT	B32
TM4V6513015 ALTIN-MW	B14	TM5V0E16006SV ALTIN-MV	B44	TM5V0S13015E ALTIN-MT	B30	TM5V0T13015AW ALTIN-MT	B32
TM4V6513015S ALTIN-MW	B13	TM5V0E16006SW ALTIN-MW	B44	TM5V0S13015EW ALTIN-MT	B30	TM5V0T13015B ALTIN-MT	B32
TM4V6519007S ALTIN-MW	B15	TM5V0E19007BV ALTIN-MV	B44	TM5V0S13015S ALTIN-MT	B30	TM5V0T13015BW ALTIN-MT	B32
TM4V6525028S ALTIN-MW	B15	TM5V0E19007BW ALTIN-MW	B44	TM5V0S13015SW ALTIN-MT	B30	TM5V0T13015C ALTIN-MT	B32
TM4VPT13005 ALTIN-MT	B18	TM5V0E19007CV ALTIN-MV	B44	TM5V0S16006B ALTIN-MT	B30	TM5V0T13015CW	B32
TM4VPT13005S ALTIN-MT	B18	TM5V0E19007CW ALTIN-MW	B44	TM5V0S16006BW ALTIN-MT	B30	TM5V0T13015D ALTIN-MT	B32
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TM4VPT16006S ALTIN-MT	B18	TM5V0E19007EW ALTIN-MW	B44	TM5V0S16006DW ALTIN-MT	B31	TM5V0T13015S ALTIN-MT	B32
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TM4VPT16016S ALTIN-MT	B18	TM5V0E19007SW ALTIN-MW	B44	TM5V0S16006SW ALTIN-MT	B31	TM5V0T16006B ALTIN-MT	B33
TM4VPT16026 ALTIN-MT	B18	TM5V0E25008BV ALTIN-MV	B44	TM5V0S19007B ALTIN-MT	B31	TM5V0T16006BW ALTIN-MT	B33
TM4VPT16026S ALTIN-MT	B18	TM5V0E25008BW ALTIN-MW	B44	TM5V0S19007BW ALTIN-MT	B31	TM5V0T16006C ALTIN-MT	B33
TM4VPT19007 ALTIN-MT	B18	TM5V0E25008CV ALTIN-MV	B44	TM5V0S19007C ALTIN-MT	B31	TM5V0T16006CW	B33
TM4VPT19007S ALTIN-MT	B18	TM5V0E25008CW ALTIN-MW	B44	TM5V0S19007CW	B31	TM5V0T16006D ALTIN-MT	B33
TM4VPT19017 ALTIN-MT	B18	TM5V0E25008EV ALTIN-MV	B44	TM5V0S19007D ALTIN-MT	B31	TM5V0T16006DW ALTIN-MT	B33
TM4VPT19017S ALTIN-MT	B18	TM5V0E25008EW ALTIN-MW	B44	TM5V0S19007DW ALTIN-MT	B31	TM5V0T16006S ALTIN-MT	B33
TM4VPT19027 ALTIN-MT	B18	TM5V0E25008FV ALTIN-MV	B44	TM5V0S19007E ALTIN-MT	B31	TM5V0T16006SW ALTIN-MT	B33



Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
TM5V0T19007B ALTIN-MT	B33	TM5W1S08003A ALTIN-MT	B40	WMTC015L05CM08 WU25PT	A16	WMTR250I6PPC WU25PT	A20
TM5V0T19007BW ALTIN-MT	B33	TM5W1S08003B ALTIN-MT	B40	WMTC015N00CM08 WU25PT	A16	WMTR300M3PPC WU10PT	A20
TM5V0T19007C ALTIN-MT	B33	TM5W1S08003S ALTIN-MT	B40	WMTC015N00CMW08 WU25PT	A17	WMTR300M3PPC WU25PT	A20
TM5V0T19007CW	B33	TM5W1S10004A ALTIN-MT	B40	WMTC015R05CM08 WU25PT	A16	WMTR305M3UPC WP10CT	A20
TM5V0T19007D ALTIN-MT	B33	TM5W1S10004B ALTIN-MT	B40	WMTC015R12CM08 WU25PT	A16	WMTR305M3UPC WU10PT	A20
TM5V0T19007DW ALTIN-MT	B33	TM5W1S10004C ALTIN-MT	B40	WMTC020L05CM08 WU25PT	A16	WMTR305M3UPC WU25PT	A20
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TM5V0T19007EW ALTIN-MT	B33	TM5W1S13005A ALTIN-MT	B40	WMTC020L12CMW08 WU25PT	A17	WMTR312I8PPC WU25PT	A20
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TM5V0T25008BW ALTIN-MT	B33	TM5W1S16006A ALTIN-MT	B40	WMTC020R05CMW08 WU25PT	A17	WMTR405M4UPC WU10PT	A20
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TM5V1E10004B ALTIN-MT	B44	TM5W6S19007E ALTIN-MT	B40	WMTC030R05CMW17 WU25PT	A17	WMTR605M6UPC WU10PT	A20
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TM5VNE10014A ALTIN-MT	B45	TM5W6S25028A ALTIN-MT	B40	WMTC030R12CMW17 WU25PT	A17	WMTR800M8PPC WU10PT	A20
TM5VNE13005BV ALTIN-MV	B45	TM5W6S25028B ALTIN-MT	B40	WMTC040L05CM17 WU25PT	A16	WMTR800M8PPC WU25PT	A20
TM5VNE13005BW ALTIN-MW	B45	TM5W6S25028C ALTIN-MT	B40	WMTC040L12CM17 WU25PT	A16	WMTR805M8UPC WP10CT	A20
TM5VNE16006BV ALTIN-MV	B45	TM5W6S25028D ALTIN-MT	B40	WMTC040N00CM17 WU25PT	A16	WMTR805M8UPC WU10PT	A20
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TM5VNE19017BV ALTIN-MV	B45	TM5W6S25028S ALTIN-MT	B40	WMTC040R05CM17 WU25PT	A16	WMTS094I2BP02PT WU10PT	A18
TM5VNE19017BW ALTIN-MW	B45	TP..22	A78	WMTC040R12CM17 WU25PT	A16	WMTS094I2BP04PT WU25PT	A18
TM5VNE25018BV ALTIN-MV	B45	TP..32	A78	WMTC094N00CM13 WU25PT	A16	WMTS125I3P03PH WU10PT	A19
TM5VNE25018BW ALTIN-MW	B45	TP..43	A78	WMTC094N00CMW13 WU25PT	A17	WMTS125I3P03PH WU25PT	A19
TM5VNS07012A ALTIN-MT	B34	TTSS05014M	D38-D39	WMTC094R05CM13 WU25PT	A16	WMTS125I3P03PT WU10PT	A18
TM5VNS10014A ALTIN-MT	B34	TTSS06014M	D38-D39	WMTC094R05CMW13 WU25PT	A17	WMTS125I3P08PH WU10PT	A19
TM5VNS13005B ALTIN-MT	B34	TTSS08014M	D38-D39	WMTC094R12CM13 WU25PT	A16	WMTS125I3P08PH WU25PT	A19
TM5VNS13005BW ALTIN-MT	B34	TTSS10014M	D38-D41	WMTC094R12CMW13 WU25PT	A17	WMTS125I3P08PT WU10PT	A18
TM5VNS16006B ALTIN-MT	B34	TTSS12014M	D38-D41	WMTC125N00CM17 WU25PT	A16	WMTS156I4P03PH WU10PT	A19
TM5VNS16006BW ALTIN-MT	B34	TTSS16014M	D38-D41	WMTC125N00CMW17 WU25PT	A17	WMTS156I4P03PH WU25PT	A19
TM5VNS19017B ALTIN-MT	B34	TTSS20014M	D39, D41	WMTC125R05CM17 WU25PT	A16	WMTS156I4P08PH WU10PT	A19
TM5VNS19017BW ALTIN-MT	B34	WGMSL12	A28	WMTC125R05CMW17 WU25PT	A17	WMTS156I4P08PH WU25PT	A19
TM5VNS25018B ALTIN-MT	B34	WGMSL16	A28	WMTC125R12CM17 WU25PT	A16	WMTS188I5P03PH WU10PT	A19
TM5VNS25018BW ALTIN-MT	B34	WGMSL20	A28	WMTC125R12CMW17 WU25PT	A17	WMTS188I5P03PH WU25PT	A19
TM5W1S07002A ALTIN-MT	B40	WGMSR12	A28	WMTR188I5PPC WU10PT	A20	WMTS188I5P03PT WU25PT	A18
TM5W1S07002B ALTIN-MT	B40	WGMSR16	A28	WMTR188I5PPC WU25PT	A20	WMTS188I5P08PH WU10PT	A19
TM5W1S07002S ALTIN-MT	B40	WGMSR20	A28	WMTR250I6PPC WU10PT	A20	WMTS188I5P08PH WU25PT	A19

Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)	Catalog No.	Page(s)
WMTS188I5P08PT WU25PT	A18	WMTS400M4P06PH WU10PT	A19	WMTS605M6U03PT WU25PT	A18	WMTWGL616B038-052	A30
WMTS200M2P02PT WU10PT	A18	WMTS400M4P06PH WU25PT	A19	WMTS605M6U06PH WU10PT	A19	WMTWGL619B052-070	A30
WMTS200M2P02PT WU25PT	A18	WMTS400M4P06PT WU10PT	A18	WMTS605M6U06PH WU25PT	A19	WMTWGL619B070-100	A30
WMTS205M2U02PT WP10CT	A18	WMTS400M4P06PT WU25PT	A18	WMTS605M6U06PT WP10CT	A18	WMTWGL625B100-205	A30
WMTS205M2U02PT WP25CT	A18	WMTS405M4U03PH WU10PT	A19	WMTS605M6U06PT WP25CT	A18	WMTWGL625S	A29
WMTS250I6P03PH WU10PT	A19	WMTS405M4U03PH WU25PT	A19	WMTS605M6U06PT WU10PT	A18	WMTWGL625S	A29
WMTS250I6P03PH WU25PT	A19	WMTS405M4U03PT WP10CT	A18	WMTS605M6U06PT WU25PT	A18	WMTWGL625S	A29
WMTS250I6P03PT WU10PT	A18	WMTS405M4U03PT WP25CT	A18	WMTS800M8P03PH WU10PT	A19	WMTWGL625S	A29
WMTS250I6P08PH WU10PT	A19	WMTS405M4U03PT WU10PT	A18	WMTS800M8P03PH WU25PT	A19	WMTWGL625S	A29
WMTS250I6P08PH WU25PT	A19	WMTS405M4U03PT WU25PT	A18	WMTS800M8P06PH WU10PT	A19	WMTWGL625S	A29
WMTS250I6P08PT WU10PT	A18	WMTS405M4U06PH WU10PT	A19	WMTS800M8P06PH WU25PT	A19	WMTWGL625S	A29
WMTS300M3P03PH WU10HT	A19	WMTS405M4U06PH WU25PT	A19	WMTS800M8P06PT WU10PT	A18	WMTWGL625S	A29
WMTS300M3P03PH WU10PT	A19	WMTS405M4U06PT WP10CT	A18	WMTS800M8P06PT WU25PT	A18	WMTWGL625S	A29
WMTS300M3P03PH WU25PT	A19	WMTS405M4U06PT WP25CT	A18	WMTS800M8P15PT WU10PT	A18	WMTWGL625S	A29
WMTS300M3P03PT WU10HT	A18	WMTS405M4U06PT WU10PT	A18	WMTS800M8P15PT WU25PT	A18	WMTWGL625S	A29
WMTS300M3P03PT WU10PT	A18	WMTS405M4U06PT WU25PT	A19	WMTS805M8U03PH WU10PT	A19	WMTWGL625S	A29
WMTS300M3P03PT WU25PT	A18	WMTS500M5P03PH WU10HT	A19	WMTS805M8U03PH WU25PT	A19	WMTWGL625S	A29
WMTS300M3P06PH WU10HT	A19	WMTS500M5P03PH WU10PT	A19	WMTS805M8U06PH WU10PT	A19	WMTWGL625S	A29
WMTS300M3P06PH WU10PT	A19	WMTS500M5P03PH WU25PT	A19	WMTS805M8U06PH WU25PT	A19	WMTWGL625S	A29
WMTS300M3P06PH WU25PT	A19	WMTS500M5P03PT WU10HT	A18	WMTS805M8U06PT WP10CT	A18	WMTWGL625S	A29
WMTS300M3P06PT WU10PT	A18	WMTS500M5P06PH WU10HT	A19	WMTS805M8U06PT WP25CT	A18	WMTWGL625S	A29
WMTS300M3P06PT WU25PT	A18	WMTS500M5P06PH WU10PT	A19	WMTS805M8U06PT WU10PT	A18	WMTWGL625S	A29
WMTS305M3U03PH WU10PT	A19	WMTS500M5P06PH WU25PT	A19	WMTS805M8U06PT WU25PT	A18	WMTWGL625S	A29
WMTS305M3U03PH WU25PT	A19	WMTS500M5P06PT WU25PT	A18	WMTS805M8U15PT WP10CT	A18	WMTWGL625S	A29
WMTS305M3U03PH WP10CT	A18	WMTS505M5U03PH WU10PT	A19	WMTS805M8U15PT WP25CT	A18	WMTWGL625S	A29
WMTS305M3U03PT WP25CT	A18	WMTS505M5U03PH WU25PT	A19	WMTS805M8U15PT WU10PT	A18	WMTWGL625S	A29
WMTS305M3U03PT WU10PT	A18	WMTS505M5U03PT WP10CT	A18	WMTS805M8U15PT WU25PT	A18	WMTWGL625S	A29
WMTS305M3U03PT WU25PT	A18	WMTS505M5U03PT WP25CT	A18	WMTWGL117S	A29	WMTWGL625S	A29
WMTS305M3U06PH WU10PT	A19	WMTS505M5U06PH WU10PT	A19	WMTWGL217S	A29	WMTWGL625S	A29
WMTS305M3U06PH WU25PT	A19	WMTS505M5U06PH WU25PT	A19	WMTWGL2B19S	A29	WMTWGL625S	A29
WMTS305M3U06PT WP10CT	A18	WMTS505M5U06PT WP10CT	A18	WMTWGL313B038-052	A30	WMTWGL625S	A29
WMTS305M3U06PT WP25CT	A18	WMTS505M5U06PT WP25CT	A18	WMTWGL316B052-070	A30	WMTWGL625S	A29
WMTS305M3U06PT WU10PT	A18	WMTS600M6P03PH WU10PT	A19	WMTWGL316B070-100	A30	WMTWGL625S	A29
WMTS305M3U06PT WU25PT	A18	WMTS600M6P03PH WU25PT	A19	WMTWGL319100-205	A30	WMTWGL625S	A29
WMTS312I8P03PH WU10PT	A19	WMTS600M6P03PT WU10PT	A18	WMTWGL322S	A29	WMTWGL625S	A29
WMTS312I8P03PH WU25PT	A19	WMTS600M6P03PT WU25PT	A18	WMTWGL413B038-052	A30	WMTWGL625S	A29
WMTS312I8P08PH WU10PT	A19	WMTS600M6P06PH WU10PT	A19	WMTWGL416B052-070	A30	WMTWGL625S	A29
WMTS312I8P08PH WU25PT	A19	WMTS600M6P06PH WU25PT	A19	WMTWGL416B070-100	A30	WMTWGL625S	A29
WMTS400M4P03PH WU10HT	A19	WMTS600M6P06PT WU10PT	A18	WMTWGL419B100-205	A30	WMTWGL625S	A29
WMTS400M4P03PH WU10PT	A19	WMTS600M6P06PT WU25PT	A18	WMTWGL422S	A29	WMTWGL625S	A29
WMTS400M4P03PH WU25PT	A19	WMTS605M6U03PH WU10PT	A19	WMTWGL516B038-052	A30	WMTWGL625S	A29
WMTS400M4P03PT WU10HT	A18	WMTS605M6U03PH WU25PT	A19	WMTWGL519B052-070	A30	WMTWGL625S	A29
WMTS400M4P03PT WU10PT	A18	WMTS605M6U03PT WP10CT	A18	WMTWGL519B070-100	A30	WMTWGL625S	A29
WMTS400M4P03PT WU25PT	A18	WMTS605M6U03PT WP25CT	A18	WMTWGL525B100-205	A30	WMTWGL625S	A29
WMTS400M4P06PH WU10HT	A19	WMTS605M6U03PT WU10PT	A18	WMTWGL525S	A29	WMTWGL625S	A29



Index

North America

- United States**
 General Sales: 800-979-4342
 Technical Support: 888-539-5145
w-na.service@widia.com
- Canada**
 General Sales: 800-979-4342
 Technical Support: 888-539-5145
w-ca.service@widia.com
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Central/South America

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- Venezuela**
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paxi@bellsouth.net

Africa

- Egypt**
 General Sales: +20 2-263-9828
w-uk.service@widia.com
- South Africa**
 General Sales: +27 11 748 9300
w-za.service@widia.com

Europe

- Austria**
 General Sales: +43-2236-379898
 Technical Support: 0800 291630
w-at.service@widia.com
- Belgium**
 General Sales: +32 4 248 48 48
 Technical Support: 0800 80410
w-be.service@widia.com
- Czech Republic**
 General Sales: 800 900 840
w-cz.service@widia.com
- France**
 General Sales: +33 1 60 12 81 00
 Technical Support: 080 5540 379
w-fr.service@widia.com
- Germany**
 General Sales: +49 6172 737-0
 Technical Support: 0800 1015774
w-de.service@widia.com
- Great Britain**
 General Sales: 0800 072 4528
 Technical Support: 0800 028 2996
w-uk.service@widia.com
- Hungary**
 General Sales: +36 96 618 158
w-hu.service@widia.com
- Ireland**
 General Sales: +44 28-9084-9433
w-ie.service@widia.com
- Italy**
 General Sales: +39 02-895-961
 Technical Support: 800 916568
w-it.service@widia.com
- Luxembourg**
 General Sales: +32 4 248 48 48
w-be.service@widia.com
- Netherlands**
 General Sales: +31 26 384 48 51
 Technical Support: 0800 0201131
w-nl.service@widia.com
- Poland**
 General Sales: +48 61 6656501
 Technical Support: 00800 4411943
w-pl.service@widia.com
- Portugal**
 General Sales: +351 22 4119 400
w-pt.service@widia.com
- Russia**
 General Sales: 81080021431044
w-ru.service@widia.com
- Slovakia**
 General Sales: 0800-044053
w-sk.service@widia.com
- Spain**
 General Sales: +34 93706 06 10
w-es.service@widia.com
- Turkey**
 General Sales: +90 216-574-4780
w-tr.service@widia.com

East/Asia Pacific

- **Australia**
 General Sales: 613 9755 5302
w-au.service@widia.com

- **Bahrain**
 General Sales: 00 971 (0) 5572371
w-uk.service@widia.com

- **China**
 General Sales: +86 400 889 2136
 Technical Support: +86 400 889 2136
w-cn.service@widia.com

- **Dubai**
 General Sales: +971 433 911 46
w-uk.service@widia.com

- **Hong Kong**
 General Sales: +86 21 3860 8288
w-cn.service@widia.com

- **India**
 General Sales: +91 80 2219 8215
w-in.service@widia.com

- **Indonesia**
 General Sales: +62 81 1148 8217
w-sg.service@widia.com

- **Israel**
 General Sales: 972 3 556 2211
w-il.service@widia.com

- **Japan**
 General Sales: 813 3820 2855
w-jp.service@widia.com

- **Korea**
 General Sales: +82 2 2109 5505
w-kr.service@widia.com

- **Kuwait**
 General Sales: 00 971 (0) 5572371
w-uk.service@widia.com

- **Malaysia**
 General Sales: (6) 03-5569 9080
w-my.service@widia.com

- **New Zealand**
 General Sales: 613 9755 5302
w-nz.service@widia.com

- **Pakistan**
 General Sales: +92 21 2465305
itsystem@brain.net.pk

- **Singapore***
 General Sales: +65 6 265-9222
w-sg.service@widia.com

*Vietnam and Philippines individuals should contact the Singapore office.

- **Taiwan**
 General Sales: +886-4-2350 1920
w-tw.service@widia.com

- **Thailand**
 General Sales: 662 642 3455
w-th.service@widia.com



Solid End Milling Icons

Plunge Milling	Ramping: Blank	Slotting: Ball Nose	Slotting: Ball Nose with AP Dimension
Slotting: Square End	Slotting: Square End with AP Dimension	Side Milling/Shoulder Milling: Ball Nose	Side Milling/Shoulder Milling: Ball Nose with AE/AP Dimension
Side Milling/Shoulder Milling: Square End	Side Milling/Shoulder Milling: Square End with AE/AP Dimension	3D Profiling	HSS-M42
Corner Style: Ball Nose	Corner Style: Corner Chamfer	Corner Style: Corner Radius	Corner Style: Square End
Shank: Cylindrical Plain	Shank: Cylindrical Weldon®	Shank: SAFE-LOCK™	Shank: NAS986 5.4D
Helix Angle: 38°	Helix Angle: 43°	Tool Dimensions: Flute Configuration: 4	Tool Dimensions: Flute Configuration: 5
Tool Dimensions: Flute Configuration: 6			

Indexable Milling Icons

Face Milling	Helical Milling	Plunge Milling	Ramping: Blank
Slotting: Square End	Side Milling/Shoulder Milling: Ball Nose	Side Milling/Shoulder Milling: Square End	3D Profiling
Pocketing	Shank: Cylindrical Plain	Shank: Cylindrical Plain Weldon® 2 Flat	Shank: Screw-On
Shank: Shell Mill			

Tooling Systems Icons

Shank: Cylindrical Plain	Shank: Cylindrical Plain ≤H6	Shank: Cylindrical Weldon®	Shank: Weldon ≤H6
Shank: Whistle Notch™	Shank: Whistle Notch ≤H6	Shank: SK BT (MAS-403-BT)	Shank: SK DV (DIN 69871)
Shank: SK CAT Drawbar Thread	Shank: HSK A/DIN 69893	Shank: Shell Mill	Shank: KM-TS™ (ISO 26622)
Shank: Square	Shank: KM4X™	Shank: SAFE-LOCK™ h6	Axial Adjustments: End
Axial Adjustments: Side	Balance-by-Design	Balance: G 2.5@15,000 min ⁻¹	Balance: G 2.5@15,000 min ⁻¹
Balance: G2.5@15,000 min ⁻¹	Tap Dimensions: DIN 1835/E	Tap Dimensions: DIN 1835/B	Collet: ER DIN 6499
Runout ≤3	Through Coolant: Radial: Drilling	Through Coolant: Radial: Indexable Milling	MLQ (Minimum Quantity Lubricant): Axial Drilling
Axial: Drilling	Through Coolant: 100 bar	Through Coolant: 1500 psi	Through Adapter Face
ISO 26622	Tunable Bar/Milling		

DIN – German Institute for Standardization

















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WIDIA 

DIN ISO 513	VDI 3323	Material	Condition	Rm N/mm ²	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	
14.1	Stainless steel/cast steel			AU	600	180	1.4301, 1.4401, 1.4436, 1.4541, 1.4550, 1.4568, 1.4571, 1.4573, 1.4580
14.2				DU	740	230	1.4362, 1.4417, 1.4410, 1.4460, 1.4462, 1.4575, 1.4582
14.3			S-AU	680	200	1.4465, 1.4505, 1.4506, 1.4529 (254SMO), 1.4539, 1.4563, 1.4577, 1.4586, 654SMO	
14.4			AU-PH	1060	330	1.4504, 1.4568	
K	15	Gray iron GG		FE/PE	180	GG-10, GG-15, GG-170 HB	
	16			PE	260	GG20, GG-25, GG-30, GG-25Cr	
	17	Nodular iron GGG		FE	160	GGG-35.3, GGG-40, GGG-50, GGV-30	
	18			PE	250	≥GGG-60, GGV-40	
	19	Malleable iron GTS/GTW		FE	130	GTS-35-10, GTS-45-06, GTW-S-38-12	
20			PE	230	GTW-35-04, GTS-55-04, GTS-65-02		
N	21	Wrought aluminum alloys		NAG	60	Al 99.5, AlMg 1	
	22			AG	100	AlCuMg 1, AlMgSiPb, AlMgSi 1	
	23	Cast aluminum alloys	Si<12%	NAG	75	G-AlSi 10 Mg, G-AlSi12	
	24			AG	90	G-AlCu 5 Si 3	
	25		Si>12%		130	G-AlSi 17, G-AlSi 23	
	26	Copper/copper alloys	Pb>1%		110	Free cutting brass, CuNi 18 Zn 19 Pb	
	27				90	Brass, red brass, CuZn33, CuZn-/CuSnZn-alloys	
	28				100	Bronze, electrolytic copper, CuNi 3 Si, CuSn-alloys	
	29	Non-metals				Thermosetting plastics, FVK, Fiber reinforced plastics, Bakelit	
	30					Hard rubber	
S	31	High-temperature alloys	Fe-based	G	200	1.4864, 1.4865, 1.4876	
	32			AG	280	1.4864, 1.4865, 1.4876	
	33		Ni-/Co-based	G	250	INCONEL® 718, NIMONIC® 80 A, Hastelloy®, UDIMET®	
	34		AG	350	INCONEL® 718, NIMONIC® 80 A, Hastelloy®, UDIMET®		
	35		GO	320	INCONEL® 718, NIMONIC® 80 A, Hastelloy®, UDIMET®		
	36	Titanium/titanium alloys, Alpha-/Beta-alloys			400	Titanium	
	37			AG	1050	TiAl 6 V 4	
H	38.1	Steel		H	45 HRC	90 MnV 8, Hardox 400	
	38.2			H	55 HRC	Hardox 500	
	39.1			H	60 HRC	HSS, 90 MnV 8	
	39.2			H	>62 HRC	HSS, 90 MnV 8	
	40.1	Chilled cast iron		GO	400	G-X 260 Cr 27, G-X 260 NiCr 42, G-X 300 CrNiSi 9 5 2, G-X 330 NiCr 42	
	40.2			GO	>440	G-X 260 Cr 27, G-X 260 NiCr 42, G-X 300 CrNiSi 9 5 2, G-X 330 NiCr 42	
	41.1	Cast iron		H	55 HRC	G-X 300 NiMo 3 Mg	
	41.2			H	>57 HRC	G-X 300 NiMo 3 Mg	

Material Groups and Conditions

Many materials — mostly steels — can be available in various microstructures that differ in their machinability significantly. Those materials are part of several material groups depending on their actual conditions.

AG — Aged	G — Annealed	NAG — Non-aged (non-aging)
AU — Austenitic	GG — Gray cast iron	PH — Precipitation hardened
BF — Heat treated to specified strength	GGG — Nodular cast iron	S-AU — Superaustenitic
BG — Heat treated to specified microstructure	GO — Cast	U — Untreated
BY — Heat treated to improved machinability	H — Hardened	V — Heat treated
DU — Stainless steel duplex (austenitic-ferritic)	MA — Martensitic	var1 — Variable
FE — Ferritic	N — Normalized	

Metalcutting Safety

IMPORTANT SAFETY INSTRUCTIONS

Read before using the tools in this catalog!

Projectile and Fragmentation Hazards

Modern metalcutting operations involve high spindle and cutter speeds and high temperatures and cutting forces. Hot metal chips may fly off the workpiece during metalcutting. Although cutting tools are designed and manufactured to withstand high cutting forces and temperatures, they can sometimes fragment, particularly if they are subjected to over-stress, severe impact, or other abuse.

To avoid injury:

- Always wear appropriate personal protective equipment, including safety goggles, when operating metalcutting machines or working nearby.
- Always make sure all machine guards are in place.

Breathing and Skin Contact Hazards:

Grinding carbide or other advanced cutting tool materials produce dust or mist containing metallic particles. Breathing this dust or mist — especially over an extended period — can cause temporary or permanent lung disease or make existing medical conditions worse. Contact with this dust or mist can irritate eyes, skin, and mucous membranes and may make existing skin conditions worse.

To avoid injury:

- Always wear breathing protection and safety goggles when grinding.
- Provide ventilation control and collect and properly dispose of dust, mist, or sludge from grinding.
- Avoid skin contact with dust or mist.

For more information, read the applicable Material Safety Data Sheet provided by Kennametal and consult General Industry Safety and Health Regulations, Part 1910, Title 29 of the Code of Federal Regulations.

These safety instructions are general guidelines. Many variables affect machining operations. It is impossible to cover every specific situation. The technical information included in this catalogue and recommendations on machining practices may not apply to your particular operation. For more information, consult Kennametal's Metalcutting Safety booklet, available free from Kennametal at 724.539.5747 or fax 724.539.5439. For specific product safety and environmental questions, contact our Corporate Environmental Health and Safety Office at 724.539.5066 or fax 724.539.5372.

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DIN ISO 513	VDI 3323	Material	Condition	Rm N/mm²	Hardness HB 30	Examples		
P	1	Unalloyed steel/cast steel	C<0.25%	G	420	125	1010, 1015, 1020, 1023, 1102, 1108, 1109, 1213, 1215	
	2		0.25≤C<0.55%	G	650	190	1025, 1030, 1035, 1040, 1041, 1045, 1050, 1140, 1141, 1146, 1330	
	3	Free cutting steel		V	850	250	1025, 1030, 1035, 1040, 1041, 1045, 1050, 1140, 1141, 1146, 1330	
	4		0.55%≤C	G	750	220	1055, 1060, 1151	
	5			V	1000	300	1055, 1060, 1151	
	6	Low-alloyed steel/cast steel		G	600	180		
	7			V	930	275	4130, 4140, 4150, 4320, 4340, 5120, 5132, 5135, 5140, 5155, 6150, 8620, 8625, 9260,	
	8			V	1000	300	A 355/A, A 355/C, A 355/D, A 485/2, A 485/3, E-3310	
	9			V	1200	350		
	10	High-alloyed steel/cast steel		G	680	200	440 C, 613, EV 8, M2 regular C, T1	
	11		Tool steel	V	1100	325	440 C, 613, EV 8, M2 regular C, T1	
	12	Stainless steel/cast steel		FE/MA	680	200	403, 405, 409, 410, 410 S, 416, 420, 430, 430 Ti, 439, 446,	
13.1			MA	820	240	420, 430 F, 431, 434, 440 B, 440 C		
13.2			MA-PH	1060	330	630, 630		
M	14.1	Stainless steel/cast steel		AU	600	180	301, 303, 304, 304 L, 304 LN, 305, 309 S, 316, 316 L, 316 LN, 317 L, 317 LN	
	14.2			DU	740	230	201, 329, 2205	
	14.3			S-AU	680	200	310 mod	
	14.4			AU-PH	1060	330	17-7 PH, 630	
	15		Gray iron GG		FE/PE		180	Class 20 B, Class 25 B,
16		PE			260	Class 30 B, Class 40 B, Class 45 B, Class 50 B		
17	Nodular iron GGG			FE		160	Class 50 B, Grade 60-40-18, Grade 65-45-12	
18				PE		250	Grade 80-55-06, Grade 100-70-03, Grade120-90-02	
19	Malleable iron GTS/GTW		FE		130	Grade 22010, 32510		
20			PE		230	GTW-35-04, GTS-55-04, GTS-65-02		
N	21	Wrought aluminum alloys		NAG		60	6061, 2014-T6, 2011-T3, 2024-T4, A2, 7075, 1000, AlMg 1, AlCuMg 1, AlMgSiPb, AlMgSi 1	
	22			AG		100	6061, 2014-T6, 2011-T3, 2024-T4, A2, 7075, 1000, AlMg 1, AlCuMg 1, AlMgSiPb, AlMgSi 1	
	23	Cast aluminum alloys	Si<12%	NAG		75	A380-1, A280, A390-1, G-AISI 10 Mg, G-AISI12, G-AICu 5 Si 3, G-AISI 17, G-AISI 23	
	24				AG		90	A380-1, A280, A390-1, G-AISI 10 Mg, G-AISI12, G-AICu 5 Si 3, G-AISI 17, G-AISI 23
	25					130	A380-1, A280, A390-1, G-AISI 10 Mg, G-AISI12, G-AICu 5 Si 3, G-AISI 17, G-AISI 23	
	26	Copper/copper alloys	Pb>1%			110	Free cutting brass, CuNi 18 Zn 19 Pb	
	27					90	Brass, red brass, CuZn33, CuZn-/CuSnZn-alloys	
	28					100	Bronze, electrolytic copper, CuNi 3 Si, CuSn-alloys	
	29			Non-metals				Thermosetting plastics, FVK, Fiber reinforced plastics, Bakelit
	30					Hard rubber		
31	High-temperature alloys	Fe-based	G			200	A-286, 321, 321 H, 330, 409, EV 9, EV11, HNV3	
32				AG		280	A-286, 321, 321 H, 330, 409, EV 9, EV11, HNV3	
33			Ni-/Co-based	G		250	INCONEL® 601/617/625/700/706/718, NIMONIC® 80 A, Hastelloy®, UDIMET®, Haynes® 25, Waspaloy, Rene41, Stellite®	
34					AG		350	INCONEL® 601/617/625/700/706/718, NIMONIC® 80 A, Hastelloy®, UDIMET®, Haynes® 25, Waspaloy, Rene41, Stellite®
35					GO		320	INCONEL® 601/617/625/700/706/718, NIMONIC® 80 A, Hastelloy®, UDIMET®, Haynes® 25, Waspaloy, Rene41, Stellite®
36	Titanium/titanium alloys, Alpha-/Beta-alloys			400	Titanium			
37			AG		1050	TiAl 64 V		
H	38.1	Steel		H		45 HRC	90 MnV 8, Hardox® 400	
	38.2			H		55 HRC	Hardox 500	
	39.1			H		60 HRC	HSS, 90 MnV 8	
	39.2			H		>62 HRC	HSS, 90 MnV 8	
	40.1	Chilled cast iron		GO		400	G-X 260 Cr 27, G-X 260 NiCr 42, G-X 300 CrNiSi 9 5 2, G-X 330 NiCr 42	
	40.2			GO		>440	G-X 260 Cr 27, G-X 260 NiCr 42, G-X 300 CrNiSi 9 5 2, G-X 330 NiCr 42	
	41.1	Cast iron		H		55 HRC	G-X 300 NiMo 3 Mg	
	41.2			H		>57 HRC	G-X 300 NiMo 3 Mg	

Material Groups and Conditions

Many materials — mostly steels — can be available in various microstructures that differ in their machinability significantly. Those materials are part of several material groups depending on their actual conditions.

- | | | |
|---|----------------------------|----------------------------------|
| AG — Aged | G — Annealed | NAG — Non-aged (non-aging) |
| AU — Austenitic, AISI 300 | GG — Gray cast iron | PH — Precipitation hardened |
| BF — Heat treated to specified strength | GGG — Nodular cast iron | S-AU — Superaustenitic, AISI 300 |
| BG — Heat treated to specified microstructure | GO — Cast | U — Untreated |
| BY — Heat treated to improved machinability | H — Hardened | V — Heat treated |
| DU — Stainless steel duplex (austenitic-ferritic) | MA — Martensitic, AISI 400 | var1 — Variable |
| FE — Ferritic, AISI 400 | N — Normalized | |

ADVANCES 2014

World and Corporate Headquarters

Kennametal Inc.
WIDIA Products Group
1600 Technology Way
Latrobe, PA 15650 USA
Phone: 800.979.4342
E-mail: w-na.service@widia.com

European Headquarters

Kennametal Europe GmbH
WIDIA Products Group
Rheingoldstrasse 50
CH 8212 Neuhausen am Rheinfall
Switzerland
Phone: (41) 52.6750.100
E-mail: w-ch.service@widia.com

Asia-Pacific Headquarters

Kennametal (Singapore) Pte. Ltd.
WIDIA Products Group
3A International Business Park
Unit #01-02/03/05, ICON@IBP
Singapore 609935
Phone: 65.6265.9222
E-mail: w-sg.service@widia.com

India Headquarters

Kennametal India Limited
WIDIA Products Group
8/9th Mile, Tumkur Road
Bangalore - 560 073
Phone: +91 (80) 2839 4321
E-mail: w-in.service@widia.com

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