

Turning

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Turning Product Highlights

WIDIA™ Victory™ High-Temp Turning

With the geometry and these grades, WIDIA Victory has a complete portfolio for high-temp turning applications in nickel-based (INCONEL®, TITANOL®, Inconel, Incoel, Incoel (Plasma)), and Fe-based (Alloy 303) materials, as well as difficult-to-machine stainless (HAUTE, duplex, high alloy stainless), cobalt chrome, and stainless Incoel powdered metals. These materials are commonly found in rings, bearings, valves, compressors, fans, rotors, and medical devices.

-FS Geometry

The -FS Geometry is a ground, highly positive design tool used in turning cuts where chip control, finish, and minimization of part deflection are considerations.

- Excellent chip control versus similar competitive geometries. The chip control with ground, stability and reduces machine shavings to remove shavings.
- Increased cutting speed allows feed rate for better chip control to reduce cycle time, gain productivity, and reduce machining cost.
- Reduced cutting force provides longer tool life and the better surface finish.
- Improved depth of cut (DOC) reducing resistance for longer tool life.
- Advanced PVD grades provide more wear resistance and longer tool life.





-MS Geometry

MS geometry is a modified geometry with increased edge toughness that is best suited to medium machining.

- The MS geometry offers excellent chip control versus similar competitive geometries. This chip control adds process stability and reduces machine stoppages to remove shavings.
- Available in two PVD grades, MS is a high performance geometry. Competes with confidence against any competitor. The MS is also available in an uncoated grade.
- The WIDIA™ Jetray™ grades offer better depth-of-cut (DOC) cutting resistance and improved edge toughness. This offers customers an improved solution from other competitors.

-UR Geometry

- UR geometry offers a rounding solution for high temp materials. Available in WC/Co™ and WC/Co/Ti™, the UR geometry provides smooth chip forming and improved coolant flow for increased tool life. This positive geometry, with its unique chipbreaker without helical points, reduces cutting forces and improves depth-of-cut (DOC) cutting resistance.



Turning Product Highlights

Widia™ VanTurn™

Formerly known as WDSR Value, the Widia VanTurn platform offers high performance inserts with versatility. With eight grades and eight geometries, VanTurn covers 80% of all turning applications.

Every insert is gold, which reduces wear as the tool continues to be used. This makes it easy to detect when an insert is ready to be changed, maintaining the product's value and protecting the workplace. Also, because Widia VanTurn inserts can be used in most applications, a single insert can take on any number of tasks, thus reducing inventory. Widia VanTurn products are reliable enough to cut steel, stainless steel, cast iron, and high-temperature alloys, enabling quick changes in workplace materials without the need to swap inserts, saving time and money.

WMT™ System

The WMT platform is the mechanical and reliable option for all grooving, face grooving, cut-off, boring, and parting applications. The WMT system ensures precise insert positioning and provides only the most accurate finishing, with exceptionally fast cycle times and superior performance.

The WMT portfolio offers:

- Proven rigidity stability
 - WMT insert design has the best clamping system for stability
- Platform flexibility, with multiple geometries to single holder for multiple application types
- Victory™ grades:
 - WDC11™ — Ductile
 - WDR11, WDR11-1 — FCB
 - WDR12, WDR12-1 — CB
- Greater depth-of-cut (DOC) capability

Versatile and Well Constructed

- Specifically designed to increase speeds and feeds
- Excellent geometry for over the most demanding deep grooving applications
- The WMT system enables heavy stock removal in turning applications
- Lowers tool surface friction and a strong, reliable tool life





WIDIA™ Tools for Small Hole Boring

When the application calls for boring of a hole of less than 1.5mm, WIDIA offers comprehensive and easy-to-use solutions to choose from. Our portfolio of tools for small hole boring offer solutions in either indexable inserts or solid carbide inserts, and inserts are available for boring, profiling, threading, and grooving.

I.D. Indexable Tooling

- Steel and solid carbide inserts with through coolant in both end and side tools.
- Ground in and ground type chipbreaker inserts.
- Coated and uncoated carbide grades and cubic boron nitride/polycrystalline diamond tipped inserts to support all machining applications.

Quadralock™ System

- Versatile and engineered to give exceptional performance for I.D. machining applications. Quick, accurate insert indexing.
- Internal coolant can be used with all tool bores. Cutting fluid to form special seals that do not contact in the cutting edge.
- Carbide grades for steels, stainless steels, non-ferrous materials, super alloys, titanium, and hard materials.

A/B Series Tooling

- Inserts repeat within ± 0.002 mm, allowing quick and accurate setups.
- Optimal, ground insert shanks allow for maximum strength and rigidity.
- Available in boring, grooving, threading, and profiling insert styles.
- Coated and uncoated carbide grades and cubic boron nitride/polycrystalline diamond tipped inserts to support all machining applications.



■ ISO Turning Inserts

Step 1 • Select Insert Style

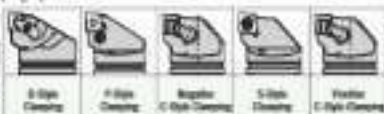
						
			Square inserts, Positive	Round inserts, Positive	Diamond Inserts	Punch/Drill Inserts
2	Round 3/4"		120-180	120-210 180-240	210-300	120-220
3	Round 1"		180-220	180-220 220-240	300-350	120-210
4	Round 1 1/2"		90	180-190	300-350	120
5	Square 1"		120-120	180-170 170-180	300-350	120-120
6	Triangle 1"		120-120	180-180	300-350	120-120
7	Round 1 1/2"		180-180	180-180	350	120-180
8	Large with long corner radius		180-240	210	350	120

■ Threading, Grooving, and Cut-Off

						
	LT	Tap/Thread	WOT	Tap/Thread	Superlat	ProGroove
Insert	180-180	180-120	120-120	180-120	120-120	180-120
Toolholder	120-120	120-120	120-120	120-120	120-120	120-120

■ WIDIA™ Turning Solutions

			
	Inserts in Manticore Headstock	Fortus™	Tool for Small Hole Boring
Insert	120-120	120-120	120-120

Step 2 • Select Application and Clamping System
External Mounting


			B-Style Clamping	P-Style Clamping	Rappaport C-Style Clamping	S-Style Clamping	Profile C-Style Clamping
C Flankland 30°		external	128-C-16	128-C20	128-C20	128-C16	-
B Flankland 30°		external	114	128-C24	128-C20	128-C16	-
E Flank		external	110	-	128	-	128-C16
G Square 30°		external	128-C16	128-C20	128-C20	116	-
F Taperland 30°		external	110	128-C16	128-C20	128-C16	-
H Flankland 30°		external	128-C20	-	-	116	-
I Top 30° with rounded corner angles		external	110	116	-	128-C16	-

Internal Mounting


			P-Style Clamping	S-Style Clamping	Rappaport C-Style Clamping	S-Style Clamping	Profile C-Style Clamping
C Flankland 30°		external	128	128	128	128-C16	-
B Flankland 30°		external	128-C20	-	128	128-C16	-
E Flank		external	-	-	-	-	-
G Square 30°		external	-	-	128-C20	-	-
F Taperland 30°		external	128	128	-	128-C16	128
H Flankland 30°		external	128	-	-	128-C16	-
I Top 30° with rounded corner angles		external	128	128	128	-	-



Turning • ISO Inserts

WIDIA Victory High-Performance Inserts	B3-B100
WIDIA VarTurn	D106-D140
Inserts for Machining Aluminum	D120-D127
Ceramic, PBN, and PCD Inserts	B155-B219

A Complete High-Performance Turning Portfolio • WIDIA™ Victory™

Specifically engineered multilayer coating provides high-speed capability for finishing to roughing operations. New geometries enhance chip control for better tool life and superior surface finishes.



Victory

- Market leading technology
- Longest tool life
- Higher productivity through increased speed capability

Steel and Stainless Steel Grades

- Reduced cycle times — high speed and feed capability
- Long tool life — new multilayer coating provides better wear resistance
- Finest cutting — smooth and accurate cutting surface
- Color layer is brown colored for easier wear detection

Post-cut treatment

- Improved edge toughness
- Long, predictable tool life
- Reduces depth of cut reworking
- Wide range of applications

New geometry
revolutionary system



Improved edge toughness

- Provides smooth outer surface to reduce forces, friction, and workpiece sticking

Post-cut grinding

- Provides accurate cutting surface

Alpha alumina layer

- Provides cutting strength at elevated speeds
- Higher productivity and dependability at high cutting temperatures

New WIDIA™ Victory™ grades and geometries are designed to offer better tool life and surface finishes.

.55-PS Geometry

- All .55-PS inserts are 6-flute inserts, there is a central flute in each application, especially for aerospace industry.
- Reduced cycle times — high speed and tool capability.
- Reduced cutting forces — improved dimensional control and reduced deflection.
- New chip-forming inserts — better chip control.
- Long tool life — new multilayer coating provides better wear resistance.
- Finer coating — smooth and secure coating surface.



.MS-MS Geometry

- High positive rake helps achieve improved tool life by reducing cutting forces and built-up chips when machining high temp alloys.
- Improved chip control and reduced crater wear due to proprietary chipbreakers with varying shapes and distances.
- Reduced thermal wear and cracking due to new sharp cutting edge with spherical edge treatment.
- Improved chipbreaking of various depths of cut due to variable land width, which improves impact strength.
- All MS-MS inserts are modified, which supports increased tool life due to the alteration of grinding abuse.



How Do Catalogue Numbers Work?

Each character in our catalog's number system has a specific half of that product. Use the following key column and corresponding images to easily identify what attributes apply.



C	N	M	G	12
Insert Shape	Insert Clearance Angle	Intersect Lines	Insert Feature	Size
H Hexagon 1/2"	A 1"	Intersections apply prior to alignment and rounding	H Hexagon 1/2"	Code for new cutting edge length
C Circle 1/2"	B 1"		C Circle 1/2"	mm 1 2 3 4 5 6 7 8 9
P Pentagon 1/2"	C 1"		P Pentagon 1/2"	1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00
R Round 1/2"	D 1"		R Round 1/2"	5.50 6.00 6.50 7.00 7.50 8.00 8.50 9.00 9.50
S Square 1/2"	E 1"		S Square 1/2"	10.00 10.50 11.00 11.50 12.00 12.50 13.00 13.50 14.00
T Triangle 1/2"	F 1"		T Triangle 1/2"	14.50 15.00 15.50 16.00 16.50 17.00 17.50 18.00 18.50
C Circle 1/2"	G 1"		C Circle 1/2"	19.00 19.50 20.00 20.50 21.00 21.50 22.00 22.50 23.00
C Circle 1/2"	H 1"		C Circle 1/2"	23.50 24.00 24.50 25.00 25.50 26.00 26.50 27.00 27.50
C Circle 1/2"	I 1"		C Circle 1/2"	28.00 28.50 29.00 29.50 30.00 30.50 31.00 31.50 32.00
C Circle 1/2"	J 1"		C Circle 1/2"	32.50 33.00 33.50 34.00 34.50 35.00 35.50 36.00 36.50
C Circle 1/2"	K 1"		C Circle 1/2"	37.00 37.50 38.00 38.50 39.00 39.50 40.00 40.50 41.00
C Circle 1/2"	L 1"		C Circle 1/2"	41.50 42.00 42.50 43.00 43.50 44.00 44.50 45.00 45.50
C Circle 1/2"	M 1"		C Circle 1/2"	46.00 46.50 47.00 47.50 48.00 48.50 49.00 49.50 50.00
C Circle 1/2"	N 1"		C Circle 1/2"	50.50 51.00 51.50 52.00 52.50 53.00 53.50 54.00 54.50
C Circle 1/2"	O 1"		C Circle 1/2"	55.00 55.50 56.00 56.50 57.00 57.50 58.00 58.50 59.00
C Circle 1/2"	P 1"		C Circle 1/2"	59.50 60.00 60.50 61.00 61.50 62.00 62.50 63.00 63.50
C Circle 1/2"	Q 1"		C Circle 1/2"	64.00 64.50 65.00 65.50 66.00 66.50 67.00 67.50 68.00
C Circle 1/2"	R 1"		C Circle 1/2"	68.50 69.00 69.50 70.00 70.50 71.00 71.50 72.00 72.50
C Circle 1/2"	S 1"		C Circle 1/2"	73.00 73.50 74.00 74.50 75.00 75.50 76.00 76.50 77.00
C Circle 1/2"	T 1"		C Circle 1/2"	77.50 78.00 78.50 79.00 79.50 80.00 80.50 81.00 81.50
C Circle 1/2"	U 1"		C Circle 1/2"	82.00 82.50 83.00 83.50 84.00 84.50 85.00 85.50 86.00
C Circle 1/2"	V 1"		C Circle 1/2"	86.50 87.00 87.50 88.00 88.50 89.00 89.50 90.00 90.50
C Circle 1/2"	W 1"		C Circle 1/2"	91.00 91.50 92.00 92.50 93.00 93.50 94.00 94.50 95.00
C Circle 1/2"	X 1"		C Circle 1/2"	95.50 96.00 96.50 97.00 97.50 98.00 98.50 99.00 99.50
C Circle 1/2"	Y 1"		C Circle 1/2"	100.00 100.50 101.00 101.50 102.00 102.50 103.00 103.50 104.00
C Circle 1/2"	Z 1"		C Circle 1/2"	104.50 105.00 105.50 106.00 106.50 107.00 107.50 108.00 108.50
C Circle 1/2"	AA 1"		C Circle 1/2"	109.00 109.50 110.00 110.50 111.00 111.50 112.00 112.50 113.00
C Circle 1/2"	AB 1"		C Circle 1/2"	113.50 114.00 114.50 115.00 115.50 116.00 116.50 117.00 117.50
C Circle 1/2"	AC 1"		C Circle 1/2"	118.00 118.50 119.00 119.50 120.00 120.50 121.00 121.50 122.00
C Circle 1/2"	AD 1"		C Circle 1/2"	122.50 123.00 123.50 124.00 124.50 125.00 125.50 126.00 126.50
C Circle 1/2"	AE 1"		C Circle 1/2"	127.00 127.50 128.00 128.50 129.00 129.50 130.00 130.50 131.00
C Circle 1/2"	AF 1"		C Circle 1/2"	131.50 132.00 132.50 133.00 133.50 134.00 134.50 135.00 135.50
C Circle 1/2"	AG 1"		C Circle 1/2"	136.00 136.50 137.00 137.50 138.00 138.50 139.00 139.50 140.00
C Circle 1/2"	AH 1"		C Circle 1/2"	140.50 141.00 141.50 142.00 142.50 143.00 143.50 144.00 144.50
C Circle 1/2"	AI 1"		C Circle 1/2"	145.00 145.50 146.00 146.50 147.00 147.50 148.00 148.50 149.00
C Circle 1/2"	AJ 1"		C Circle 1/2"	149.50 150.00 150.50 151.00 151.50 152.00 152.50 153.00 153.50
C Circle 1/2"	AK 1"		C Circle 1/2"	154.00 154.50 155.00 155.50 156.00 156.50 157.00 157.50 158.00
C Circle 1/2"	AL 1"		C Circle 1/2"	158.50 159.00 159.50 160.00 160.50 161.00 161.50 162.00 162.50
C Circle 1/2"	AM 1"		C Circle 1/2"	163.00 163.50

Victory Trapezoids/Wear Resistance



W1-Groove for Steel

- Two grooves and more insert geometries for use in roughing to finishing operations
- Increases cutting speed while reducing tool wear



W1-Groove for Cast Iron

- Two grooves increase all of these tool performance parameters
- Increases tool life by 20% and increases tool life by 20% by increasing tool life by 20% by increasing tool life by 20%



W1-Groove for Stainless Steel

- Two grooves increase all of these tool performance parameters
- Increases tool life by 20% and increases tool life by 20% by increasing tool life by 20%



W1-Groove for High Temp Alloys

- Two grooves increase all of these tool performance parameters
- Increases tool life by 20% and increases tool life by 20% by increasing tool life by 20%

Positive and Negative Inserts

Positive Inserts



- Positive inserts are the best choice for all turning and drilling operations
- Increases tool life by 20% and increases tool life by 20% by increasing tool life by 20%

Negative Inserts



- Negative inserts are the best choice for all turning and drilling operations
- Increases tool life by 20% and increases tool life by 20% by increasing tool life by 20%

Geometric Inserts



- Geometric inserts are the best choice for all turning and drilling operations
- Increases tool life by 20% and increases tool life by 20% by increasing tool life by 20%

PCBN and PCD Inserts



- PCBN and PCD inserts are the best choice for all turning and drilling operations
- Increases tool life by 20% and increases tool life by 20% by increasing tool life by 20%

Insert Selection System

How To Use

The WIDIA Insert Selection System enables choosing and specifying the most productive tool to suit an application. Tool recommendations are based on all workplace material groups, specifying selection accuracy.

Example

The workplace material groups

■ Step 1 • Select the insert geometry

Given: shaft of cast iron (EN-GT)
Feed: 0.2mm (0.008")
Unknown: insert geometry
Solution: 40°

■ Step 2 • Select the grade

Given: cutting conditions
Apply maximum ad. 
Geometry: 40°
Unknown: grade
Solution: WDT12T™

■ Step 3 • Select the cutting speed

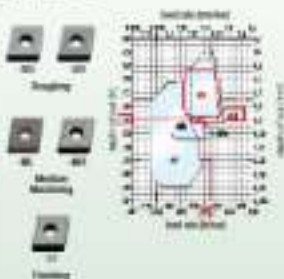
Given: grade WDT12T™ 
Cutting conditions
Unknown: cutting speed
Solution: 120 m/min

Need help in selecting a product?

Additional information can be obtained by contacting
the WIDIA Customer Application Support Team.
Go to widia.com for your country's phone number.

Step 1 • Select the insert geometry

Negative Inserts



	Steel
	Aluminum Alloy
	Cast Iron
	Non-ferrous
	High-temp alloy
	Exhaust/Alumina

Step 2 • Select the grade

Cutting condition		Negative Insert Geometry					Positive Insert Geometry		
		P1	SE	SE1	SE2	P2	SE	SE1	
Inserts: Interrupted cut		WF10CT	WF10CT	WF10CT	WF10CT	WF10CT	WF10CT	WF10CT	
Light interrupted cut		WF10CT	WF10CT	WF10CT	WF10CT	WF10CT	WF10CT	WF10CT	
Light interrupted cut, feeding, or turning rate		WF10CT	WF10CT	WF10CT	WF10CT	WF10CT	WF10CT	WF10CT	
Smooth cut, wet break surface		WF10CT	WF10CT	WF10CT	WF10CT	WF10CT	WF10CT	WF10CT	

Step 3 • Selecting the cutting speed

Low Carbon (0.2% C) and Free-Machining Steel		speed - m/min										Starting Condition
material group	grade	100	150	200	250	300	350	400	450	500	550	600
	WF10CT											100
	WF10CT											150
	WF10CT											200
	WF10CT											250

Widia Material Group Selection Guide
 To optimize speed recommendations, selected subgroups have been added to each of the six principal material groups.

material	material group (all grades)	number of material subgroups
steel		1-6
aluminum alloy		1-3
cast iron		1-3
non-ferrous materials		1-6
high-temp alloy		1-4
hardness materials		1

Step 1 • Select the insert geometry

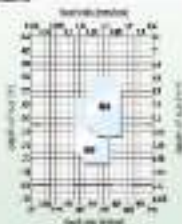
Negative Wiper Inserts



Negative Wiper



Finishing Wiper



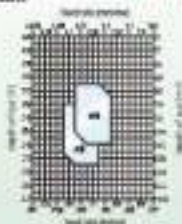
Positive Wiper Inserts



Positive Wiper



Finishing Wiper



Step 2 • Select the grade

Cutting conditions		Negative Insert Geometry		Positive Insert Geometry	
		WN	FW	PW	FW
Steady interrupted cut	1	WN101	WN101	—	WN101
Light interrupted cut	2	WN101	WN101	WN101	WN101
Heavy depth of cut, cutting at high speed	3	WN101	WN101	WN101	WN101
Intermittent, unsteady cutting	4	WN101	WN101	WN101	WN101

Step 1 • Select the insert geometry

Negative Inserts



Negative



Negative



Negative



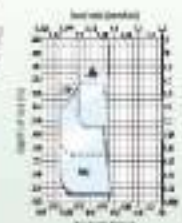
Positive Inserts



Positive



Positive



Step 2 • Select the grade

Cutting conditions		Negative Insert Geometry					Positive Insert Geometry		
		NI	PI	NI	PI	PI	PI	PI	PI
Steady interrupted cut	1	WN101	WN101	WN101	WN101	WN101	WN101	WN101	WN101
Light interrupted cut	2	WN101	WN101	WN101	WN101	WN101	WN101	WN101	WN101
Heavy depth of cut, cutting at high speed	3	WN101	WN101	WN101	WN101	WN101	WN101	WN101	WN101
Intermittent, unsteady cutting	4	WN101	WN101	WN101	WN101	WN101	WN101	WN101	WN101

(continued)

Step 3 • Select the cutting speed - comment
Low Carbon (0.25% C) and Free-Machining Steel

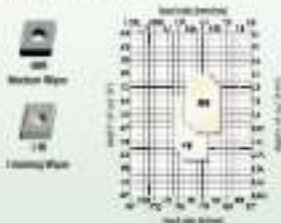
speed - m/min

Starting Conditions ⓘ

material group	grade	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	375	390	405	420	435	450	465	480	495	510	525	540	555	570	585	600	615	630	645	660	675	690	705	720	735	750	765	780	795	810	825	840	855	870	885	900	915	930	945	960	975	990	1005	1020	1035	1050	1065	1080	1095	1110	1125	1140	1155	1170	1185	1200	1215	1230	1245	1260	1275	1290	1305	1320	1335	1350	1365	1380	1395	1410	1425	1440	1455	1470	1485	1500	1515	1530	1545	1560	1575	1590	1605	1620	1635	1650	1665	1680	1695	1710	1725	1740	1755	1770	1785	1800	1815	1830	1845	1860	1875	1890	1905	1920	1935	1950	1965	1980	1995	2010	2025	2040	2055	2070	2085	2100	2115	2130	2145	2160	2175	2190	2205	2220	2235	2250	2265	2280	2295	2310	2325	2340	2355	2370	2385	2400	2415	2430	2445	2460	2475	2490	2505	2520	2535	2550	2565	2580	2595	2610	2625	2640	2655	2670	2685	2700	2715	2730	2745	2760	2775	2790	2805	2820	2835	2850	2865	2880	2895	2910	2925	2940	2955	2970	2985	3000	3015	3030	3045	3060	3075	3090	3105	3120	3135	3150	3165	3180	3195	3210	3225	3240	3255	3270	3285	3300	3315	3330	3345	3360	3375	3390	3405	3420	3435	3450	3465	3480	3495	3510	3525	3540	3555	3570	3585	3600	3615	3630	3645	3660	3675	3690	3705	3720	3735	3750	3765	3780	3795	3810	3825	3840	3855	3870	3885	3900	3915	3930	3945	3960	3975	3990	4005	4020	4035	4050	4065	4080	4095	4110	4125	4140	4155	4170	4185	4200	4215	4230	4245	4260	4275	4290	4305	4320	4335	4350	4365	4380	4395	4410	4425	4440	4455	4470	4485	4500	4515	4530	4545	4560	4575	4590	4605	4620	4635	4650	4665	4680	4695	4710	4725	4740	4755	4770	4785	4800	4815	4830	4845	4860	4875	4890	4905	4920	4935	4950	4965	4980	4995	5010	5025	5040	5055	5070	5085	5100	5115	5130	5145	5160	5175	5190	5205	5220	5235	5250	5265	5280	5295	5310	5325	5340	5355	5370	5385	5400	5415	5430	5445	5460	5475	5490	5505	5520	5535	5550	5565	5580	5595	5610	5625	5640	5655	5670	5685	5700	5715	5730	5745	5760	5775	5790	5805	5820	5835	5850	5865	5880	5895	5910	5925	5940	5955	5970	5985	6000	6015	6030	6045	6060	6075	6090	6105	6120	6135	6150	6165	6180	6195	6210	6225	6240	6255	6270	6285	6300	6315	6330	6345	6360	6375	6390	6405	6420	6435	6450	6465	6480	6495	6510	6525	6540	6555	6570	6585	6600	6615	6630	6645	6660	6675	6690	6705	6720	6735	6750	6765	6780	6795	6810	6825	6840	6855	6870	6885	6900	6915	6930	6945	6960	6975	6990	7005	7020	7035	7050	7065	7080	7095	7110	7125	7140	7155	7170	7185	7200	7215	7230	7245	7260	7275	7290	7305	7320	7335	7350	7365	7380	7395	7410	7425	7440	7455	7470	7485	7500	7515	7530	7545	7560	7575	7590	7605	7620	7635	7650	7665	7680	7695	7710	7725	7740	7755	7770	7785	7800	7815	7830	7845	7860	7875	7890	7905	7920	7935	7950	7965	7980	7995	8010	8025	8040	8055	8070	8085	8100	8115	8130	8145	8160	8175	8190	8205	8220	8235	8250	8265	8280	8295	8310	8325	8340	8355	8370	8385	8400	8415	8430	8445	8460	8475	8490	8505	8520	8535	8550	8565	8580	8595	8610	8625	8640	8655	8670	8685	8700	8715	8730	8745	8760	8775	8790	8805	8820	8835	8850	8865	8880	8895	8910	8925	8940	8955	8970	8985	9000	9015	9030	9045	9060	9075	9090	9105	9120	9135	9150	9165	9180	9195	9210	9225	9240	9255	9270	9285	9300	9315	9330	9345	9360	9375	9390	9405	9420	9435	9450	9465	9480	9495	9510	9525	9540	9555	9570	9585	9600	9615	9630	9645	9660	9675	9690	9705	9720	9735	9750	9765	9780	9795	9810	9825	9840	9855	9870	9885	9900	9915	9930	9945	9960	9975	9990	10005	10020	10035	10050	10065	10080	10095	10110	10125	10140	10155	10170	10185	10200	10215	10230	10245	10260	10275	10290	10305	10320	10335	10350	10365	10380	10395	10410	10425	10440	10455	10470	10485	10500	10515	10530	10545	10560	10575	10590	10605	10620	10635	10650	10665	10680	10695	10710	10725	10740	10755	10770	10785	10800	10815	10830	10845	10860	10875	10890	10905	10920	10935	10950	10965	10980	10995	11010	11025	11040	11055	11070	11085	11100	11115	11130	11145	11160	11175	11190	11205	11220	11235	11250	11265	11280	11295	11310	11325	11340	11355	11370	11385	11400	11415	11430	11445	11460	11475	11490	11505	11520	11535	11550	11565	11580	11595	11610	11625	11640	11655	11670	11685	11700	11715	11730	11745	11760	11775	11790	11805	11820	11835	11850	11865	11880	11895	11910	11925	11940	11955	11970	11985	12000	12015	12030	12045	12060	12075	12090	12105	12120	12135	12150	12165	12180	12195	12210	12225	12240	12255	12270	12285	12300	12315	12330	12345	12360	12375	12390	12405	12420	12435	12450	12465	12480	12495	12510	12525	12540	12555	12570	12585	12600	12615	12630	12645	12660	12675	12690	12705	12720	12735	12750	12765	12780	12795	12810	12825	12840	12855	12870	12885	12900	12915	12930	12945	12960	12975	12990	13005	13020	13035	13050	13065	13080	13095	13110	13125	13140	13155	13170	13185	13200	13215	13230	13245	13260	13275	13290	13305	13320	13335	13350	13365	13380	13395	13410	13425	13440	13455	13470	13485	13500	13515	13530	13545	13560	13575	13590	13605	13620	13635	13650	13665	13680	13695	13710	13725	13740	13755	13770	13785	13800	13815	13830	13845	13860	13875	13890	13905	13920	13935	13950	13965	13980	13995	14010	14025	14040	14055	14070	14085	14100	14115	14130	14145	14160	14175	14190	14205	14220	14235	14250	14265	14280	14295	14310	14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Step 1 • Select the insert geometry

Negative Wiper Inserts



■ Step 2 • Select the grade (insert)

cutting condition		Negative Insert Geometry					
		DT	AT	MT	UM	ST	UT
heavily interrupted cut		W100T	W100T	W100T	W100T	-	W100T
lightly interrupted cut		W100T	W100T	W100T	W100T	W100T	W100T
steady depth of cut turning, or facing		W100T	W100T	W100T	W100T	W100T	W100T
conventional dry machining		W100T	W100T	W100T	W100T	-	W100T

cutting condition		Positive Insert Geometry		
		DT	MT	UT
heavily interrupted cut		W100T	W100T	W100T
lightly interrupted cut		W100T	W100T	W100T
steady depth of cut turning, or facing		W100T	W100T	W100T
conventional dry machining		W100T	W100T	W100T

■ Step 3 • Select the cutting speed

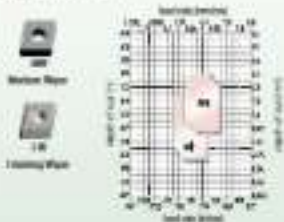
Austempered Martensitic Steel		speed – m/min											Working Conditions
material grade	grade	10	15	20	25	30	35	40	45	50	55	60	notes
W100T	W100T												10
	W100T												15
	W100T												20
	W100T												25
	W100T												30

Austempered Martensitic Steel		speed – m/min											Working Conditions
material grade	grade	10	15	20	25	30	35	40	45	50	55	60	notes
W100T	W100T												10
	W100T												15
	W100T												20
	W100T												25
	W100T												30

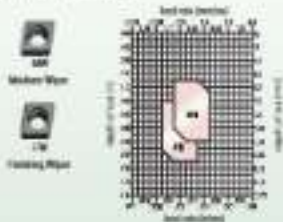
Austempered Martensitic Steel, High-Purity, and Austempered Steel		speed – m/min											Working Conditions
material grade	grade	10	15	20	25	30	35	40	45	50	55	60	notes
W100T	W100T												10
	W100T												15
	W100T												20
	W100T												25
	W100T												30

Step 1 • Select the insert geometry

Negative Wiper Inserts



Positive Wiper Inserts

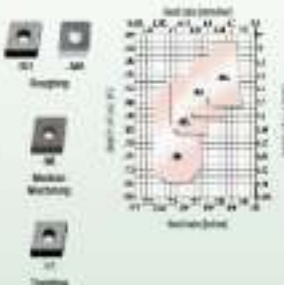


Step 2 • Select the grade

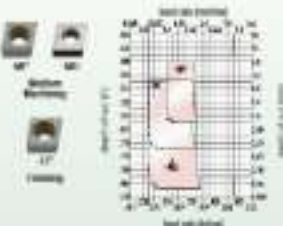
Cutting Condition		Negative Insert Geometry		Positive Insert Geometry	
		1.0	1.6	1.0	1.6
Insert interrupted cut		—	—	—	—
Stable interrupted cut		W0201	W0201	W0201	W0201
Stable depth of cut, cutting at high feed		W0201	W0201	W0201	W0201
Stable cut, low feed, low feed		W0201	W0201	W0201	W0201

Step 1 • Select the insert geometry

Negative Inserts



Positive Inserts



(continued)

Step 2 • Select the grade insert

cutting condition		Magnum Insert Geometry				Ductile Insert Geometry		
		17	45	135	40	17	45	40°
heavily interrupted cut	1/2	W1001	W1002	W1003	W1007	W1001	W1002	W1003
lightly interrupted cut	1/4	W1001	W1003	W1007	W1007	W1001	W1002	W1003
constant depth of cut, cutting at high speed	1	W1001	W1003	W1007	W1007	W1001	W1002	W1003
conventional jet introduction	0	W1001	W1002	W1007	W1007	W1001	W1002 W1007	W1003

Step 3 • Select the cutting speed

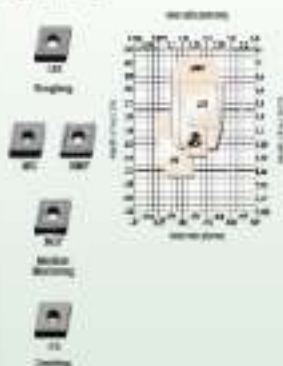
Gray Cast Iron		speed - m/min												Starting Conditions
material grade	grade	10	15	20	25	30	35	40	45	50	55	60	65	width
B1	W1001													100
	W1002													50
	W1007													50

Ductile, Compacted Graphite, and Malleable Cast Irons (200 MPa tensile strength)		speed - m/min												Starting Conditions
material grade	grade	10	15	20	25	30	35	40	45	50	55	60	65	width
B2	W1001													100
	W1002													50
	W1007													100

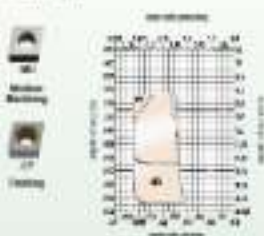
Ductile, Malleable, and Noncompacted Cast Irons (150 MPa tensile strength)		speed - m/min												Starting Conditions
material grade	grade	10	15	20	25	30	35	40	45	50	55	60	65	width
B3	W1001													100
	W1002													100
	W1007													100

Step 1 • Select the insert geometry

Negative Inserts



Positive Inserts



Step 2 • Select the grade

Cutting condition		Negative Insert Geometry			Positive Insert Geometry		
		75	60°/90°	60	60	75	60
Steady interrupted cut	1	W100T	W100T	W100T	W100T / W100C	W100T / W100C	W100T
Lightly interrupted cut	2	W100T	W100T	W100T	W100T / W100C	W100T	W100T
Working depth about equaling or exceeding	3	W100T	W100T	W100T	W100T	W100T	W100T
Interrupted, per formed surface	4	W100T / W100C	W100T / W100C	W100T	W100T	W100T	W100T

(continued)

Step 3 • Select the cutting speed - m/min
Iron Based, Cast Stainless Alloys
 (20-250 MPa) (A1-A5)

material group	grade	speed - m/min											Starting Conditions
		15	30	45	60	75	90	105	120	135	150	165	
	W1007		↔										white
	W1007			↔									white
	W1007			↔									white
	W1007			↔									white
	W1007/W1007T		↔										white

Cast Steels, Heat Treatment Alloys (20-400 MPa) (A1-A5)

material group	grade	speed - m/min											Starting Conditions
		15	30	45	60	75	90	105	120	135	150	165	
	W1007		↔										white
	W1007			↔									white
	W1007			↔									white
	W1007			↔									white
	W1007/W1007T		↔										white

Nickel Based, Cast Stainless Alloys
 (40-470 MPa) (A1-A5)

material group	grade	speed - m/min											Starting Conditions
		15	30	45	60	75	90	105	120	135	150	165	
	W1007		↔										white
	W1007			↔									white
	W1007			↔									white
	W1007			↔									white
	W1007/W1007T		↔										white

Titanium and Titanium Alloys (20-400 MPa) (A1-A5)

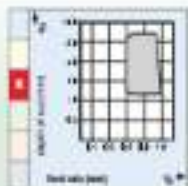
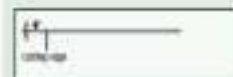
material group	grade	speed - m/min											Starting Conditions
		15	30	45	60	75	90	105	120	135	150	165	
	W1007		↔										white
	W1007			↔									white
	W1007/W1007T		↔										white

■ Negative Inserts

MA



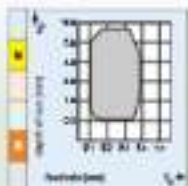
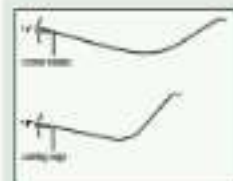
Flat top geometry for maximum wear life. For finishing for roughing applications.



NM



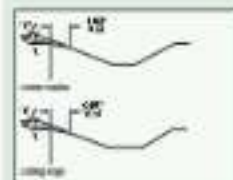
For medium chip removing of tough and medium work materials and general finish steps. Maximum flexibility for versatile to perform to order.



4



Sharp leading geometry for light to medium chip and finishing. Shallow back faces and front angles for stability. Well suited for positive, abrasive operations.



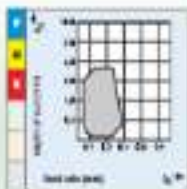
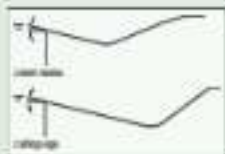
(continued)

Negative Inserts - product

22



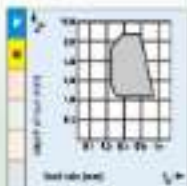
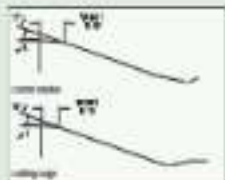
For best cutting performance, insert is suited for very good chip control, especially at low depths of cut.



65



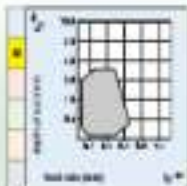
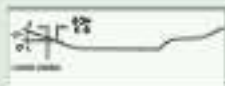
Tough turning geometry with chip control looking to the medium duty range. Positive rake angle favors cutting heavy, reducing power requirements. Used at low feeds and shallow cuts.



CT



Designed for smooth easy turning. More chip breaking action helps chip, low chip distribution of the cut results in good chip control.



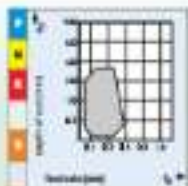
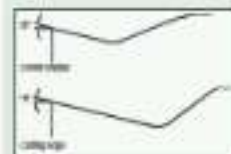
[continued]

■ Negative inserts: continued

IS



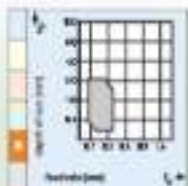
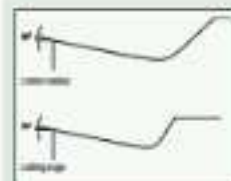
For best bending, underboring results in excessive vibration.
The geometry tested: versatility of low depths of cut.



IS



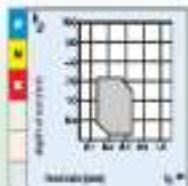
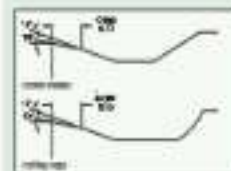
For best bending, underboring. General purpose with positive cutting edge. Slightly
suitable for high speed. Also: More balanced against the ground conditions with
just a slight bias for improved edge strength and stability.



FW



When geometry for bending, when parts without break is needed using high feed rates.
Indicates to high performance drilling.



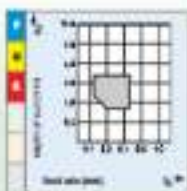
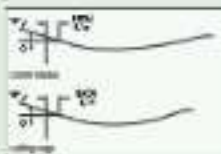
(continued)

• Negative Inserts (continued)

MG



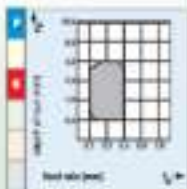
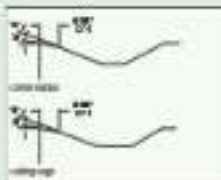
1 to light machining to light hogging



ML



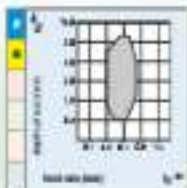
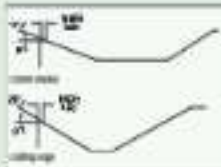
1 to finishing to medium hogging with a negative, stable cutting edge



MR



1 to medium to light hogging of ducts, difficult to machine high alloy steels, and titanium-aluminum. High strength to avoid brittle shattering.



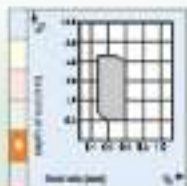
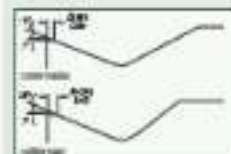
(continued)

■ Negative inserts: *continued*

M5



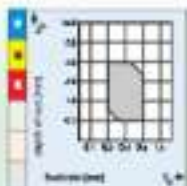
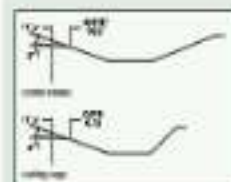
For medium machining in high-speed steels. Offers a robust finished edge perpendicular to the cutting edge trajectory.



MW



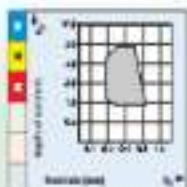
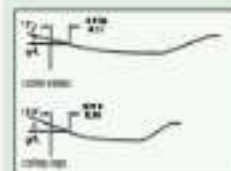
When geometry is right for medium turning with high feed rates. Low friction on high axial rigidity with full corner radii to produce smooth surface finish.



RH



For medium duty & light duty. Outstanding chip control. High edge strength for interrupted cuts, hogging, etc. Full corner radii to avoid burrs, good surface finish, and coolant.



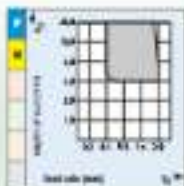
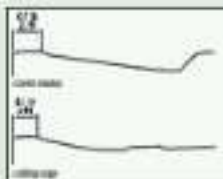
(continued)

Negative Inserts (continued)

G2



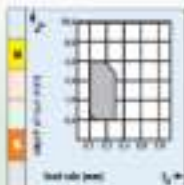
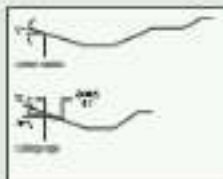
A super roughing geometry. The G2 has a strong cutting edge for superior high cutting speeds in roughing applications. The positive rake geometry removes chips.



G2



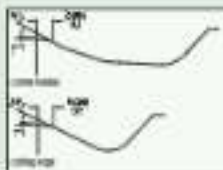
For finishing with a positive cutting edge for superior finishing results and superior surface quality.



G2



The modern daily turning revolution. G2's cutting edge is designed for superior productivity, roughing with finishing, finish or profile or super turning. Good dimensional accuracy. For all steel materials and stainless steels.



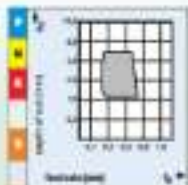
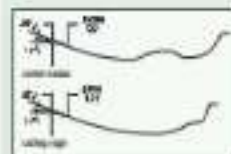
(continued)

Negative Inserts: continued

UR



High rigidity geometry will result in high accuracy and improved surface finish for increased tool life. Double geometry reduces cutting forces and improves depth of cut and chip formation. Ideally suited for difficult steel applications and for rough turning of steel.

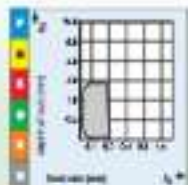


Positive Inserts

2



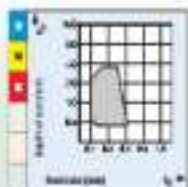
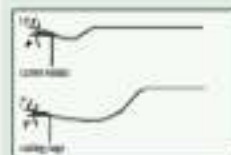
Deep chips for finish turning. Good chip control with long reach chip formation. High dimensional accuracy and smooth surface finishes. Insert with 20° corner radius provides good results at all rates.



41



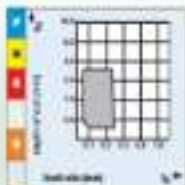
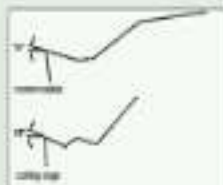
Preferred for light to medium duty machining. Low cutting forces with reduced power requirements due to positive rake angles. Good chip control over variable ranges. Also used in short chippping and bro.



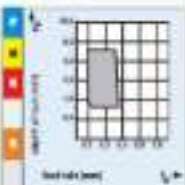
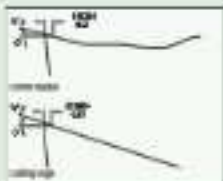
(continued)

• Positive Inserts - *positive*
CP

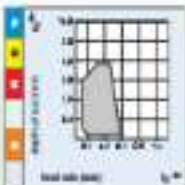

For finishing operations turning operations with optimally rounded and stable contact cutting conditions and long-life inserts.


MP


For medium rough turning with reduced cutting forces and improved chip control for high feed rates. Suitable for high-speed external and gear applications.


NP


It enables external grinding with a soft cutting action due to its positive geometry. It is suitable for applications with low feed rates for turning external components and for heavy applications.





Coatings provide high speed capability and are engineered for brocking to heavy roughing

- TiAlN
- Diamond Coat
- Coat 100
- Nano Ceramic
- High Temp AlTiN
- Diamond/AlTiN

Grade	Coating	Grade Description	Machining Regime									
			15	10	10	25	20	20	40	40		
NP150CT		Coated inserts: NP150CT010 – 10-15% Al ₂ O ₃ , TiAlN. Good balance of wear resistance and toughness properties. High productivity machining on medium to light interrupted cuts for steel.	•									
	ISO P10											
NP150CT		Coated inserts: NP150CT010 – 10-15% Al ₂ O ₃ , TiAlN. Good toughness properties. Excellent for steel on the steel machining. High productivity would be achieved for all but the heaviest interrupted cuts.	•									
	ISO P10											
NP150CT		Coated inserts: NP150CT010 – 10-15% Al ₂ O ₃ , TiAlN. Designed for all roughing and heavy roughing operations. Excellent for interrupted and continuous cuts.	•									
	ISO P10											
V150CT		Coated inserts: V150CT010 – 10-15% Al ₂ O ₃ , TiAlN. High degree of wear resistance and good toughness to enable for fast cutting on dry and dry to brocking to medium turning applications.	•									
	ISO P10											
V150CT		Coated inserts: V150CT010 – 10-15% Al ₂ O ₃ , TiAlN. Good balance of wear resistance and toughness properties. Light and medium turning for stainless steels and cast steels.	•									
	ISO P10											
V150CT		Coated inserts: V150CT010 – 10-15% Al ₂ O ₃ , TiAlN. Good toughness and wear resistance. Excellent for turning operations with light and heavy interrupted cuts.	•									
	ISO P10											



Coatings provide high-speed capability and are engineered for freedom to heavy roughing.

- TiAlN
- Diamond-Like
- TiAlN
- TiN
- High Temp. TiAlN
- Diamond-Like

Grade	Coating	Grade Description	Feed mm/min										Spindle rpm									
			10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
Y80		Coated carbide. Ideal for both hard and soft materials. Best economic value. Light and medium machining. For cast iron, steel, stainless steel, titanium, nickel, and aluminum.																				
	YW 802																					
Y100		Coated carbide. Medium machining. For steel.																				
	YW 102																					
Y15		Coated carbide. Light and medium machining. For steel. Best used at low cutting speeds. Not for severe conditions.																				
	YW 152																					
Y15-0		Coated. Light machining. Good for both hard and soft materials. For high cutting speeds. For steel and cast iron. Not recommended for high cutting speeds on cast iron and aluminum.																				
	YW 150																					

NOVO KNOWS CAD/CAM

With the addition of NOVO™ to your team, your CAD/CAM capabilities become much more accurate, streamlined, and productive.

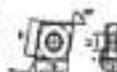
Before NOVO: The programmer would be in their CAD/CAM software, programming a part using the outdated method of finding a tool in a catalogue, and then manually inputting the tooling information from the catalogue into the CAD/CAM software.

The concern is that assumptions are made, and only partial tooling information is entered.

With NOVO: The powerful digital intelligence of NOVO not only helps the programmer find the right tool for the manufacturing job, but also automatically integrates all the tooling data into a complete CAD/CAM solution. The integration of all the tooling data increases the viability of the part being programmed, and is delivered quickly – saving you time.

NOVO can ensure you have the right tools on your machines, in the right sequence. Resulting in flawless execution that accelerates every job, and maximizes every shift. widia.com/novo





4 Reproduction

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463																																					

■CCNET-41

2017 calendar quarter	Q1	Q2	Q3	Q4	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1971	1970	1969	1968	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	1957	1956	1955	1954	1953	1952	1951	1950	1949	1948	1947	1946	1945	1944	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929	1928	1927	1926	1925	1924	1923	1922	1921	1920	1919	1918	1917	1916	1915	1914	1913	1912	1911	1910	1909	1908	1907	1906	1905	1904	1903	1902	1901	1900	1899	1898	1897	1896	1895	1894	1893	1892	1891	1890	1889	1888	1887	1886	1885	1884	1883	1882	1881	1880	1879	1878	1877	1876	1875	1874	1873	1872	1871	1870	1869	1868	1867	1866	1865	1864	1863	1862	1861	1860	1859	1858	1857	1856	1855	1854	1853	1852	1851	1850	1849	1848	1847	1846	1845	1844	1843	1842	1841	1840	1839	1838	1837	1836	1835	1834	1833	1832	1831	1830	1829	1828	1827	1826	1825	1824	1823	1822	1821	1820	1819	1818	1817	1816	1815	1814	1813	1812	1811	1810	1809	1808	1807	1806	1805	1804	1803	1802	1801	1800	1799	1798	1797	1796	1795	1794	1793	1792	1791	1790	1789	1788	1787	1786	1785	1784	1783	1782	1781	1780	1779	1778	1777	1776	1775	1774	1773	1772	1771	1770	1769	1768	1767	1766	1765	1764	1763	1762	1761	1760	1759	1758	1757	1756	1755	1754	1753	1752	1751	1750	1749	1748	1747	1746	1745	1744	1743	1742	1741	1740	1739	1738	1737	1736	1735	1734	1733	1732	1731	1730	1729	1728	1727	1726	1725	1724	1723	1722	1721	1720	1719	1718	1717	1716	1715	1714	1713	1712	1711	1710	1709	1708	1707	1706	1705	1704	1703	1702	1701	1700	1699	1698	1697	1696	1695	1694	1693	1692	1691	1690	1689	1688	1687	1686	1685	1684	1683	1682	1681	1680	1679	1678	1677	1676	1675	1674	1673	1672	1671	1670	1669	1668	1667	1666	1665	1664	1663	1662	1661	1660	1659	1658	1657	1656	1655	1654	1653	1652	1651	1650	1649	1648	1647	1646	1645	1644	1643	1642	1641	1640	1639	1638	1637	1636	1635	1634	1633	1632	1631	1630	1629	1628	1627	1626	1625	1624	1623	1622	1621	1620	1619	1618	1617	1616	1615	1614	1613	1612	1611	1610	1609	1608	1607	1606	1605	1604	1603	1602	1601	1600	1599	1598	1597	1596	1595	1594	1593	1592	1591	1590	1589	1588	1587	1586	1585	1584	1583	1582	1581	1580	1579	1578	1577	1576	1575	1574	1573	1572	1571	1570	1569	
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● **CCMT-10**

[illegible]


 • Best choice
 • Alternative choice

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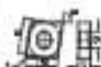

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* Dimension
inches and millimeters

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4 Reproduction

2017 analysis number	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																																																																																																																																																																																																																																																																						
2017-001	12.1	13.2	14.3	15.4	16.5	17.6	18.7	19.8	20.9	21.0	22.1	23.2	24.3	25.4	26.5	27.6	28.7	29.8	30.9	31.0	32.1	33.2	34.3	35.4	36.5	37.6	38.7	39.8	40.9	41.0	42.1	43.2	44.3	45.4	46.5	47.6	48.7	49.8	50.9	51.0	52.1	53.2	54.3	55.4	56.5	57.6	58.7	59.8	60.9	61.0	62.1	63.2	64.3	65.4	66.5	67.6	68.7	69.8	70.9	71.0	72.1	73.2	74.3	75.4	76.5	77.6	78.7	79.8	80.9	81.0	82.1	83.2	84.3	85.4	86.5	87.6	88.7	89.8	90.9	91.0	92.1	93.2	94.3	95.4	96.5	97.6	98.7	99.8	100.9	101.0	102.1	103.2	104.3	105.4	106.5	107.6	108.7	109.8	110.9	111.0	112.1	113.2	114.3	115.4	116.5	117.6	118.7	119.8	120.9	121.0	122.1	123.2	124.3	125.4	126.5	127.6	128.7	129.8	130.9	131.0	132.1	133.2	134.3	135.4	136.5	137.6	138.7	139.8	140.9	141.0	142.1	143.2	144.3	145.4	146.5	147.6	148.7	149.8	150.9	151.0	152.1	153.2	154.3	155.4	156.5	157.6	158.7	159.8	160.9	161.0	162.1	163.2	164.3	165.4	166.5	167.6	168.7	169.8	170.9	171.0	172.1	173.2	174.3	175.4	176.5	177.6	178.7	179.8	180.9	181.0	182.1	183.2	184.3	185.4	186.5	187.6	188.7	189.8	190.9	191.0	192.1	193.2	194.3	195.4	196.5	197.6	198.7	199.8	200.9	201.0	202.1	203.2	204.3	205.4	206.5	207.6	208.7	209.8	210.9	211.0	212.1	213.2	214.3	215.4	216.5	217.6	218.7	219.8	220.9	221.0	222.1	223.2	224.3	225.4	226.5	227.6	228.7	229.8	230.9	231.0	232.1	233.2	234.3	235.4	236.5	237.6	238.7	239.8	240.9	241.0	242.1	243.2	244.3	245.4	246.5	247.6	248.7	249.8	250.9	251.0	252.1	253.2	254.3	255.4	256.5	257.6	258.7	259.8	260.9	261.0	262.1	263.2	264.3	265.4	266.5	267.6	268.7	269.8	270.9	271.0	272.1	273.2	274.3	275.4	276.5	277.6	278.7	279.8	280.9	281.0	282.1	283.2	284.3	285.4	286.5	287.6	288.7	289.8	290.9	291.0	292.1	293.2	294.3	295.4	296.5	297.6	298.7	299.8	300.9	301.0	302.1	303.2	304.3	305.4	306.5	307.6	308.7	309.8	310.9	311.0	312.1	313.2	314.3	315.4	316.5	317.6	318.7	319.8	320.9	321.0	322.1	323.2	324.3	325.4	326.5	327.6	328.7	329.8	330.9	331.0	332.1	333.2	334.3	335.4	336.5	337.6	338.7	339.8	340.9	341.0	342.1	343.2	344.3	345.4	346.5	347.6	348.7	349.8	350.9	351.0	352.1	353.2	354.3	355.4	356.5	357.6	358.7	359.8	360.9	361.0	362.1



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DO Contract Number	0	10	5	75	99	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099
Contract Number	0	10	5	75	99	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099



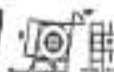
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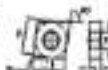


* For details
... consult the datasheet

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ISO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	122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Widia inserts
catalogue V2020

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

CM80-LF

ISO catalogue number	0	100	2	30	100	ISO catalogue number	0	100	2	30	100
CM80-LF0000	0.10	0.05	0.10	0.1	0.1	CM80-LF0000	0.10	0.05	0.10	0.1	0.1
CM80-LF0001	0.10	0.05	0.10	0.1	0.1	CM80-LF0001	0.10	0.05	0.10	0.1	0.1
CM80-LF0002	0.10	0.05	0.10	0.1	0.1	CM80-LF0002	0.10	0.05	0.10	0.1	0.1



CM80-LM

ISO catalogue number	0	100	2	30	100	ISO catalogue number	0	100	2	30	100
CM80-LM0000	0.10	0.05	0.10	0.1	0.1	CM80-LM0000	0.10	0.05	0.10	0.1	0.1
CM80-LM0001	0.10	0.05	0.10	0.1	0.1	CM80-LM0001	0.10	0.05	0.10	0.1	0.1
CM80-LM0002	0.10	0.05	0.10	0.1	0.1	CM80-LM0002	0.10	0.05	0.10	0.1	0.1



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7	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100		
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521																																																																															

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2018 Kategori	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1971	1970	1969	1968	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	1957	1956	1955	1954	1953	1952	1951	1950	1949	1948	1947	1946	1945	1944	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929	1928	1927	1926	1925	1924	1923	1922	1921	1920	1919	1918	1917	1916	1915	1914	1913	1912	1911	1910	1909	1908	1907	1906	1905	1904	1903	1902	1901	1900	1899	1898	1897	1896	1895	1894	1893	1892	1891	1890	1889	1888	1887	1886	1885	1884	1883	1882	1881	1880	1879	1878	1877	1876	1875	1874	1873	1872	1871	1870	1869	1868	1867	1866	1865	1864	1863	1862	1861	1860	1859	1858	1857	1856	1855	1854	1853	1852	1851	1850	1849	1848	1847	1846	1845	1844	1843	1842	1841	1840	1839	1838	1837	1836	1835	1834	1833	1832	1831	1830	1829	1828	1827	1826	1825	1824	1823	1822	1821	1820	1819	1818	1817	1816	1815	1814	1813	1812	1811	1810	1809	1808	1807	1806	1805	1804	1803	1802	1801	1800	1799	1798	1797	1796	1795	1794	1793	1792	1791	1790	1789	1788	1787	1786	1785	1784	1783	1782	1781	1780	1779	1778	1777	1776	1775	1774	1773	1772	1771	1770	1769	1768	1767	1766	1765	1764	1763	1762	1761	1760	1759	1758	1757	1756	1755	1754	1753	1752	1751	1750	1749	1748	1747	1746	1745	1744	1743	1742	1741	1740	1739	1738	1737	1736	1735	1734	1733	1732	1731	1730	1729	1728	1727	1726	1725	1724	1723	1722	1721	1720	1719	1718	1717	1716	1715	1714	1713	1712	1711	1710	1709	1708	1707	1706	1705	1704	1703	1702	1701	1700	1699	1698	1697	1696	1695	1694	1693	1692	1691	1690	1689	1688	1687	1686	1685	1684	1683	1682	1681	1680	1679	1678	1677	1676	1675	1674	1673	1672	1671	1670	1669	1668	1667	1666	1665	1664	1663	1662	1661	1660	1659	1658	1657	1656	1655	1654	1653	1652	1651	1650	1649	1648	1647	1646	1645	1644	1643	1642	1641	1640	1639	1638	1637	1636	1635	1634	1633	1632	1631	1630	1629	1628	1627	1626	1625	1624	1623	1622	1621	1620	1619	1618	1617	1616	1615	1614	1613	1612	1611	1610	1609	1608	1607	1606	1605	1604	1603	1602	1601	1600	1599	1598	1597	1596	1595	1594	1593	1592	1591	1590	1589	1588	1587	1586	1585	1584	1583	1582	1581	1580	1579	1578	1577	1576	1575	1574	1573	1572	1571	1570	1569	1568	1567	1566	1
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4 Inserts
1/4" wide inserts

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

■ CNMG 45

ISO colleges insert	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990	1000																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
CNMG450400	0.04	0.06	0.08	0.10	0.12	0.14	0.16	0.18	0.20	0.22	0.24	0.26	0.28	0.30	0.32	0.34	0.36	0.38	0.40	0.42	0.44	0.46	0.48	0.50	0.52	0.54	0.56	0.58	0.60	0.62	0.64	0.66	0.68	0.70	0.72	0.74	0.76	0.78	0.80	0.82	0.84	0.86	0.88	0.90	0.92	0.94	0.96	0.98	1.00	1.02	1.04	1.06	1.08	1.10	1.12	1.14	1.16	1.18	1.20	1.22	1.24	1.26	1.28	1.30	1.32	1.34	1.36	1.38	1.40	1.42	1.44	1.46	1.48	1.50	1.52	1.54	1.56	1.58	1.60	1.62	1.64	1.66	1.68	1.70	1.72	1.74	1.76	1.78	1.80	1.82	1.84	1.86	1.88	1.90	1.92	1.94	1.96	1.98	2.00	2.02	2.04	2.06	2.08	2.10	2.12	2.14	2.16	2.18	2.20	2.22	2.24	2.26	2.28	2.30	2.32	2.34	2.36	2.38	2.40	2.42	2.44	2.46	2.48	2.50	2.52	2.54	2.56	2.58	2.60	2.62	2.64	2.66	2.68	2.70	2.72	2.74	2.76	2.78	2.80	2.82	2.84	2.86	2.88	2.90	2.92	2.94	2.96	2.98	3.00	3.02	3.04	3.06	3.08	3.10	3.12	3.14	3.16	3.18	3.20	3.22	3.24	3.26	3.28	3.30	3.32	3.34	3.36	3.38	3.40	3.42	3.44	3.46	3.48	3.50	3.52	3.54	3.56	3.58	3.60	3.62	3.64	3.66	3.68	3.70	3.72	3.74	3.76	3.78	3.80	3.82	3.84	3.86	3.88	3.90	3.92	3.94	3.96	3.98	4.00	4.02	4.04	4.06	4.08	4.10	4.12	4.14	4.16	4.18	4.20	4.22	4.24	4.26	4.28	4.30	4.32	4.34	4.36	4.38	4.40	4.42	4.44	4.46	4.48	4.50	4.52	4.54	4.56	4.58	4.60	4.62	4.64	4.66	4.68	4.70	4.72	4.74	4.76	4.78	4.80	4.82	4.84	4.86	4.88	4.90	4.92	4.94	4.96	4.98	5.00	5.02	5.04	5.06	5.08	5.10	5.12	5.14	5.16	5.18	5.20	5.22	5.24	5.26	5.28	5.30	5.32	5.34	5.36	5.38	5.40	5.42	5.44	5.46	5.48	5.50	5.52	5.54	5.56	5.58	5.60	5.62	5.64	5.66	5.68	5.70	5.72	5.74	5.76	5.78	5.80	5.82	5.84	5.86	5.88	5.90	5.92	5.94	5.96	5.98	6.00	6.02	6.04	6.06	6.08	6.10	6.12	6.14	6.16	6.18	6.20	6.22	6.24	6.26	6.28	6.30	6.32	6.34	6.36	6.38	6.40	6.42	6.44	6.46	6.48	6.50	6.52	6.54	6.56	6.58	6.60	6.62	6.64	6.66	6.68	6.70	6.72	6.74	6.76	6.78	6.80	6.82	6.84	6.86	6.88	6.90	6.92	6.94	6.96	6.98	7.00	7.02	7.04	7.06	7.08	7.10	7.12	7.14	7.16	7.18	7.20	7.22	7.24	7.26	7.28	7.30	7.32	7.34	7.36	7.38	7.40	7.42	7.44	7.46	7.48	7.50	7.52	7.54	7.56	7.58	7.60	7.62	7.64	7.66	7.68	7.70	7.72	7.74	7.76	7.78	7.80	7.82	7.84	7.86	7.88	7.90	7.92	7.94	7.96	7.98	8.00	8.02	8.04	8.06	8.08	8.10	8.12	8.14	8.16	8.18	8.20	8.22	8.24	8.26	8.28	8.30	8.32	8.34	8.36	8.38	8.40	8.42	8.44	8.46	8.48	8.50	8.52	8.54	8.56	8.58	8.60	8.62	8.64	8.66	8.68	8.70	8.72	8.74	8.76	8.78	8.80	8.82	8.84	8.86	8.88	8.90	8.92	8.94	8.96	8.98	9.00	9.02	9.04	9.06	9.08	9.10	9.12	9.14	9.16	9.18	9.20	9.22	9.24	9.26	9.28	9.30	9.32	9.34	9.36	9.38	9.40	9.42	9.44	9.46	9.48	9.50	9.52	9.54	9.56	9.58	9.60	9.62	9.64	9.66	9.68	9.70	9.72	9.74	9.76	9.78	9.80	9.82	9.84	9.86	9.88	9.90	9.92	9.94	9.96	9.98	10.00	10.02	10.04	10.06	10.08	10.10	10.12	10.14	10.16	10.18	10.20	10.22	10.24	10.26	10.28	10.30	10.32	10.34	10.36	10.38	10.40	10.42	10.44	10.46	10.48	10.50	10.52	10.54	10.56	10.58	10.60	10.62	10.64	10.66	10.68	10.70	10.72	10.74	10.76	10.78	10.80	10.82	10.84	10.86	10.88	10.90	10.92	10.94	10.96	10.98	11.00	11.02	11.04	11.06	11.08	11.10	11.12	11.14	11.16	11.18	11.20	11.22	11.24	11.26	11.28	11.30	11.32	11.34	11.36	11.38	11.40	11.42	11.44	11.46	11.48	11.50	11.52	11.54	11.56	11.58	11.60	11.62	11.64	11.66	11.68	11.70	11.72	11.74	11.76	11.78	11.80	11.82	11.84	11.86	11.88	11.90	11.92	11.94	11.96	11.98	12.00	12.02	12.04	12.06	12.08	12.10	12.12	12.14	12.16	12.18	12.20	12.22	12.24	12.26	12.28	12.30	12.32	12.34	12.36	12.38	12.40	12.42	12.44	12.46	12.48	12.50	12.52	12.54	12.56	12.58	12.60	12.62	12.64	12.66	12.68	12.70	12.72	12.74	12.76	12.78	12.80	12.82	12.84	12.86	12.88	12.90	12.92	12.94	12.96	12.98	13.00	13.02	13.04	13.06	13.08	13.10	13.12	13.14	13.16	13.18	13.20	13.22	13.24	13.26	13.28	13.30	13.32	13.34	13.36	13.38	13.40	13.42	13.44	13.46	13.48	13.50	13.52	13.54	13.56	13.58	13.60	13.62	13.64	13.66	13.68	13.70	13.72	13.74	13.76	13.78	13.80	13.82	13.84	13.86	13.88	13.90	13.92	13.94	13.96	13.98	14.00	14.02	14.04	14.06	14.08	14.10	14.12	14.14	14.16	14.18	14.20	14.22	14.24	14.26	14.28	14.30	14.32	14.34	14.36	14.38	14.40	14.42	14.44	14.46	14.48	14.50	14.52	14.54	14.56	14.58	14.60	14.62	14.64	14.66	14.68	14.70	14.72	14.74	14.76	14.78	14.80	14.82	14.84	14.86	14.88	14.90	14.92	14.94	14.96	14.98	15.00	15.02	15.04	15.06	15.08	15.10	15.12	15.14	15.16	15.18	15.20	15.22	15.24	15.26	15.28	15.30	15.32	15.34	15.36	15.38	15.40	15.42	15.44	15.46	15.48	15.50	15.52	15.54	15.56	15.58	15.60	15.62	15.64	15.66	15.68	15.70	15.72	15.74	15.76	15.78	15.80	15.82	15.84	15.86	15.88	15.90	15.92	15.94	15.96	15.98	16.00	16.02	16.04	16.06	16.08	16.10	16.12	16.14	16.16	16.18	16.20	16.22	16.24	16.26	16.28	16.30	16.32	16.34	16.36	16.38	16.40	16.42	16.44	16.46	16.48	16.50	16.52	16.54	16.56	16.58	16.60	16.62	16.64	16.66	16.68	16.70	16.72	16.74	16.76	16.78	16.80	16.82	16.84	16.86	16.88	16.90	16.92	16.94	16.96	16.98	17.00	17.02	17.04	17.06	17.08	17.10	17.12	17.14	17.16	17.18	17.20	17.22	17.24	17.26	17.28	17.30	17.32	17.34	17.36	17.38	17.40	17.42	17.44	17.46	17.48	17.50	17.52	17.54	17.56	17.58	17.60	17.62	17.64	17.66	17.68	17.70	17.72	17.74	17.76	17.78	17.80	17.82	17.84	17.86	17.88	17.90	17.92	17.94	17.96	17.98	18.00	18.02	18.04	18.06	18.08	18.10	18.12	18.14	18.16	18.18	18.20	18.22	18.24	18.26	18.28	18.30	18.32	18.34	18.36	18.38	18.40	18.42	18.44	18.46	18.48	18.50	18.52	18.54	18.56	18.58	18.60	18.62	18.64	18.66	18.68	18.70	18.72	18.74	18.76	18.78	18.80	18.82	18.84	18.86	18.88	18.90	18.92	18.94	18.96	18.98	19.00	19.02	19.04	19.06	19.08	19.10	19.12	19.14	19.16	19.18	19.20	19.22	19.24	19.26	19.28	19.30	19.32	19.34	19.36	19.38	19.40	19.42	19.44	19.46	19.48	19.50	19.52	19.54	19.56	19.58	19.60	19.62	19.64	19.66	19.68	19.70	19.72	19.74	19.76	19.78	19.80	19.82	19.84	19.86	19.88	19.90	19.92	19.94	19.96	19.98	20.00	20.02	20.04	20.06	20.08	20.10	20.12	20.14	20.16	20.18	20.20	20.22	20.24	20.26	20.28	20.30	20.32	20.34	20.36	20.38	20.40	20.42	20.44	20.46	20.48	20.50	20.52	20.54	20.56	20.58	20.60	20.62	20.64	20



WIDIA® Victory™
ISO Carbide Insert

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
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Widia inserts
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■ **EXCISE TAX**—A tax levied on the sale of certain goods, such as alcohol, tobacco, and gasoline.[illegible]

● **ECMT-MU**

[illegible]



• **Study objectives:**
1. **Primary objective:** To determine the effect of the intervention on the primary outcome of Δ in the proportion of patients with a positive response to treatment.

■ DINGO 475

[illegible]



• This column
indicates shape

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1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4. Results

■ ENVI 211

[illegible]

■ DMG-Cl

ISO cylinder number	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
CHINA CONNECT	11.0	12.0	13.0	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
CHINA CONNECT	11.0	12.0	13.0	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
CHINA CONNECT	11.0	12.0	13.0	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100





• Description
Inserts for turning

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• **Suppression**
• **Antagonism**

[illegible]



Widia inserts
in automatic machines

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• **Suppression:**
 1. **Antibiotic therapy:**

■ **ENHANCED FILM**

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What is the
relationship between

■ **CHINA** 11

NO	Indikator	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	Indikator 1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	1.11	1.12	1.13	1.14	1.15	1.16	1.17	1.18	1.19	1.20	1.21	1.22	1.23	1.24	1.25	1.26	1.27	1.28	1.29	1.30	1.31	1.32	1.33	1.34	1.35	1.36	1.37	1.38	1.39	1.40	1.41	1.42	1.43	1.44	1.45	1.46	1.47	1.48	1.49	1.50	1.51	1.52	1.53	1.54	1.55	1.56	1.57	1.58	1.59	1.60	1.61	1.62	1.63	1.64	1.65	1.66	1.67	1.68	1.69	1.70	1.71	1.72	1.73	1.74	1.75	1.76	1.77	1.78	1.79	1.80	1.81	1.82	1.83	1.84	1.85	1.86	1.87	1.88	1.89	1.90	1.91	1.92	1.93	1.94	1.95	1.96	1.97	1.98	1.99	2.00
2	Indikator 2	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	2.11	2.12	2.13	2.14	2.15	2.16	2.17	2.18	2.19	2.20	2.21	2.22	2.23	2.24	2.25	2.26	2.27	2.28	2.29	2.30	2.31	2.32	2.33	2.34	2.35	2.36	2.37	2.38	2.39	2.40	2.41	2.42	2.43	2.44	2.45	2.46	2.47	2.48	2.49	2.50	2.51	2.52	2.53	2.54	2.55	2.56	2.57	2.58	2.59	2.60	2.61	2.62	2.63	2.64	2.65	2.66	2.67	2.68	2.69	2.70	2.71	2.72	2.73	2.74	2.75	2.76	2.77	2.78	2.79	2.80	2.81	2.82	2.83	2.84	2.85	2.86	2.87	2.88	2.89	2.90	2.91	2.92	2.93	2.94	2.95	2.96	2.97	2.98	2.99	3.00
3	Indikator 3	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	3.10	3.11	3.12	3.13	3.14	3.15	3.16	3.17	3.18	3.19	3.20	3.21	3.22	3.23	3.24	3.25	3.26	3.27	3.28	3.29	3.30	3.31	3.32	3.33	3.34	3.35	3.36	3.37	3.38	3.39	3.40	3.41	3.42	3.43	3.44	3.45	3.46	3.47	3.48	3.49	3.50	3.51	3.52	3.53	3.54	3.55	3.56	3.57	3.58	3.59	3.60	3.61	3.62	3.63	3.64	3.65	3.66	3.67	3.68	3.69	3.70	3.71	3.72	3.73	3.74	3.75	3.76	3.77	3.78	3.79	3.80	3.81	3.82	3.83	3.84	3.85	3.86	3.87	3.88	3.89	3.90	3.91	3.92	3.93	3.94	3.95	3.96	3.97	3.98	3.99	4.00
4	Indikator 4	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	4.10	4.11	4.12	4.13	4.14	4.15	4.16	4.17	4.18	4.19	4.20	4.21																																																																															



• **Endoplasmic reticulum**

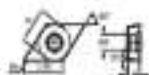
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▲ Best choice
○ Alternative choice

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1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Primo choice
Industria choice

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

OPMT-MP

ISO category number	W	L	S	W ₀	W ₁	W ₂
OPMT-MP	12.0	11.0	1.0	1.0	1.0	1.0



LNMX-12

ISO category number	W	L	S	W ₀	W ₁	W ₂
LNMX-12	12.0	11.0	1.0	1.0	1.0	1.0
LNMX-12	12.0	11.0	1.0	1.0	1.0	1.0



LNLM-12R5

ISO category number	W	L	S	W ₀	W ₁	W ₂
LNLM-12R5	12.0	11.0	1.0	1.0	1.0	1.0



What does
indicate stress

■ **GCMT-1**

NO colaborador	E	S	OS
CONTINUA	5,0	5,0	1,0



● GENIO

[illegible]



• **Electrolytes:**

7	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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■ 中国音乐人

	0	6	78	Age Group	Sex	Ethnicity	Religion	Marital Status	Education	Occupation	Income	Health Status	Mental Health	Social Support	Life Satisfaction	Overall Well-being
Female (70%)	10.5%	9.7%	11.8%	18-24	F	African American	Catholic	Single	High School	Unemployed	\$10,000	Good	Stable	Low	5.5	6.0

■ **FINANCIAL**

ISO Catalogue Number	2	3	10
EN60730-1:2018	0.9	1.0	1.0
EN60730-2:2018	0.9	1.0	1.0
EN60730-3:2018	1.0	1.0	1.0





• Best choice
in plate lathe inserts

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

SCMT

ISO cutting insert	0	10°	15°	20°	30°																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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• ISO Carbid
• Carbide Inserte

ISO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
ISO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

• ISO CARBID

ISO Carbid Inserte	ISO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
ISO CARBID	ISO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100



• ISO CARBID

ISO Carbid Inserte	ISO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
ISO CARBID	ISO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100



• Best solution:
• <http://www.mindtools.com>

7	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87													

■ SPONGE-BOB

[illegible]

■ **CRIMINALS**

2020 calendar year	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1971	1970	1969	1968	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	1957	1956	1955	1954	1953	1952	1951	1950	1949	1948	1947	1946	1945	1944	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929	1928	1927	1926	1925	1924	1923	1922	1921	1920	1919	1918	1917	1916	1915	1914	1913	1912	1911	1910	1909	1908	1907	1906	1905	1904	1903	1902	1901	1900	1899	1898	1897	1896	1895	1894	1893	1892	1891	1890	1889	1888	1887	1886	1885	1884	1883	1882	1881	1880	1879	1878	1877	1876	1875	1874	1873	1872	1871	1870	1869	1868	1867	1866	1865	1864	1863	1862	1861	1860	1859	1858	1857	1856	1855	1854	1853	1852	1851	1850	1849	1848	1847	1846	1845	1844	1843	1842	1841	1840	1839	1838	1837	1836	1835	1834	1833	1832	1831	1830	1829	1828	1827	1826	1825	1824	1823	1822	1821	1820	1819	1818	1817	1816	1815	1814	1813	1812	1811	1810	1809	1808	1807	1806	1805	1804	1803	1802	1801	1800	1799	1798	1797	1796	1795	1794	1793	1792	1791	1790	1789	1788	1787	1786	1785	1784	1783	1782	1781	1780	1779	1778	1777	1776	1775	1774	1773	1772	1771	1770	1769	1768	1767	1766	1765	1764	1763	1762	1761	1760	1759	1758	1757	1756	1755	1754	1753	1752	1751	1750	1749	1748	1747	1746	1745	1744	1743	1742	1741	1740	1739	1738	1737	1736	1735	1734	1733	1732	1731	1730	1729	1728	1727	1726	1725	1724	1723	1722	1721	1720	1719	1718	1717	1716	1715	1714	1713	1712	1711	1710	1709	1708	1707	1706	1705	1704	1703	1702	1701	1700	1699	1698	1697	1696	1695	1694	1693	1692	1691	1690	1689	1688	1687	1686	1685	1684	1683	1682	1681	1680	1679	1678	1677	1676	1675	1674	1673	1672	1671	1670	1669	1668	1667	1666	1665	1664	1663	1662	1661	1660	1659	1658	1657	1656	1655	1654	1653	1652	1651	1650	1649	1648	1647	1646	1645	1644	1643	1642	1641	1640	1639	1638	1637	1636	1635	1634	1633	1632	1631	1630	1629	1628	1627	1626	1625	1624	1623	1622	1621	1620	1619	1618	1617	1616	1615	1614	1613	1612	1611	1610	1609	1608	1607	1606	1605	1604	1603	1602	1601	1600	1599	1598	1597	1596	1595	1594	1593	1592	1591	1590	1589	1588	1587	1586	1585	1584	1583	1582	1581	1580	1579	1578	1577	1576	1575	1574	1573	1572	1571	1570	1569	1568	1
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Price sheet
Customer sheet

7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

■ DNMG 151

ISO collet/nose width	2	3.50	5	6.5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355	360	365	370	375	380	385	390	395	400	405	410	415	420	425	430	435	440	445	450	455	460	465	470	475	480	485	490	495	500	505	510	515	520	525	530	535	540	545	550	555	560	565	570	575	580	585	590	595	600	605	610	615	620	625	630	635	640	645	650	655	660	665	670	675	680	685	690	695	700	705	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000
DNMG15100000	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.55	3.60	3.65	3.70	3.75	3.80	3.85	3.90	3.95	4.00	4.05	4.10	4.15	4.20	4.25	4.30	4.35	4.40	4.45	4.50	4.55	4.60	4.65	4.70	4.75	4.80	4.85	4.90	4.95	5.00	5.05	5.10	5.15	5.20	5.25	5.30	5.35	5.40	5.45	5.50	5.55	5.60	5.65	5.70	5.75	5.80	5.85	5.90	5.95	6.00	6.05	6.10	6.15	6.20	6.25	6.30	6.35	6.40	6.45	6.50	6.55	6.60	6.65	6.70	6.75	6.80	6.85	6.90	6.95	7.00	7.05	7.10	7.15	7.20	7.25	7.30	7.35	7.40	7.45	7.50	7.55	7.60	7.65	7.70	7.75	7.80	7.85	7.90	7.95	8.00	8.05	8.10	8.15	8.20	8.25	8.30	8.35	8.40	8.45	8.50	8.55	8.60	8.65	8.70	8.75	8.80	8.85	8.90	8.95	9.00	9.05	9.10	9.15	9.20	9.25	9.30	9.35	9.40	9.45	9.50	9.55	9.60	9.65	9.70	9.75	9.80	9.85	9.90	9.95	10.00					



■ DNMG 151

ISO collet/nose width	2	3.50	5	6.5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355	360	365	370	375	380	385	390	395	400	405	410	415	420	425	430	435	440	445	450	455	460	465	470	475	480	485	490	495	500	505	510	515	520	525	530	535	540	545	550	555	560	565	570	575	580	585	590	595	600	605	610	615	620	625	630	635	640	645	650	655	660	665	670	675	680	685	690	695	700	705	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000
DNMG1510000	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.55	3.60	3.65	3.70	3.75	3.80	3.85	3.90	3.95	4.00	4.05	4.10	4.15	4.20	4.25	4.30	4.35	4.40	4.45	4.50	4.55	4.60	4.65	4.70	4.75	4.80	4.85	4.90	4.95	5.00	5.05	5.10	5.15	5.20	5.25	5.30	5.35	5.40	5.45	5.50	5.55	5.60	5.65	5.70	5.75	5.80	5.85	5.90	5.95	6.00	6.05	6.10	6.15	6.20	6.25	6.30	6.35	6.40	6.45	6.50	6.55	6.60	6.65	6.70	6.75	6.80	6.85	6.90	6.95	7.00	7.05	7.10	7.15	7.20	7.25	7.30	7.35	7.40	7.45	7.50	7.55	7.60	7.65	7.70	7.75	7.80	7.85	7.90	7.95	8.00	8.05	8.10	8.15	8.20	8.25	8.30	8.35	8.40	8.45	8.50	8.55	8.60	8.65	8.70	8.75	8.80	8.85	8.90	8.95	9.00	9.05	9.10	9.15	9.20	9.25	9.30	9.35	9.40	9.45	9.50	9.55	9.60	9.65	9.70	9.75	9.80	9.85	9.90	9.95	10.00					
DNMG1510000	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.55	3.60	3.65	3.70	3.75	3.80	3.85	3.90	3.95	4.00	4.05	4.10	4.15	4.20	4.25	4.30	4.35	4.40	4.45	4.50	4.55	4.60	4.65	4.70	4.75	4.80	4.85	4.90	4.95	5.00	5.05	5.10	5.15	5.20	5.25	5.30	5.35	5.40	5.45	5.50	5.55	5.60	5.65	5.70	5.75	5.80	5.85	5.90	5.95	6.00	6.05	6.10	6.15	6.20	6.25	6.30	6.35	6.40	6.45	6.50	6.55	6.60	6.65	6.70	6.75	6.80	6.85	6.90	6.95	7.00	7.05	7.10	7.15	7.20	7.25	7.30	7.35	7.40	7.45	7.50	7.55	7.60	7.65	7.70	7.75	7.80	7.85	7.90	7.95	8.00	8.05	8.10	8.15	8.20	8.25	8.30	8.35	8.40	8.45	8.50	8.55	8.60	8.65	8.70	8.75	8.80	8.85	8.90	8.95	9.00	9.05	9.10	9.15	9.20	9.25	9.30	9.35	9.40	9.45	9.50	9.55	9.60	9.65	9.70	9.75	9.80	9.85	9.90	9.95	10.00					
DNMG1510000	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.55	3.60	3.65	3.70	3.75	3.80	3.85	3.90	3.95	4.00	4.05	4.10	4.15	4.20	4.25	4.30	4.35	4.40	4.45	4.50	4.55	4.60	4.65	4.70	4.75	4.80	4.85	4.90	4.95	5.00	5.05	5.10	5.15	5.20	5.25	5.30	5.35	5.40	5.45	5.50	5.55	5.60	5.65	5.70	5.75	5.80	5.85	5.90	5.95	6.00	6.05	6.10	6.15	6.20	6.25	6.30	6.35	6.40	6.45	6.50	6.55	6.60	6.65	6.70	6.75	6.80	6.85	6.90	6.95	7.00	7.05	7.10	7.15	7.20	7.25	7.30	7.35	7.40	7.45	7.50	7.55	7.60	7.65	7.70	7.75	7.80	7.85	7.90	7.95	8.00	8.05	8.10	8.15	8.20	8.25	8.30	8.35	8.40	8.45	8.50	8.55	8.60	8.65	8.70	8.75	8.80	8.85	8.90	8.95	9.00	9.05	9.10	9.15	9.20	9.25	9.30	9.35	9.40	9.45	9.50	9.55	9.60	9.65	9.70	9.75	9.80	9.85	9.90	9.95	10.00					



• Best choice
• Alternative choice

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■ DME

ISO carbide grade	D	L/40	S	T ₉	D ₉	ISO 5300									
						1	2	3	4	5	6	7	8	9	10
SNMG120408	12.70	12.70	9.14	6.0	3.0	1	2	3	4	5	6	7	8	9	10
SNMG100408	12.70	12.70	9.14	4.0	3.0	1	2	3	4	5	6	7	8	9	10
SNMG120406	12.70	12.70	9.14	6.0	2.0	1	2	3	4	5	6	7	8	9	10
SNMG100406	12.70	12.70	9.14	4.0	2.0	1	2	3	4	5	6	7	8	9	10
SNMG120404	12.70	12.70	9.14	6.0	1.0	1	2	3	4	5	6	7	8	9	10
SNMG100404	12.70	12.70	9.14	4.0	1.0	1	2	3	4	5	6	7	8	9	10



4 face chamfer
radius 0.25 mm

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• Back-flank
• Minor-flank

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Prise d'usure
Cotée d'usure

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• Back-flank
• Alternative finish

P	M	K	N	S	H	A	B	C	D	E	F	G	I	L	O	R	T	V	X	Z	Y	Q	W	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CV	CW	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DV	DW	DX	DY	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL	EM	EN	EO	EP	EQ	ER	ES	ET	EV	EW	EX	EY	EZ	FA	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN	FO	FP	FQ	FR	FS	FT	FV	FW	FX	FY	FZ	GA	GB	GC	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP	GQ	GR	GS	GT	GV	GW	GX	GY	GZ	HA	HB	HC	HD	HE	HF	HG	HH	HI	HJ	HK	HL	HM	HN	HO	HP	HQ	HR	HS	HT	HV	HW	HX	HY	HZ	IA	IB	IC	ID	IE	IF	IG	IH	II	IJ	IK	IL	IM	IN	IO	IP	IQ	IR	IS	IT	IV	IW	IX	IY	IZ	JA	JB	JC	JD	JE	JF	JG	JH	JI	JJ	JK	JL	JM	JN	JO	JP	JQ	JR	JS	JT	JV	JW	JX	JY	JZ	KA	KB	KC	KD	KE	KF	KG	KH	KI	KJ	KK	KL	KM	KN	KO	KP	KQ	KR	KS	KT	KV	KW	KX	KY	KZ	LA	LB	LC	LD	LE	LF	LG	LH	LI	LJ	LK	LL	LM	LN	LO	LP	LQ	LR	LS	LT	LV	LW	LX	LY	LZ	MA	MB	MC	MD	ME	MF	MG	MH	MI	MJ	MK	ML	MM	MN	MO	MP	MQ	MR	MS	MT	MV	MW	MX	MY	MZ	NA	NB	NC	ND	NE	NF	NG	NH	NI	NJ	NK	NL	NM	NN	NO	NP	NQ	NR	NS	NT	NV	NW	NX	NY	NZ	OA	OB	OC	OD	OE	OF	OG	OH	OI	OJ	OK	OL	OM	ON	OO	OP	OQ	OR	OS	OT	OV	OW	OX	OY	OZ	PA	PB	PC	PD	PE	PF	PG	PH	PI	PJ	PK	PL	PM	PN	PO	PP	PQ	PR	PS	PT	PV	PW	PX	PY	PZ	QA	QB	QC	QD	QE	QF	QG	QH	QI	QJ	QK	QL	QM	QN	QO	QP	QQ	QR	QS	QT	QV	QW	QX	QY	QZ	RA	RB	RC	RD	RE	RF	RG	RH	RI	RJ	RK	RL	RM	RN	RO	RP	RQ	RR	RS	RT	RV	RW	RX	RY	RZ	SA	SB	SC	SD	SE	SF	SG	SH	SI	SJ	SK	SL	SM	SN	SO	SP	SQ	SR	SS	ST	SV	SW	SX	SY	SZ	TA	TB	TC	TD	TE	TF	TG	TH	TI	TJ	TK	TL	TM	TN	TO	TP	TQ	TR	TS	TT	TV	TW	TX	TY	TZ	UA	UB	UC	UD	UE	UF	UG	UH	UI	UJ	UK	UL	UM	UN	UO	UP	UQ	UR	US	UT	UV	UW	UX	UY	UZ	VA	VB	VC	VD	VE	VF	VG	VH	VI	VJ	VK	VL	VM	VN	VO	VP	VQ	VR	VS	VT	VV	VW	VX	VY	VZ	WA	WB	WC	WD	WE	WF	WG	WH	WI	WJ	WK	WL	WM	WN	WO	WP	WQ	WR	WS	WT	WV	WW	WX	WY	WZ	XA	XB	XC	XD	XE	XF	YG	YH	YI	YJ	YK	YL	YM	YN	YO	YP	YQ	YR	YS	YT	YV	YW	YX	YY	YZ	ZA	ZB	ZC	ZD	ZE	ZF	ZG	ZH	ZI	ZJ	ZK	ZL	ZM	ZN	ZO	ZP	ZQ	ZR	ZS	ZT	ZV	ZW	ZX	ZY	ZZ	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CV	CW	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DV	DW	DX	DY	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL	EM	EN	EO	EP	EQ	ER	ES	ET	EV	EW	EX	EY	EZ	FA	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN	FO	FP	FQ	FR	FS	FT	FV	FW	FX	FY	FZ	GA	GB	GC	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP	GQ	GR	GS	GT	GV	GW	GX	GY	GZ	HA	HB	HC	HD	HE	HF	HG	HH	HI	HJ	HK	HL	HM	HN	HO	HP	HQ	HR	HS	HT	HV	HW	HX	HY	HZ	IA	IB	IC	ID	IE	IF	IG	IH	II	IJ	IK	IL	IM	IN	IO	IP	IQ	IR	IS	IT	IV	IW	IX	IY	IZ	JA	JB	JC	JD	JE	JF	JG	JH	JI	JJ	JK	JL	JM	JN	JO	JP	JQ	JR	JS	JT	JV	JW	JX	JY	JZ	KA	KB	KC	KD	KE	KF	KG	KH	KI	KJ	KK	KL	KM	KN	KO	KP	KQ	KR	KS	KT	KV	KW	KX	KY	KZ	LA	LB	LC	LD	LE	LF	LG	LH	LI	LJ	LK	LM	LN	LO	LP	LQ	LR	LS	LT	LV	LW	LX	LY	LZ	MA	MB	MC	MD	ME	MF	MG	MH	MI	MJ	MK	ML	MM	MN	MO	MP	MQ	MR	MS	MT	MV	MW	MX	MY	MZ	NA	NB	NC	ND	NE	NF	NG	NH	NI	NJ	NK	NL	NM	NN	NO	NP	NQ	NR	NS	NT	NV	NW	NX	NY	NZ	OA	OB	OC	OD	OE	OF	OG	OH	OI	OJ	OK	OL	OM	ON	OO	OP	OQ	OR	OS	OT	OV	OW	OX	OY	OZ	PA	PB	PC	PD	PE	PF	PG	PH	PI	PJ	PK	PL	PM	PN	PO	PP	PQ	PR	PS	PT	PV	PW	PX	PY	PZ	QA	QB	QC	QD	QE	QF	QG	QH	QI	QJ	QK	QL	QM	QN	QO	QP	QQ	QR	QS	QT	QV	QW	QX	QY	QZ	RA	RB	RC	RD	RE	RF	RG	RH	RI	RJ	RK	RL	RM	RN	RO	RP	RQ	RR	RS	RT	RV	RW	RX	RY	RZ	SA	SB	SC	SD	SE	SF	SG	SH	SI	SJ	SK	SL	SM	SN	SO	SP	SQ	SR	SS	ST	SV	SW	SX	SY	SZ	TA	TB	TC	TD	TE	TF	TG	TH	TI	TJ	TK	TL	TM	TN	TO	TP	TQ	TR	TS	TT	TV	TW	TX	TY	TZ	UA	UB	UC	UD	UE	UF	UG	UH	UI	UJ	UK	UL	UM	UN	UO	UP	UQ	UR	US	UT	UV	UW	UX	UY	UZ	VA	VB	VC	VD	VE	VF	VG	VH	VI	VJ	VK	VL	VM	VN	VO	VP	VQ	VR	VS	VT	VV	VW	VX	VY	VZ	WA	WB	WC	WD	WE	WF	WG	WH	WI	WJ	WK	WL	WM	WN	WO	WP	WQ	WR	WS	WT	WV	WW	WX	WY	WZ	XA	XB	XC	XD	XE	XF	YG	YH	YI	YJ	YK	YL	YM	YN	YO	YP	YQ	YR	YS	YT	YV	YW	YX	YY	YZ	ZA	ZB	ZC	ZD	ZE	ZF	ZG	ZH	ZI	ZJ	ZK	ZL	ZM	ZN	ZO	ZP	ZQ	ZR	ZS	ZT	ZV	ZW	ZX	ZY	ZZ	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CV	CW	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DV	DW	DX	DY	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL	EM	EN	EO	EP	EQ	ER	ES	ET	EV	EW	EX	EY	EZ	FA	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN	FO	FP	FQ	FR	FS	FT	FV	FW	FX	FY	FZ	GA	GB	GC	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP	GQ	GR	GS	GT	GV	GW	GX	GY	GZ	HA	HB	HC	HD	HE	HF	HG	HH	HI	HJ	HK	HL	HM	HN	HO	HP	HQ	HR	HS	HT	HV	HW	HX	HY	HZ	IA	IB	IC	ID	IE	IF	IG	IH	II	IJ	IK	IL	IM	IN	IO	IP	IQ	IR	IS	IT	IV	IW	IX	IY	IZ	JA	JB	JC	JD	JE	JF	JG	JH	JI	JJ	JK	JL	JM	JN	JO	JP	JQ	JR	JS	JT	JV	JW	JX	JY	JZ	KA	KB	KC	KD	KE	KF	KG	KH	KI	KJ	KK	KL	KM	KN	KO	KP	KQ	KR	KS	KT	KV	KW	KX	KY	KZ	LA	LB	LC	LD	LE	LF	LG	LH	LI	LJ	LK	LM	LN	LO	LP	LQ	LR	LS	LT	LV	LW	LX	LY	LZ	MA	MB	MC	MD	ME	MF	MG	MH	MI	MJ	MK	ML	MM	MN	MO	MP	MQ	MR	MS	MT	MV	MW	MX	MY	MZ	NA	NB	NC	ND	NE	NF	NG	NH	NI	NJ	NK	NL	NM	NN	NO	NP	NQ	NR	NS	NT	NV	NW	NX	NY	NZ	OA	OB	OC	OD	OE	OF	OG	OH	OI	OJ	OK	OL	OM	ON	OO	OP	OQ	OR	OS	OT	OV	OW	OX	OY	OZ	PA	PB	PC	PD	PE	PF	PG	PH	PI	PJ	PK	PL	PM	PN	PO	PP	PQ	PR	PS	PT	PV	PW	PX	PY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[illegible]

2021 calendar year	0	10	20	30	40	50	60	70	80	90	100
2021-00001	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
2021-00002	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
2021-00003	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
2021-00004	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
2021-00005	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
2021-00006	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
2021-00007	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
2021-00008	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0



• Back face
○ Chamfer factor

P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	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• **Prüfungsinhalte:**
• **Prüfungstermin:**

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* Feed (mm/min)
† Cutting speed (m/min)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

WIDIA®

ED triangular insert	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355	360	365	370	375	380	385	390	395	400	405	410	415	420	425	430	435	440	445	450	455	460	465	470	475	480	485	490	495	500	505	510	515	520	525	530	535	540	545	550	555	560	565	570	575	580	585	590	595	600	605	610	615	620	625	630	635	640	645	650	655	660	665	670	675	680	685	690	695	700	705	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000
WIDIA®	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355	360	365	370	375	380	385	390	395	400	405	410	415	420	425	430	435	440	445	450	455	460	465	470	475	480	485	490	495	500	505	510	515	520	525	530	535	540	545	550	555	560	565	570	575	580	585	590	595	600	605	610	615	620	625	630	635	640	645	650	655	660	665	670	675	680	685	690	695	700	705	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000



WIDIA®

ED triangular insert	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355	360	365	370	375	380	385	390	395	400	405	410	415	420	425	430	435	440	445	450	455	460	465	470	475	480	485	490	495	500	505	510	515	520	525	530	535	540	545	550	555	560	565	570	575	580	585	590	595	600	605	610	615	620	625	630	635	640	645	650	655	660	665	670	675	680	685	690	695	700	705	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000
WIDIA®	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355	360	365	370	375	380	385	390	395	400	405	410	415	420	425	430	435	440	445	450	455	460	465	470	475	480	485	490	495	500	505	510	515	520	525	530	535	540	545	550	555	560	565	570	575	580	585	590	595	600	605	610	615	620	625	630	635	640	645	650	655	660	665	670	675	680	685	690	695	700	705	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000



• **Best solution:**
 1. **collaborative filtering**

■ **THINGS TO**

Model	Q	L ₀	Q	L ₀	Q
Model 1 (Q=0.1)	0.1	0.1	0.1	0.1	0.1
Model 2 (Q=0.2)	0.2	0.2	0.2	0.2	0.2
Model 3 (Q=0.3)	0.3	0.3	0.3	0.3	0.3
Model 4 (Q=0.4)	0.4	0.4	0.4	0.4	0.4
Model 5 (Q=0.5)	0.5	0.5	0.5	0.5	0.5
Model 6 (Q=0.6)	0.6	0.6	0.6	0.6	0.6
Model 7 (Q=0.7)	0.7	0.7	0.7	0.7	0.7
Model 8 (Q=0.8)	0.8	0.8	0.8	0.8	0.8
Model 9 (Q=0.9)	0.9	0.9	0.9	0.9	0.9
Model 10 (Q=1.0)	1.0	1.0	1.0	1.0	1.0




 • Best choice
 • Alternative choice

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

VCMT-60

ISO cutting tool number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
VCMT-60	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100



VNGG-PS

ISO cutting tool number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
VNGG-PS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100





WIDIA Victory
ISO Certified Insert

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1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[illegible][illegible][illegible]



• Feed (mm/min)
 ○ Rotational Speed (rpm)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

WIDIA® TW

ISO cutting speed	10	15	20	25	30	35
WIDIA® TW	100	120	140	160	180	200
WIDIA® TW	100	120	140	160	180	200
WIDIA® TW	100	120	140	160	180	200
WIDIA® TW	100	120	140	160	180	200
WIDIA® TW	100	120	140	160	180	200



WIDIA® M

ISO cutting speed	10	15	20	25	30	35
WIDIA® M	100	120	140	160	180	200
WIDIA® M	100	120	140	160	180	200
WIDIA® M	100	120	140	160	180	200
WIDIA® M	100	120	140	160	180	200





2021 Collegiate Student	0	1-50	51	56	100	2021 Collegiate Student	0	1-50	51	56	100
WINDYBROOK	11.76	6.69	6.76	6.6	1.46	WINDYBROOK	11.76	6.69	6.76	6.6	1.46
WINDYBROOK	11.76	6.69	6.76	1.7	1.46	WINDYBROOK	11.76	6.69	6.76	1.7	1.46
WINDYBROOK	11.76	6.69	6.76	1.6	1.46	WINDYBROOK	11.76	6.69	6.76	1.6	1.46

[illegible]

NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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The Gold Standard for Value •
WIDIA™ VariTurn™

VariTurn

WIDIA VariTurn is the cost-effective line of inserts from the brand you already know and trust for quality. Each insert is 100% manufactured by WIDIA to outperform the competition. WIDIA VariTurn offers the versatility for those operators that are cutting steel today and cast iron tomorrow and need an insert to get the job done. A focused portfolio with a simple grade selection method allows WIDIA VariTurn to be used for up to approximately 70% of all turning applications.

- Engineered to optimize performance
- Lasts longer on every insert
- Proven grade technology

- Post-cut treatment**
- Improves edge toughness
 - Wide range of applications

WIDIA VARI-TURN
TURNING ADD-ON



- Improved edge toughness**
- Provides smooth outer surface to reduce finish, tooling, and workpiece chipping
- Post-cut grinding**
- Provides smooth cutting surfaces

Getting the Most from Every Insert

WIDIA® VariTurn™ products make it simple to get the most out of your inserts, and your money. Every insert is gold, which means most of the tool continues to do work. This makes it easy to detect when an insert is ready to be changed — maximizing the product's value and protecting the workplace. Also, because WIDIA VariTurn inserts can be used in most applications, a single insert can take on any number of tasks, thus reducing your inventory. WIDIA VariTurn products are also reliable enough to cut steel, stainless steel, cast iron, and high temperature alloys, enabling quick changes in workpiece materials without the need to swap inserts, saving time and money.

WIDIA VariTurn Options

This versatile line offers a simple geometry selection system, eight grades, and eight geometries, including negative rake and corner-ops. With these options, WIDIA VariTurn inserts cover 90% of all general turning applications.

By endorsing this study in our guide, you can identify the correct product to find your match.



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<tr><td>900</td><</tr></tbody></table>	Symbol	Radius	—	0.05	10	0.07	15	0.09	20	0.10	25	0.12	30	0.15	35	0.18	40	0.20	45	0.25	50	0.30	55	0.35	60	0.40	65	0.45	70	0.50	75	0.55	80	0.60	85	0.65	90	0.70	95	0.75	100	0.80	105	0.85	110	0.90	115	0.95	120	1.00	125	1.05	130	1.10	135	1.15	140	1.20	145	1.25	150	1.30	155	1.35	160	1.40	165	1.45	170	1.50	175	1.55	180	1.60	185	1.65	190	1.70	195	1.75	200	1.80	205	1.85	210	1.90	215	1.95	220	2.00	225	2.05	230	2.10	235	2.15	240	2.20	245	2.25	250	2.30	255	2.35	260	2.40	265	2.45	270	2.50	275	2.55	280	2.60	285	2.65	290	2.70	295	2.75	300	2.80	305	2.85	310	2.90	315	2.95	320	3.00	325	3.05	330	3.10	335	3.15	340	3.20	345	3.25	350	3.30	355	3.35	360	3.40	365	3.45	370	3.50	375	3.55	380	3.60	385	3.65	390	3.70	395	3.75	400	3.80	405	3.85	410	3.90	415	3.95	420	4.00	425	4.05	430	4.10	435	4.15	440	4.20	445	4.25	450	4.30	455	4.35	460	4.40	465	4.45	470	4.50	475	4.55	480	4.60	485	4.65	490	4.70	495	4.75	500	4.80	505	4.85	510	4.90	515	4.95	520	5.00	525	5.05	530	5.10	535	5.15	540	5.20	545	5.25	550	5.30	555	5.35	560	5.40	565	5.45	570	5.50	575	5.55	580	5.60	585	5.65	590	5.70	595	5.75	600	5.80	605	5.85	610	5.90	615	5.95	620	6.00	625	6.05	630	6.10	635	6.15	640	6.20	645	6.25	650	6.30	655	6.35	660	6.40	665	6.45	670	6.50	675	6.55	680	6.60	685	6.65	690	6.70	695	6.75	700	6.80	705	6.85	710	6.90	715	6.95	720	7.00	725	7.05	730	7.10	735	7.15	740	7.20	745	7.25	750	7.30	755	7.35	760	7.40	765	7.45	770	7.50	775	7.55	780	7.60	785	7.65	790	7.70	795	7.75	800	7.80	805	7.85	810	7.90	815	7.95	820	8.00	825	8.05	830	8.10	835	8.15	840	8.20	845	8.25	850	8.30	855	8.35	860	8.40	865	8.45	870	8.50	875	8.55	880	8.60	885	8.65	890	8.70	895	8.75	900
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[illegible]

A system of grades, geometries, and application guidelines to provide optimal solutions for your industrial sector. It's easy to combine with WIDIA® chip-control cutting tool will work best to give specific workplace materials and applications!



WIDIA™ Tunable Tooling



EXTREME CHALLENGES. EXTREME RESULTS.

Internal dampening package eliminates chatter, vibration, and harmonics in all your deep-hole boring applications!

- Proprietary toolbars provide superior surface finish and increased productivity
- Wide product offering — from boring bars, extenders, and toolbars to boring adapters and modular sections
- Reduce setup time with WIDIA™ Quick Change Tooling — now an ISO standard
- Customized WIDIA pre-tuned boring bars — after they've run the machine — to optimize performance in your specific machining operations

For lighter tolerances, reduced setup times, and improved tool life, you can rely on WIDIA Tunable Tooling!

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

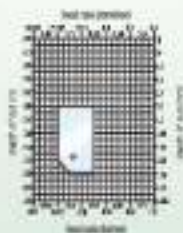
WIDIA

■ Step 1 • Select the insert geometry

Negative Inserts

25
Featuring27
Featuring29
Featuring Feeding

Positive Inserts

27
Featuring

■ Step 2 • Select the grade

Cutting conditions		Negative Insert Geometry			Positive Insert Geometry
		25	27	29	27
heavy interrupted cut		70-80°	70-80°	70-80°	70-80°
light interrupted cut		70-80°/70-80°	70-80°/70-80°	70-80°/70-80°	70-80°
steady depth of cut, feeding, or tapping drill		70-80°/70-80°	70-80°/70-80°	70-80°/70-80°	70-80°
smooth, pre-formed surface		70-80°	70-80°	70-80°	70-80°

continued

Step 3 • Selecting the cutting speed

Low Carbon (0.25% C)
and Free-Machining Steels

Material Group	grade	speed – m/min										Starting Conditions 
		15	30	45	60	75	90	110	130	150		
	1008											medium
	1010											1.0
	1015											1.5

Medium- and High-Carbon Steels
(0.25% C)

Material Group	grade	speed – m/min										Starting Conditions 
		15	30	45	60	75	90	110	130	150		
	1020											1.0
	1025											1.5
	1030											2.0

Alloy Steels and Tool Steels
(0.28-0.50% C, 40-60%)

Material Group	grade	speed – m/min										Starting Conditions 
		15	30	45	60	75	90	110	130	150		
	1040											1.0
	1045											1.5
	1050											2.0

Alloy Steels and Tool Steels
(0.50-0.80% C, 50-60%)

Material Group	grade	speed – m/min										Starting Conditions 
		15	30	45	60	75	90	110	130	150		
	1055											1.0
	1060											1.5
	1065											2.0

Low-Alloy, Alloy, and HSS Steels
(0.80-0.90% C, 60-70%)

Material Group	grade	speed – m/min										Starting Conditions 
		15	30	45	60	75	90	110	130	150		
	1070											1.0
	1075											1.5
	1080											2.0

Low-Alloy, Alloy, and HSS Steels
(0.90-1.00% C, 60-70%)

Material Group	grade	speed – m/min										Starting Conditions 
		15	30	45	60	75	90	110	130	150		
	1085											1.0
	1090											1.5
	1095											2.0

■ Step 1 • Select the insert geometry

Negative Inserts



3° Tooling



6° Tooling



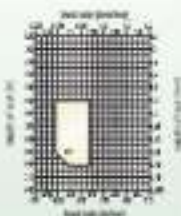
12° Tooling



Positive Inserts



3° Tooling



■ Step 2 • Select the grade

Cutting condition		Negative Insert Geometry		Positive Insert Geometry	
		3°	6°	12°	15°
heavy interrupted cut		101/101/101	101/101	101/101	101/101/101
lightly interrupted cut		101/101/101	101/101	101/101	101/101
varying depths of cut, cutting of long chip		101/101	101/101/101/101	101/101/101/101	101/101/101/101
smooth cut, peripheral surface		101/101	101/101	101/101	101/101

■ Step 3 • Selecting the cutting speed

Automatic Diamond Drill		speed – m/min										Starting Conditions
Material Group	grade	50	100	150	200	250	300	350	400	450		
M	101/101		100									100
	101/101		100									100
	101/101		100									100
	101/101		100									100

Automatic Diamond Drill		speed – m/min										Starting Conditions
Material Group	grade	50	100	150	200	250	300	350	400	450		
M	101/101		100									100
	101/101		100									100
	101/101		100									100
	101/101		100									100

Automatic Diamond Drill (Twist and Reversible Twist)		speed – m/min										Starting Conditions
Material Group	grade	50	100	150	200	250	300	350	400	450		
M	101/101		100									100
	101/101		100									100
	101/101		100									100
	101/101		100									100

Step 1 • Select the insert geometry

Negative Inserts



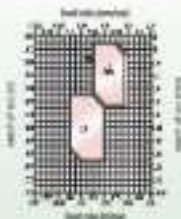
0° Inserting



45° Inserting



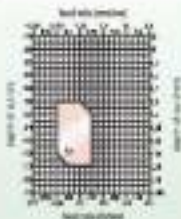
75° Inserting



Positive Inserts



0° Inserting



Step 2 • Select the grade

Cutting Condition		Negative Insert Geometry			Positive Insert Geometry	
		0°	45°	75°	0°	
Heavy interrupted cut		W020	W020	W020	W020	
Lightly interrupted cut		W020	W020	W020	W020	
Medium depth of cut, cutting in long strokes		W020	W020	W020	W020	
Smooth cut, precision surface		W020	W020	W020	W020	

Step 3 • Selecting the cutting speed

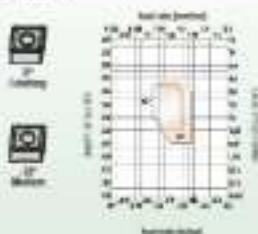
Grey Cast Iron											Starting Conditions
Material Group	grade	60	100	240	320	400	500	600	800	1000	W020
01	W020										110

Ductile, Compacted Ductile, and Malleable Cast Irons (all K10 tensile strength)											Starting Conditions
Material Group	grade	60	100	240	320	400	500	600	800	1000	W020
02	W020										110

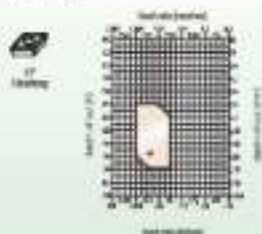
Grey, Compacted Ductile, and Malleable Cast Irons (all K10 tensile strength)											Starting Conditions
Material Group	grade	60	100	240	320	400	500	600	800	1000	W020
03	W020										110

■ Step 1 • Select the insert geometry

Negative Inserts



Positive Inserts



■ Step 2 • Select the grade

Cutting Condition		Negative Insert Geometry		Positive Insert Geometry
		3°	2°	3°
Heavy interrupted cut	⚙️	18101	—	18101
Light interrupted cut	⚙️	18101	18101	18101
Very smooth cut, cutting at feeding rate	⚙️	18101	18101	18101
Smooth cut, low speed surface	⚙️	18101	18101	18101

■ Step 3 • Select the cutting speed

Iron-Based, High Temperature Alloys
(12-27 HRC (41-60))

Material Group	Grade	Speed - m/min										Feeding Conditions
		15	45	75	105	145	175	205	235	265		
18101	18101		⚙️									0.1
	18102		⚙️									0.1

Cobalt-Based, High Temperature Alloys
(13-42 HRC (47-60))

Material Group	Grade	Speed - m/min										Feeding Conditions
		15	45	75	105	145	175	205	235	265		
18101	18101		⚙️									0.1
	18102		⚙️									0.1

Nickel-Based, High Temperature Alloys
(16-47 HRC (48-60))

Material Group	Grade	Speed - m/min										Feeding Conditions
		15	45	75	105	145	175	205	235	265		
18101	18101			⚙️								0.1
	18102		⚙️									0.1

Titanium and Titanium Alloys
(19-42 HRC (48-60))

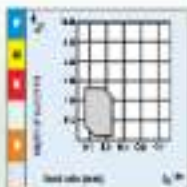
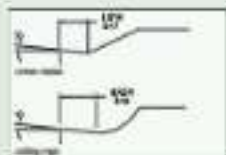
Material Group	Grade	Speed - m/min										Feeding Conditions
		15	45	75	105	145	175	205	235	265		
18101	18101			⚙️								0.1
	18102		⚙️									0.1

Positive and Negative Inserts

1P



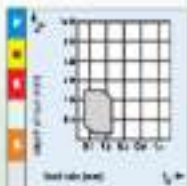
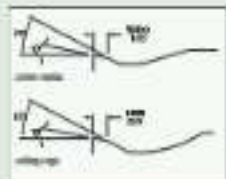
Processed by light feeding (low cutting force) and/or small inserts
 due to positive chip angle. Good chip control and a wide edge.



2P



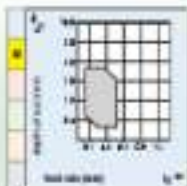
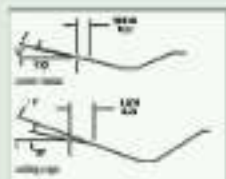
Low feed turning operations with small inserts. Very good chip control,
 especially at low depths of cut.



3P



For medium duty turning operations. Good cutting displacement (feed) is application
 producing happy chip formation, such as profile or edge turning. Good dimensional accuracy
 for all insert materials and cutting speeds.



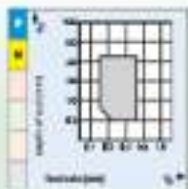
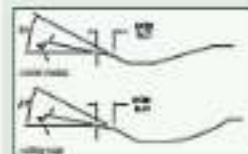
© 2010 WIDIA

Positive and Negative inserts: general

69



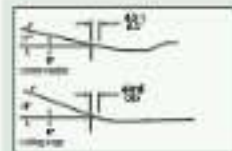
For medium to rough turning. Subsequent chip control due to specially configured chipbreaker should be taken into account. Tool chip breaking with low depth of cut.



70



For medium chip in roughing. Subsequent chip control: high edge strength for interrupted cut, high rigidity in work. Preferred for deep turn work on grey cast iron, and stainless.



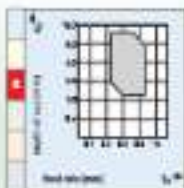
continued

Positive and Negative Inserts (continued)

MA



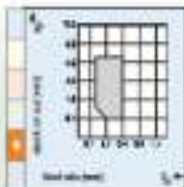
For the geometry for working with lathe for turning in mapping conditions



GP

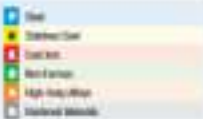


For light machining in light mapping





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



		MSS MATERIALS																HARDNESS	
Coating		Grade Description																01	02
TN 100		Coated carbide (WC/Co) (W, TiCN, Al ₂ O ₃) (TiN) - Ideal for light finishing to medium machining applications. Temperature resistant.																01	02
	IC-P20																	03	04
TN 500		Coated carbide (WC/Co) (W, TiCN, Al ₂ O ₃) (TiN) - Ideal general purpose finishing grade for tools. Ideal for fine finishing to moderate heavy roughing.																05	06
	IC-P20																	07	08
TN 500		Coated carbide (WC/Co) (W, TiCN, Al ₂ O ₃) (TiN) - Tough coating grade ideal for roughing and heavy roughing applications.																09	10
	IC-P20																	11	12
TN 100		Coated carbide (WC/Co) (W, TiCN, Al ₂ O ₃) (TiN) - Ideal for general purpose machining of various steels.																13	14
	IC-P20																	15	16



Outlets provide high speed capability and are engineered for drilling to heavy roughing.

- Tool
- Coarse Steel
- Cast Iron
- High Speed
- High Temp Alloy
- Hardened Materials

		WID Performance										Length	
Tooling		Grade Description											
Grade	Tooling	Grade Description										0	10
	 TC-M20	Coated carbide MTCO 104-1034-45/55-10, ideal for general purpose machining of stainless steels.										20	30
	 TC-M20	Coated carbide MTCO 104-1034-45/55-10, ideal when used for deep or light interrupted cut applications on ductile stainless steels.										40	50
	 TC-M20	Coated carbide MTCO 104-1034-45/55-10, ideal when used for deep or light interrupted cut applications on ductile stainless steels.										60	70
Grade	Tooling	Grade Description										0	10
	 TC-M20	Coated carbide MTCO 104-1034-45/55-10, ideal when used for deep or light interrupted cut applications on ductile stainless steels.										20	30
	 TC-M20	Coated carbide MTCO 104-1034-45/55-10, ideal when used for deep or light interrupted cut applications on ductile stainless steels.										40	50
	 TC-M20	Coated carbide MTCO 104-1034-45/55-10, ideal when used for deep or light interrupted cut applications on ductile stainless steels.										60	70
Grade	Tooling	Grade Description										0	10
	 TC-M20	Coated carbide MTCO 104-1034-45/55-10, ideal when used for deep or light interrupted cut applications on ductile stainless steels.										20	30
	 TC-M20	Coated carbide MTCO 104-1034-45/55-10, ideal when used for deep or light interrupted cut applications on ductile stainless steels.										40	50
	 TC-M20	Coated carbide MTCO 104-1034-45/55-10, ideal when used for deep or light interrupted cut applications on ductile stainless steels.										60	70



• **Best design:**
• **Customer driven**

27							
28							
29							
30							
31							
32							

[illegible]



• Technische
informatie vinden



• CNMG GP

ISO code / code number	5	10	2	10	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
CNMG100500	0,2	0,2	0,25	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2,0	2,1	2,2	2,3
CNMG100500	0,2	0,2	0,25	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2,0	2,1	2,2	2,3
CNMG100500	0,2	0,2	0,25	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2,0	2,1	2,2	2,3
CNMG100500	0,2	0,2	0,25	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2,0	2,1	2,2	2,3
CNMG100500	0,2	0,2	0,25	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2,0	2,1	2,2	2,3
CNMG100500	0,2	0,2	0,25	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2,0	2,1	2,2	2,3
CNMG100500	0,2	0,2	0,25	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2,0	2,1	2,2	2,3
CNMG100500	0,2	0,2	0,25	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2,0	2,1	2,2	2,3





• **Staphylococcus aureus**
...*Staphylococcus aureus*



●DECEMBER

[illegible]

■ **ECMT-IP**

[illegible]


 a) Para chisla
 b) Para fresas

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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WIDIA 3P

WIDIA 3P Código de producto	8	100	2	10	20	WIDIA 3P Código de producto	8	100	2	10	20
WIDIA 3P 1000	10.10	10.10	10.10	10.10	10.10	WIDIA 3P 1000	10.10	10.10	10.10	10.10	10.10
WIDIA 3P 1000	10.10	10.10	10.10	10.10	10.10	WIDIA 3P 1000	10.10	10.10	10.10	10.10	10.10
WIDIA 3P 1000	10.10	10.10	10.10	10.10	10.10	WIDIA 3P 1000	10.10	10.10	10.10	10.10	10.10
WIDIA 3P 1000	10.10	10.10	10.10	10.10	10.10	WIDIA 3P 1000	10.10	10.10	10.10	10.10	10.10
WIDIA 3P 1000	10.10	10.10	10.10	10.10	10.10	WIDIA 3P 1000	10.10	10.10	10.10	10.10	10.10


WIDIA 4P

WIDIA 4P Código de producto	8	100	2	10	20	WIDIA 4P Código de producto	8	100	2	10	20
WIDIA 4P 1000	10.10	10.10	10.10	10.10	10.10	WIDIA 4P 1000	10.10	10.10	10.10	10.10	10.10
WIDIA 4P 1000	10.10	10.10	10.10	10.10	10.10	WIDIA 4P 1000	10.10	10.10	10.10	10.10	10.10
WIDIA 4P 1000	10.10	10.10	10.10	10.10	10.10	WIDIA 4P 1000	10.10	10.10	10.10	10.10	10.10
WIDIA 4P 1000	10.10	10.10	10.10	10.10	10.10	WIDIA 4P 1000	10.10	10.10	10.10	10.10	10.10
WIDIA 4P 1000	10.10	10.10	10.10	10.10	10.10	WIDIA 4P 1000	10.10	10.10	10.10	10.10	10.10





• **Extractions:**

7	4	9	8	3	6	5	2	1
6	5	3	2	1	4	9	8	7
5	3	8	7	6	5	4	3	2
4	2	1	9	8	7	6	5	4
3	9	8	7	6	5	4	3	2
2	8	7	6	5	4	3	2	1
1	7	6	5	4	3	2	1	9
0	6	5	4	3	2	1	9	8

■ ENMCL-TW

ISSN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523
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■ **CONCLUSIONS**

021	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
021	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
021	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
021	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
021	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99





• Drill diameter
• Drill length

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

• DRILL 2P

Drill diameter	0	1.0	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
DRILL 2P	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0	
DRILL 2P	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0	



• DRILL 4P

Drill diameter	0	1.0	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
DRILL 4P	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0	
DRILL 4P	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0	





• Technische
Lösungen finden Sie



• SNMG-TN

Werkzeugnummer	Ø	100	2	10	Ø1	Werkzeugnummer	Ø	100	2	10	Ø1
100000000000	10,00	10,00	0,50	0,5	0,05	100000000000	10,00	10,00	0,50	0,5	0,05
100000000000	10,00	10,00	0,50	0,7	0,05	100000000000	10,00	10,00	0,50	0,7	0,05
100000000000	10,00	10,00	0,50	1,0	0,05	100000000000	10,00	10,00	0,50	1,0	0,05
100000000000	10,00	10,00	0,50	1,5	0,05	100000000000	10,00	10,00	0,50	1,5	0,05
100000000000	10,00	10,00	0,50	2,0	0,05	100000000000	10,00	10,00	0,50	2,0	0,05
100000000000	10,00	10,00	0,50	3,0	0,05	100000000000	10,00	10,00	0,50	3,0	0,05
100000000000	10,00	10,00	0,50	4,0	0,05	100000000000	10,00	10,00	0,50	4,0	0,05
100000000000	10,00	10,00	0,50	5,0	0,05	100000000000	10,00	10,00	0,50	5,0	0,05
100000000000	10,00	10,00	0,50	6,0	0,05	100000000000	10,00	10,00	0,50	6,0	0,05
100000000000	10,00	10,00	0,50	8,0	0,05	100000000000	10,00	10,00	0,50	8,0	0,05
100000000000	10,00	10,00	0,50	10,0	0,05	100000000000	10,00	10,00	0,50	10,0	0,05





• **Just below:**
• **Below:**

■TENT-4P

[illegible]



• **Neurobiology:**
cognitive decline

7							
6							
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■ TNM2-7M

ECN challenge number	2	123	3	76	21	2019-01-01	2019-01-02	2019-01-03	2019-01-04	2019-01-05	2019-01-06	2019-01-07	2019-01-08	2019-01-09	2019-01-10	2019-01-11	2019-01-12	2019-01-13	2019-01-14	2019-01-15	2019-01-16	2019-01-17	2019-01-18	2019-01-19	2019-01-20	2019-01-21	2019-01-22	2019-01-23	2019-01-24	2019-01-25	2019-01-26	2019-01-27	2019-01-28	2019-01-29	2019-01-30	2019-01-31	2019-02-01	2019-02-02	2019-02-03	2019-02-04	2019-02-05	2019-02-06	2019-02-07	2019-02-08	2019-02-09	2019-02-10	2019-02-11	2019-02-12	2019-02-13	2019-02-14	2019-02-15	2019-02-16	2019-02-17	2019-02-18	2019-02-19	2019-02-20	2019-02-21	2019-02-22	2019-02-23	2019-02-24	2019-02-25	2019-02-26	2019-02-27	2019-02-28	2019-03-01	2019-03-02	2019-03-03	2019-03-04	2019-03-05	2019-03-06	2019-03-07	2019-03-08	2019-03-09	2019-03-10	2019-03-11	2019-03-12	2019-03-13	2019-03-14	2019-03-15	2019-03-16	2019-03-17	2019-03-18	2019-03-19	2019-03-20	2019-03-21	2019-03-22	2019-03-23	2019-03-24	2019-03-25	2019-03-26	2019-03-27	2019-03-28	2019-03-29	2019-03-30	2019-03-31	2019-04-01	2019-04-02	2019-04-03	2019-04-04	2019-04-05	2019-04-06	2019-04-07	2019-04-08	2019-04-09	2019-04-10	2019-04-11	2019-04-12	2019-04-13	2019-04-14	2019-04-15	2019-04-16	2019-04-17	2019-04-18	2019-04-19	2019-04-20	2019-04-21	2019-04-22	2019-04-23	2019-04-24	2019-04-25	2019-04-26	2019-04-27	2019-04-28	2019-04-29	2019-04-30	2019-05-01	2019-05-02	2019-05-03	2019-05-04	2019-05-05	2019-05-06	2019-05-07	2019-05-08	2019-05-09	2019-05-10	2019-05-11	2019-05-12	2019-05-13	2019-05-14	2019-05-15	2019-05-16	2019-05-17	2019-05-18	2019-05-19	2019-05-20	2019-05-21	2019-05-22	2019-05-23	2019-05-24	2019-05-25	2019-05-26	2019-05-27	2019-05-28	2019-05-29	2019-05-30	2019-05-31	2019-06-01	2019-06-02	2019-06-03	2019-06-04	2019-06-05	2019-06-06	2019-06-07	2019-06-08	2019-06-09	2019-06-10	2019-06-11	2019-06-12	2019-06-13	2019-06-14	2019-06-15	2019-06-16	2019-06-17	2019-06-18	2019-06-19	2019-06-20	2019-06-21	2019-06-22	2019-06-23	2019-06-24	2019-06-25	2019-06-26	2019-06-27	2019-06-28	2019-06-29	2019-06-30	2019-07-01	2019-07-02	2019-07-03	2019-07-04	2019-07-05	2019-07-06	2019-07-07	2019-07-08	2019-07-09	2019-07-10	2019-07-11	2019-07-12	2019-07-13	2019-07-14	2019-07-15	2019-07-16	2019-07-17	2019-07-18	2019-07-19	2019-07-20	2019-07-21	2019-07-22	2019-07-23	2019-07-24	2019-07-25	2019-07-26	2019-07-27	2019-07-28	2019-07-29	2019-07-30	2019-07-31	2019-08-01	2019-08-02	2019-08-03	2019-08-04	2019-08-05	2019-08-06	2019-08-07	2019-08-08	2019-08-09	2019-08-10	2019-08-11	2019-08-12	2019-08-13	2019-08-14	2019-08-15	2019-08-16	2019-08-17	2019-08-18	2019-08-19	2019-08-20	2019-08-21	2019-08-22	2019-08-23	2019-08-24	2019-08-25	2019-08-26	2019-08-27	2019-08-28	2019-08-29	2019-08-30	2019-08-31	2019-09-01	2019-09-02	2019-09-03	2019-09-04	2019-09-05	2019-09-06	2019-09-07	2019-09-08	2019-09-09	2019-09-10	2019-09-11	2019-09-12	2019-09-13	2019-09-14	2019-09-15	2019-09-16	2019-09-17	2019-09-18	2019-09-19	2019-09-20	2019-09-21	2019-09-22	2019-09-23	2019-09-24	2019-09-25	2019-09-26	2019
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* Feed values
in thousandths of an inch

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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WIDIA® Vertigo®

ISO cutting condition	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990	1000																																																																																																
WIDIA® Vertigo®	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.55	3.60	3.65	3.70	3.75	3.80	3.85	3.90	3.95	4.00	4.05	4.10	4.15	4.20	4.25	4.30	4.35	4.40	4.45	4.50	4.55	4.60	4.65	4.70	4.75	4.80	4.85	4.90	4.95	5.00	5.05	5.10	5.15	5.20	5.25	5.30	5.35	5.40	5.45	5.50	5.55	5.60	5.65	5.70	5.75	5.80	5.85	5.90	5.95	6.00	6.05	6.10	6.15	6.20	6.25	6.30	6.35	6.40	6.45	6.50	6.55	6.60	6.65	6.70	6.75	6.80	6.85	6.90	6.95	7.00	7.05	7.10	7.15	7.20	7.25	7.30	7.35	7.40	7.45	7.50	7.55	7.60	7.65	7.70	7.75	7.80	7.85	7.90	7.95	8.00	8.05	8.10	8.15	8.20	8.25	8.30	8.35	8.40	8.45	8.50	8.55	8.60	8.65	8.70	8.75	8.80	8.85	8.90	8.95	9.00	9.05	9.10	9.15	9.20	9.25	9.30	9.35	9.40	9.45	9.50	9.55	9.60	9.65	9.70	9.75	9.80	9.85	9.90	9.95	10.00



WIDIA® Vertigo®

ISO cutting condition	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990	1000																																																																																																
WIDIA® Vertigo®	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.55	3.60	3.65	3.70	3.75	3.80	3.85	3.90	3.95	4.00	4.05	4.10	4.15	4.20	4.25	4.30	4.35	4.40	4.45	4.50	4.55	4.60	4.65	4.70	4.75	4.80	4.85	4.90	4.95	5.00	5.05	5.10	5.15	5.20	5.25	5.30	5.35	5.40	5.45	5.50	5.55	5.60	5.65	5.70	5.75	5.80	5.85	5.90	5.95	6.00	6.05	6.10	6.15	6.20	6.25	6.30	6.35	6.40	6.45	6.50	6.55	6.60	6.65	6.70	6.75	6.80	6.85	6.90	6.95	7.00	7.05	7.10	7.15	7.20	7.25	7.30	7.35	7.40	7.45	7.50	7.55	7.60	7.65	7.70	7.75	7.80	7.85	7.90	7.95	8.00	8.05	8.10	8.15	8.20	8.25	8.30	8.35	8.40	8.45	8.50	8.55	8.60	8.65	8.70	8.75	8.80	8.85	8.90	8.95	9.00	9.05	9.10	9.15	9.20	9.25	9.30	9.35	9.40	9.45	9.50	9.55	9.60	9.65	9.70	9.75	9.80	9.85	9.90	9.95	10.00



• Maximum
allowable stress

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

• YVMC-CP

ISO Tolerance number	0	1	2	3	4
YVMC-CP10	0.04	0.05	0.06	0.08	0.10



• YVMC-A

ISO Tolerance number	0	1	2	3	4
YVMC-A10	0.04	0.05	0.06	0.08	0.10
YVMC-A20	0.05	0.06	0.07	0.09	0.11
YVMC-A30	0.06	0.08	0.10	0.12	0.15





* Maximum
cutting speed

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

WIDIA 37

ISO cutting speed	0	1.00	2	5	10
WIDIA 37-01	1.00	1.00	1.00	1.00	1.00
WIDIA 37-02	1.00	1.00	1.00	1.00	1.00
WIDIA 37-03	1.00	1.00	1.00	1.00	1.00



WIDIA 7N

ISO cutting speed	0	1.00	2	5	10
WIDIA 7N-01	1.00	1.00	1.00	1.00	1.00
WIDIA 7N-02	1.00	1.00	1.00	1.00	1.00
WIDIA 7N-03	1.00	1.00	1.00	1.00	1.00



WIDIA™ Inserts for Machining Aluminium

WIDIA offers a series of inserts specifically designed for machining aluminium materials. These inserts are available in both an uncoated and a TiN grade for better performance and better tool life.

Inserts for Aluminium

- Easy-to-chance patterns – no geometry and clear grades.
- Longer tool life.

High positive rake for
smooth chip flow.

5° clearance inserts for
better protection.

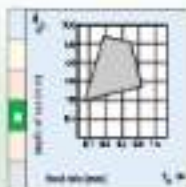
High positive inserts to prevent built-up chips
and for longer tool life.

Positive Inserts

AL1



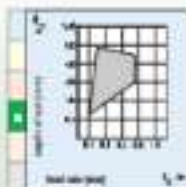
For long-run machining, high speeds, non-ferrous metals, high melting metals, plastics, glass-like, nonmetal plastics, semiconductor carriers, and for reamers.



AL3



For non-ferrous machining of aluminum, non-ferrous metals, and plastics. Especially deep cutting, roughing, and optimum feed rates with low cutting forces, non-chatter chips, high chip load, surface finish, and good tool to coolant ratio for coolant guide MCH 01™.



Step 1 • Select the insert geometry

Positive inserts



Step 2 • Select the grade

		Positive Insert Geometry	
Cutting conditions		A1	A2
Steady interrupted cut		ALN 501-MB10	ALN 501-MB10
Light interrupted cut		ALN 501-MB10	ALN 501-MB10
Very light interrupted cut, drilling, or tapping steel		ALN 501-MB10	ALN 501-MB10
Intermittent pre-forming cut		ALN 501-MB10	ALN 501-MB10

Step 3 • Selecting the cutting speed

Low-Aluminum Steels

Aluminum 6061 • 0.2% Si and Magnesium Alloy

speed - m/min

Starting Condition



Material Group	grade	200	300	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	Starting Condition
	AL6061																			AL6061

High-Aluminum Steels

Aluminum 7075 • 0.2% Si and Magnesium Alloy

speed - m/min

Starting Condition



Material Group	grade	200	300	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	Starting Condition
	AL7075																			AL7075

Additional cutting speed recommendations for miscellaneous workpiece materials

Copper, Brass, Zinc, Stainless Steel
Inch Range of 15-100

Material Group	grade	speed - v _{min}				Starting Conditions	
		25	50	75	100	width	
W	WCD10					100	
	WCD10 (WCD10000)					100	

Aluminum, Titanium, Inconel, Hastelloy, Stainless Steel, Invar, and Glass

Material Group	grade	speed - v _{min}				Starting Conditions	
		25	50	75	100	width	
W	WCD10					100	

Carbon and Stainless Composites

Graphite, Kevlar, Fiberglass, and GFRP (Kevlar 490, 495, 496, 497)

Material Group	grade	speed - v _{min}				Starting Conditions	
		25	50	75	100	width	
W	WCD10					100	

MMC's (Aluminum, Steel, Inconel, Titanium Composites)

Material Group	grade	speed - v _{min}				Starting Conditions	
		25	50	75	100	width	
W	WCD10					100	

For Alloys, Visit: www.widia.com, Alloys: 1, 2, 3, 4

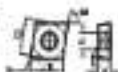
Material Group	grade	speed - v _{min}				Starting Conditions	
		25	50	75	100	width	
W	WCD10					100	
	WCD10 (WCD10000)					100	



Coatings provide high-speed capability and are engineered for freedom in tooling roughing.

- Steel
- Stainless Steel
- Cast iron
- Non-ferrous
- High-Temp. Alloys
- Coated Material

		WCD cutting speed										roughness	
Coating		Grade Description		10	15	20	25	30	35	40	45	0.3	0.8
AlTiN		Exhaustive: 100% - 100% Al ₂ O ₃ on ultra-pure carbide light and medium finishing for aluminum alloys											
	100-100												
	100-100												
AlTiN		Exhaustive: carbide ultra-pure carbide with high cutting edge stability light finishing for non-ferrous metals and cast steels											
	100-100												
	100-100												
AlTiN		Exhaustive: carbide ultra-pure carbide with high cutting edge stability light and medium finishing for non-ferrous metals and cast steels											
	100-100												
	100-100												



* See pages
144-145 for choice



Insert

• CCGT-AL3

ISO category number	10	15	20	25	30	ISO category number
CCGT100AL3	0.20	0.30	0.40	0.50	0.60	CCGT100AL3
CCGT150AL3	0.20	0.30	0.40	0.50	0.60	CCGT150AL3
CCGT200AL3	0.20	0.30	0.40	0.50	0.60	CCGT200AL3
CCGT250AL3	0.20	0.30	0.40	0.50	0.60	CCGT250AL3
CCGT300AL3	0.20	0.30	0.40	0.50	0.60	CCGT300AL3
CCGT400AL3	0.20	0.30	0.40	0.50	0.60	CCGT400AL3
CCGT500AL3	0.20	0.30	0.40	0.50	0.60	CCGT500AL3
CCGT600AL3	0.20	0.30	0.40	0.50	0.60	CCGT600AL3
CCGT700AL3	0.20	0.30	0.40	0.50	0.60	CCGT700AL3
CCGT800AL3	0.20	0.30	0.40	0.50	0.60	CCGT800AL3
CCGT900AL3	0.20	0.30	0.40	0.50	0.60	CCGT900AL3
CCGT1000AL3	0.20	0.30	0.40	0.50	0.60	CCGT1000AL3





W: Insert width
L: Minimum chip load



■ SCOT AL3

ISO catalogue number	10	1.60	5	16	25
SCOT1000AL3	4.20	1.05	0.30	0.7	0.80
SCOT1600AL3	4.20	1.05	0.30	0.8	0.80
SCOT11000AL3	6.00	1.60	0.8	0.7	0.90
SCOT161000AL3	6.00	1.60	0.8	0.8	0.90
SCOT110000AL3	6.00	1.60	0.8	0.9	0.90



■ SCOT-AL3

ISO catalogue number	10	5	25
SCOT1000AL3	4.20	0.30	0.80



■ SCOT AL3

ISO catalogue number	5	1.60	5	16	25
SCOT1000AL3	11.10	3.10	0.30	0.8	0.80



Widia inserts
with diamond coating



WIDIA AL1

ISO cutting condition	0°	15°	30°	η_{p}	0.1
WIDIA AL1	0.20	0.20	0.20	0.4	0.20
WIDIA AL1	0.20	0.20	0.20	0.4	0.20



WIDIA AL2

ISO cutting condition	0°	15°	30°	η_{p}	0.1
WIDIA AL2	0.20	0.20	0.20	0.4	0.20
WIDIA AL2	0.20	0.20	0.20	0.4	0.20
WIDIA AL2	0.20	0.20	0.20	0.4	0.20
WIDIA AL2	0.20	0.20	0.20	0.4	0.20
WIDIA AL2	0.20	0.20	0.20	0.4	0.20
WIDIA AL2	0.20	0.20	0.20	0.4	0.20



Ceramic, PcBN, and PCD Inserts

Advanced Material Inserts

Hard part turning, along with the machining of cast irons, high-temper alloys, and non-ferrous materials, can be accomplished through the use of inserts made from advanced materials. These advanced materials include ceramics, PcBN (polycrystalline cubic boron nitride), and PCD (polycrystalline diamond). WIDIA™ offers:

- Improved performance.
- Greater wear resistance.
- Longer tool life.

Ceramic Inserts

- Silicon nitride based ceramic for cast iron machining.
- Mixed ceramic for hard machining and finishing of cast iron.
- Whisker ceramic for high-temp alloy and hard machining.

CW2015 —
Mixed Ceramic



CW502B —
Silicon-Nitride
Ceramic



P208

Solid inserts

- Inserts are made only from P208.
- No industrial joint.
- Best heat absorption capacity.
- Can work at highest temperatures.



Tipped inserts

- Requires a corner and a P208 tip.
- The tip are bonded to a carrier.
- The substrate has to have a pocket that will accommodate and support the tip.



PCD

- Targeted machining of non ferrous materials.
- Significant advantage in hardness over carbide tools.
- Increased productivity through higher speeds and longer tool life.
- Best used in processing materials that are not machinable with conventional tooling.



WEDSP for Enhanced Performance – Five Unique Features

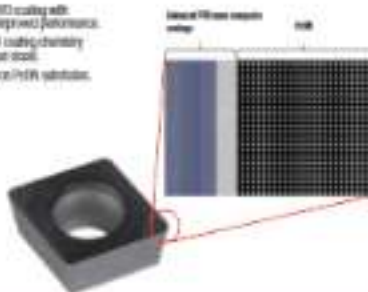
1 Newly developed substrate enables application in a wide variety of demanding situations.

The substrate contains important grains with a uniquely formulated grain distribution and nano-structured binder phase. This unique combination provides an exceptional balance of wear resistance and toughness. The net result is a robust hard turning tooling solution for a wide range of applications, including cast irons to wrought steels.



2 Nano-composite coating that enhances speed capabilities and tool life.

- Specially developed, advanced PVD coating with nano-composite architecture for improved performance.
- Improved wear resistance by PVD coating chemistry technology for maximum toolwear life.
- Enhanced PVD coating adhesion on PVD substrates.



3 Improved edge preparation technology for longer tool life, reliable performance, better surface finish, and tighter workpiece tolerances.

A critical performance factor is the edge preparation itself. The grain direction, surface roughness, nose radii, and tolerances have great impact on performance and process reliability. WIDIA™ has performed significant research work on optimized edge preparation to improve your overall machining effectiveness.

4 Large standard portfolio.

Standard edge preparation – the optimum combination of insert angle, insert width, and formable – is paramount in achieving maximum performance. WIDIA® has developed four standard edge configurations, including square inserts.

- Light machining edge prep (L)
 - Medium machining edge prep (M)
 - Heavy machining edge prep (H)
 - Insert cutting edge (C)
- Inserts: W x D : 3,000 x 10"
Inserts: W x D : 3,000 x 12"



These edge preps are available in various styles, sizes, and form factors both positive and negative geometries.

5 CH chipbreaker in positive and negative geometries, solving chipbreaking and chip control issues.

Chipbreaker – when machining cast, hardened steel with a hard nose style and a tough and softer zone, a chipbreaker provides a great advantage. The CH chipbreaker is a proven solution to all chipbreaking chips. Long chips can form and break. Causing fracture vibrations, reducing accuracy, and reducing the overall equipment effectiveness.

Available as a custom solution product.



Insert without Chipbreaker



- Long chips
- Hard spot formation

Insert with Chipbreaker



- Chips are broken

Grade Numbering System – Cubicorot

CW	2	0	15
Insert	Cutting Method Group		Application Range
CW – 90°	2 – CW Most (Good) inserts 3 – CC Multiaxial inserts 2 – CC Thin plate inserts	0 – Stationary cutting edges turning, parting, broaching 1 – Feed swimmers 2 – Low speed contour cutting edges 3 – Low speed groove extruders 0 – Rotating cutting edges drilling, milling, turning	00 – Tool breaking 10 – Drilling 15 – } medium 20 – } to roughing 25 – } roughing 30 – } roughing 40 – } roughing 45 – } roughing 50 – } roughing



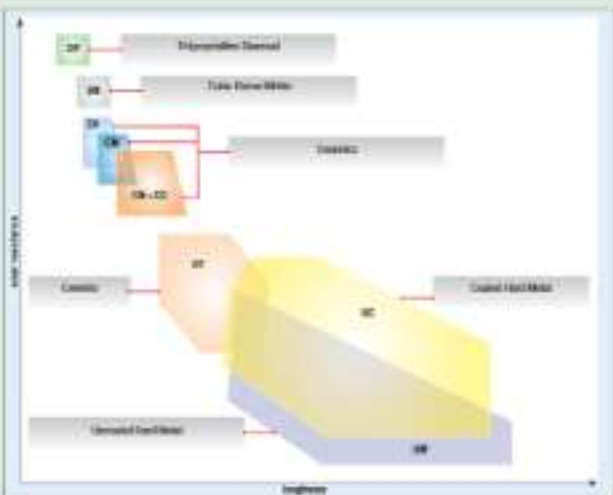
Grade Numbering System – PCDM and PCD

W	B	H	30	P
Insert	Cutting Material Group	Material Range	Application Range	Coating
WCD™	B – CBN B – TiCN		00 – No coating 05 – Coating 10 – 20 – 25 – 30 – 35 – 40 – 45 – 50 –	0 – Uncoated 1 – TiN/AlN 2 – TiN/AlN
 Steel  Inconel/Coal  Cast Iron  Aluminum  High-Speed Steels  Hardened Materials  General Machining				



Inserting two inserts are classified by the combination of their features and base materials characteristics.

International standard ISO 8338:1997 also includes recent cutting materials and the important properties (strength, stress rupture and stiffness), leading to additional classification options for these cutting material groups.



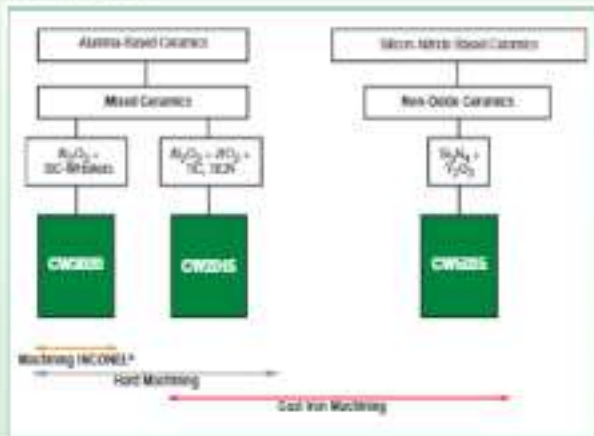
Material group	ISO group symbol	Material
Hard metal	HM	Uncoated WC-based hard metal
	HM	Coated WC-based hard metal (cermet)
	HM	Coated hard metal
Cermet	CA	Al_2O_3 base with carbides
	CM	Transition cermet Al_2O_3 - metal matrix
	CB	Al_2O_3 base with nitrides
	CL	Coated cermet
Cubic boron nitride	CB	Cubic boron nitride (CBN) with low CTE content
	CB	Cubic boron nitride (CBN) with high CTE content
Advanced	AP	Polycrystalline diamond (PCD)

Ceramic Inserts for Hard Turning, Turning in Cast Iron Materials, and Turning in High-Temp Alloys



- Ceramic offer greater wear resistance and toughness.
- Ceramic can be used in high-speed, continuous, and lightly interrupted turning applications in cast iron materials.
- Ceramic can be used for high-speed applications in high-temp alloys.

Ceramic Turning Grades


CW2015™

- Alumina and titanium nitride-binders.
- High hardness and wear resistance.
- Excellent strength and hardness.
- Excellent finish.

CW3020™

- Hardness + TiC binder.
- High hardness and wear resistance.
- Effective tool wear with interrupted cuts and very high strength.
- Deep groove cutting.

CW6025™

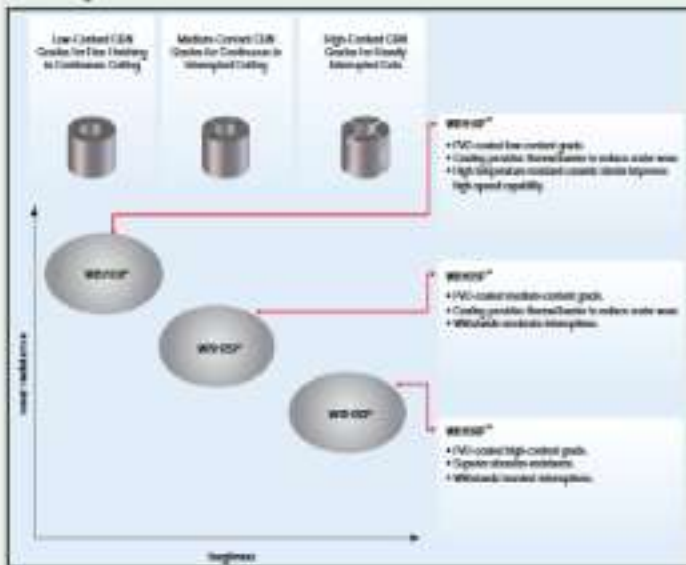
- Fine silicon nitride composition.
- Used in high-speed turning applications.
- Designed for use in gray cast iron and lower tensile ductile iron.

PCBN Grades for Hard Turning, Powder Metal, and Grey Cast Iron Machining

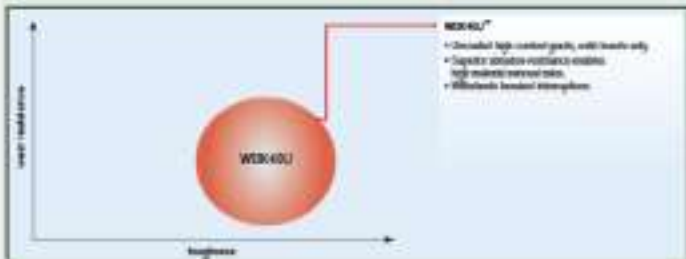


- PVD-coated grades available.
- Complete range of CBN grades for continuous to heavily interrupted turning.
- Industry-leading grades for grey cast iron machining.
- Full line of grades for hard turning.
- For best performance: index, full-flip, and tipped inserts are available.

Hard Turning Grades



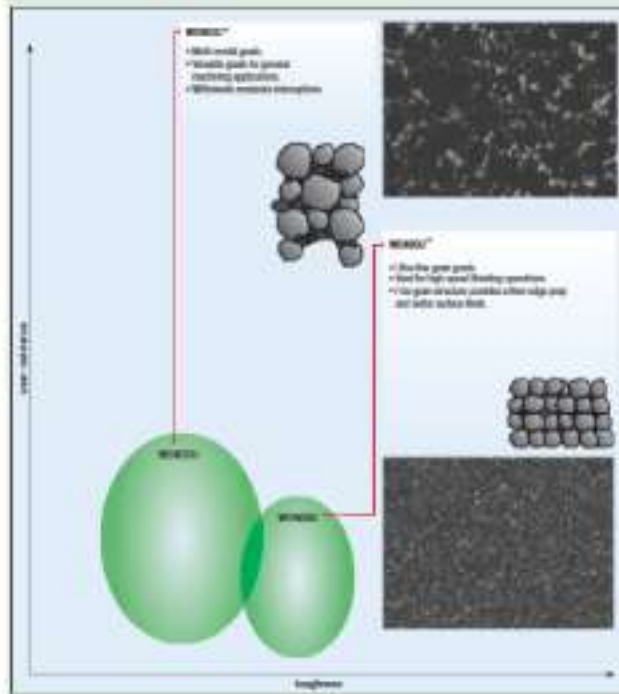
Grey Cast Iron Grades



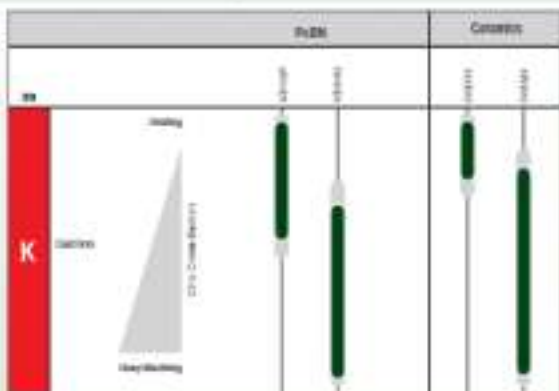
PCD Grades for Turning Non-Ferrous Materials



- New PCD grades – **WEDM11** and **WEDM12** – cover a wider range of applications
- New grades provide outstanding performance to increase productivity and cut manufacturing costs
- High abrasion and chipping resistance
- Ideal for machining aluminium alloys with low and high silicon content, copper alloys, titanium, and plastics
- Suitable for machining highly abrasive materials such as Inconel and Nickel Matrix Composites (NMC)



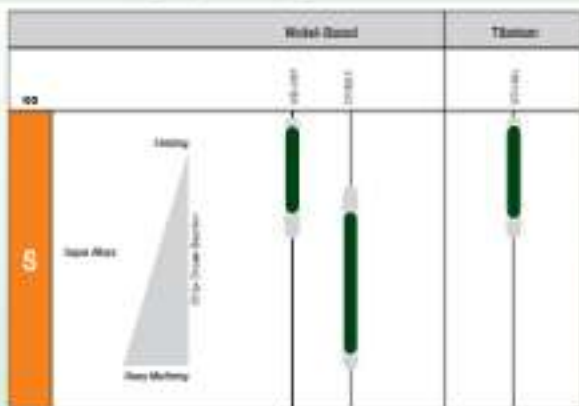
Advanced Materials for Cast Iron Machining



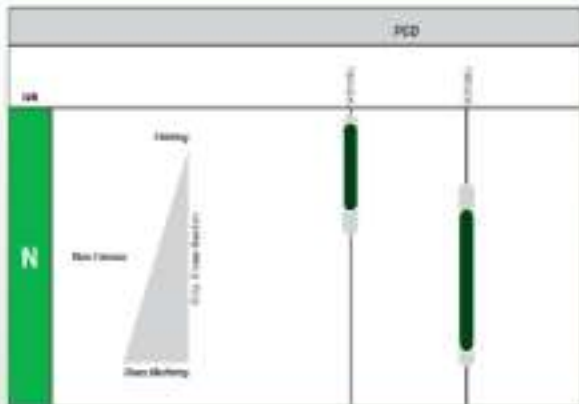
Cast Iron Machining Grade Selection



Advanced Materials for High-Temperature Machining



Advanced Materials for Non-Ferrous Machining





Reduce cycle times. High speed and feed capability. Long tool life. New multi-layer coating provides better wear resistance.

- Steel
- Stainless Steel
- Cast Iron
- Heat Treatable
- High-Temp Alloys
- Casted Materials

Wear resistance → Toughness

	Coating	Grade Description	10	15	20	25	30	35	40	45
Alloys	 CN 100	Microfined insert. Micro Al_2O_3 and TiCN. Good toughness properties combined with good wear resistance. Good finishing and finishing. For tooling on cast steel, stainless steel and for finishing.								
	 CN 400	Micro-fine insert. Submicron layer toughness properties. Finishing also it is made improved into. Capable of high performance turning. For tooling on cast steel and stainless steel.								
Alloys	 CN	Microfined insert with micro Al_2O_3 and TiCN. The CN series is suitable for the most situations after this, suitable solution for cutting high temp alloys and cast steels with high speed feeds.								
	 CN 600	High TiCN content, with TiCN insert with multiple cutting edges. Excellent finishing to finishing of high speed grey cast iron, alloyed steel, high strength alloyed steel, stainless steel, cast iron, and many cast of hardened steel (40-55 HRC). Also for turning, milling, and hole drilling. Good tool life. Good insert after high speed and short resistance than other inserts. Also good finishing longer than other inserts.								
Alloys	 CN 400	High TiCN content, with TiCN insert with multiple cutting edges. Excellent finishing to finishing of high speed grey cast iron, alloyed steel, high strength alloyed steel, stainless steel, cast iron, and many cast of hardened steel (40-55 HRC). Also for turning, milling, and hole drilling. Good tool life. Good insert after high speed and short resistance than other inserts. Also good finishing longer than other inserts.								
	 CN 400	High TiCN content, with TiCN insert with multiple cutting edges. Excellent finishing to finishing of high speed grey cast iron, alloyed steel, high strength alloyed steel, stainless steel, cast iron, and many cast of hardened steel (40-55 HRC). Also for turning, milling, and hole drilling. Good tool life. Good insert after high speed and short resistance than other inserts. Also good finishing longer than other inserts.								
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Extends cycle times. High speed and tool capability using tool life. New multi-layer coating provides better wear resistance.

- Blue: Steel
- Yellow: Titanium/Aluminum
- Red: Cast Iron
- Green: New Coatings
- Orange: High-Speed Alloys
- Grey: Coated Inserts

Wear resistance ————— Progress

Coating	Grade Description	Steel	Titanium/Aluminum	Cast Iron	New Coatings	High-Speed Alloys	Coated Inserts
 800-400 800-400	A PVD TiAlN coating over a thick TiAlN layer. Designed for roughing in turning of hardened steels (HRC 45-55). Low chip breaking force, low tool wear, high speed, high tool life.						
 800-400 800-400	A PVD TiAlN coating over a thick TiAlN layer. Designed for roughing in turning of hardened steels (HRC 45-55). Low chip breaking force, low tool wear, high speed, high tool life.						
 800-400 800-400	A PVD TiAlN coating over a thick TiAlN layer. Designed for roughing in turning of hardened steels (HRC 45-55). Low chip breaking force, low tool wear, high speed, high tool life.						
 800-400 800-400	A PVD TiAlN coating over a thick TiAlN layer. Designed for roughing in turning of hardened steels (HRC 45-55). Low chip breaking force, low tool wear, high speed, high tool life.						
 800-400 800-400	A PVD TiAlN coating over a thick TiAlN layer. Designed for roughing in turning of hardened steels (HRC 45-55). Low chip breaking force, low tool wear, high speed, high tool life.						
 800-400 800-400	A PVD TiAlN coating over a thick TiAlN layer. Designed for roughing in turning of hardened steels (HRC 45-55). Low chip breaking force, low tool wear, high speed, high tool life.						
 800-400 800-400	A PVD TiAlN coating over a thick TiAlN layer. Designed for roughing in turning of hardened steels (HRC 45-55). Low chip breaking force, low tool wear, high speed, high tool life.						
 800-400 800-400	A PVD TiAlN coating over a thick TiAlN layer. Designed for roughing in turning of hardened steels (HRC 45-55). Low chip breaking force, low tool wear, high speed, high tool life.						

Coated inserts are available in various grades.

		Cutting Speed - m/min								
Material Group		CNC 500			CNC 500			CNC 500		
		min	Start	max	min	Start	max	min	Start	max
Al (mm)		100		1,2	5,5		40	1,5		40
1 (mm)		100		1,2	5,5		40	1,5		40
Blue	0	—	—	—	—	—	—	—	—	—
	1	—	—	—	—	—	—	—	—	—
	2	—	—	—	—	—	—	—	—	—
	3	—	—	—	—	—	—	—	—	—
	4	—	—	—	—	—	—	—	—	—
	5	—	—	—	—	—	—	—	—	—
	6	—	—	—	—	—	—	—	—	—
	7	—	—	—	—	—	—	—	—	—
Yellow	0	—	—	—	—	—	—	—	—	—
	1	—	—	—	—	—	—	—	—	—
	2	—	—	—	—	—	—	—	—	—
Red	1	150	400	100	—	—	—	150	180	150
	2	150	250	400	—	—	—	110	200	440
	3	150	400	400	—	—	—	110	200	440
Green	1	—	—	—	—	—	—	—	—	—
	2	—	—	—	—	—	—	—	—	—
	3	—	—	—	—	—	—	—	—	—
	4	—	—	—	—	—	—	—	—	—
	5	—	—	—	—	—	—	—	—	—
	6	—	—	—	—	—	—	—	—	—
	7	—	—	—	—	—	—	—	—	—
	8	—	—	—	—	—	—	—	—	—
Orange	1	—	—	—	110	200	100	—	—	—
	2	—	—	—	110	200	100	—	—	—
	3	—	—	—	110	200	100	—	—	—
	4	—	—	—	—	—	—	—	—	—
Grey	1	80	180	140	40	80	140	—	—	—
	2	80	180	140	40	80	140	—	—	—
	3	80	180	140	40	80	140	—	—	—
	4	80	180	140	40	80	140	—	—	—

Insert

Cutting Speed - m/min															
Material Group	WCD-HF			WCD-DP			WCD-SP			WCD-AL			WTD-AL		
	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
St 304	0.15	0.18	0.20	0.15	0.18	0.20	0.15	0.18	0.20	0.15	0.18	0.20	0.15	0.18	0.20
Freeform	0.15	0.18	0.20	0.15	0.18	0.20	0.15	0.18	0.20	0.15	0.18	0.20	0.15	0.18	0.20
Blue	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yellow	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Red	1	-	-	-	-	-	0.05	0.05	0.05	0.05	0.05	0.05	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Green	1	-	-	-	-	-	-	-	-	0.02	0.02	0.02	0.02	0.02	0.02
	2	-	-	-	-	-	-	-	-	-	-	-	0.02	0.02	0.02
	3	-	-	-	-	-	-	-	-	0.02	0.02	0.02	0.02	0.02	0.02
	4	-	-	-	-	-	-	-	-	0.02	0.02	0.02	0.02	0.02	0.02
	5	-	-	-	-	-	-	-	-	0.02	0.02	0.02	0.02	0.02	0.02
	6	-	-	-	-	-	-	-	-	0.02	0.02	0.02	0.02	0.02	0.02
	7	-	-	-	-	-	-	-	-	0.02	0.02	0.02	0.02	0.02	0.02
Orange	1	-	-	-	-	-	0.05	0.05	0.05	-	-	-	-	-	-
	2	-	-	-	-	-	0.05	0.05	0.05	-	-	-	-	-	-
	3	-	-	-	-	-	0.05	0.05	0.05	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	0.05	0.05	0.05	-	-	-
Grey	1	0.1	0.18	0.20	0.1	0.02	0.20	0.1	0.1	0.20	0.18	-	-	-	-
	2	0.1	0.18	0.20	0.1	0.02	0.20	0.1	0.1	0.20	0.18	-	-	-	-
	3	0.1	0.18	0.20	0.1	0.02	0.20	0.1	0.1	0.20	0.18	-	-	-	-
	4	0.1	0.18	0.20	0.1	0.02	0.20	0.1	0.1	0.20	0.18	-	-	-	-



active insert
passive insert



■ CN20VC102

ISO category material	10	15	20	25	30	active insert	passive insert
CN20VC10200	12,7	15,8	19,0	22,9	—	active	passive
CN20VC10205	12,7	15,8	19,0	22,9	—	active	passive
CN20VC10210	12,7	15,8	19,0	22,9	—	active	passive
CN20VC10215	12,7	15,8	19,0	22,9	—	active	passive
CN20VC10220	12,7	15,8	19,0	22,9	—	active	passive
CN20VC10225	12,7	15,8	19,0	22,9	—	active	passive
CN20VC10230	12,7	15,8	19,0	22,9	—	active	passive
CN20VC10235	12,7	15,8	19,0	22,9	—	active	passive
CN20VC10240	12,7	15,8	19,0	22,9	—	active	passive
CN20VC10245	12,7	15,8	19,0	22,9	—	active	passive
CN20VC10250	12,7	15,8	19,0	22,9	—	active	passive
CN20VC10255	12,7	15,8	19,0	22,9	—	active	passive
CN20VC10260	12,7	15,8	19,0	22,9	—	active	passive
CN20VC10265	12,7	15,8	19,0	22,9	—	active	passive



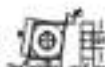


• Feed (mm/min)
• Minimum distance



CMGA

ISO material grade	0	1.05	5	25	50
CMGA12M-01T0000	0.10	0.08	4.00	10	0.30
CMGA12M-01T0000	0.10	0.08	4.00	10	0.30
CMGA12M-01T0000	0.10	0.08	4.00	10	0.30
CMGA12M-01T0000	0.10	0.08	4.00	10	0.30
CMGA12M-01T0000	0.10	0.08	4.00	10	0.30
CMGA12M-01T0000	0.10	0.08	4.00	10	0.30
CMGA12M-01T0000	0.10	0.08	4.00	10	0.30
CMGA12M-01T0000	0.10	0.08	4.00	10	0.30
CMGA12M-01T0000	0.10	0.08	4.00	10	0.30
CMGA12M-01T0000	0.10	0.08	4.00	10	0.30



CMGA TW

ISO material grade	0	1.05	5	25	50
CMGA12M-01T0000W	0.10	0.08	4.00	10	0.30
CMGA12M-01T0000W	0.10	0.08	4.00	10	0.30
CMGA12M-01T0000W	0.10	0.08	4.00	10	0.30



* See chart
... alternative choice



■ CN32

ES3 catalogue number	5	10	15	20	25	ES3 catalogue number
CN32100110000	10,10	10,00	1,00	0,0	—	CN32100110000
CN32100110000	10,10	10,00	1,00	1,0	—	CN32100110000
CN32100110000	10,00	10,00	1,00	1,0	—	CN32100110000



■ CN32-FW

ES3 catalogue number	5	10	15	20	25	ES3 catalogue number
CN32100110000	10,10	10,00	1,00	1,0	—	CN32100110000





a feed f (mm)
= diameter (mm)



■ CHARTING

EG catalogue number	D	d	D ₁	d ₁	L
CNC-EG-100-100-100-100	10.00	10.00	10.00	10.00	100
CNC-EG-100-100-100-100	10.00	10.00	10.00	10.00	100
CNC-EG-100-100-100-100	10.00	10.00	10.00	10.00	100
CNC-EG-100-100-100-100	10.00	10.00	10.00	10.00	100
CNC-EG-100-100-100-100	10.00	10.00	10.00	10.00	100


 * Feed values
 † Alternative feeds

■ DNCA

ISO code designation	C	100	2	16	20	ISO code designation	ISO code designation
DNCA 1000000000	16,75	12,00	6,50	0,4	2,0	DNCA 1000000000	DNCA 1000000000
DNCA 1000000000	16,75	12,00	6,50	0,6	2,0	DNCA 1000000000	DNCA 1000000000
DNCA 1000000000	16,75	12,00	6,50	1,0	2,0	DNCA 1000000000	DNCA 1000000000
DNCA 1000000000	16,75	12,00	6,50	0,4	2,5	DNCA 1000000000	DNCA 1000000000
DNCA 1000000000	16,75	12,00	6,50	0,6	2,5	DNCA 1000000000	DNCA 1000000000
DNCA 1000000000	16,75	12,00	6,50	1,0	2,5	DNCA 1000000000	DNCA 1000000000
DNCA 1000000000	16,75	12,00	6,50	1,0	2,0	DNCA 1000000000	DNCA 1000000000


■ DNGB

ISO code designation	C	100	2	16	20	ISO code designation	ISO code designation
DNGB 1000000000	16,75	12,00	1,00	1,0	—	DNGB 1000000000	DNGB 1000000000
DNGB 1000000000	16,75	12,00	1,00	1,6	—	DNGB 1000000000	DNGB 1000000000
DNGB 1000000000	16,75	12,00	1,00	0,4	—	DNGB 1000000000	DNGB 1000000000
DNGB 1000000000	16,75	12,00	1,00	1,0	—	DNGB 1000000000	DNGB 1000000000
DNGB 1000000000	16,75	12,00	1,00	1,6	—	DNGB 1000000000	DNGB 1000000000





• New design
• Improved safety



• UNICONS NG

ISO cutting material	0	1-2	3	4	5-6	7-8	9	10
UNICONS NG 0100	0.10	0.10	0.08	0.07	—	—	—	—
UNICONS NG 0200	0.10	0.10	0.08	0.07	—	—	—	—
UNICONS NG 0300	0.10	0.10	0.08	0.07	—	—	—	—
UNICONS NG 0400	0.10	0.10	0.08	0.07	—	—	—	—
UNICONS NG 0500	0.10	0.10	0.08	0.07	—	—	—	—



• UNICO

ISO cutting material	0	1-2	3	4	5-6	7-8	9	10
UNICO 0100	0.10	0.10	0.08	0.07	—	—	—	—



Weld clamping
clamping device



Inserting

RECOMMENDATION

ISO catalogue number	10	10	ISO catalogue number	10	10
WIDIA ES3000	1.00	1.00	WIDIA ES3000	1.00	1.00
WIDIA ES3000	1.00	1.00	WIDIA ES3000	1.00	1.00
WIDIA ES3000	1.00	1.00	WIDIA ES3000	1.00	1.00
WIDIA ES3000	1.00	1.00	WIDIA ES3000	1.00	1.00
WIDIA ES3000	1.00	1.00	WIDIA ES3000	1.00	1.00
WIDIA ES3000	1.00	1.00	WIDIA ES3000	1.00	1.00
WIDIA ES3000	1.00	1.00	WIDIA ES3000	1.00	1.00



Inserte



a. Insert width
 b. Insert height



■ SC/PS/SCG

ISO material grade	0	1-4	5	6	7
SC/PS/SCG	4.0	4.0	4.0	4.0	4.0



■ SC/LN/SCU

ISO material grade	0	1-4	5	6	7
SC/LN/SCU	4.0	4.0	4.0	4.0	4.0



* See chart
= alternate sizes



■ C30-FR

ISO cutting material	0	1.0	2	3	20
WIDIA C30-FR1000-W	0.05	0.05	0.06	0.1	—



■ C30-MX

ISO cutting material	0	1.0	2	3	20
WIDIA C30-MX1000-W	0.05	0.05	0.06	0.1	—
WIDIA C30-MX1000-W	0.05	0.05	0.06	0.1	—
WIDIA C30-MX1000-W	0.06	0.06	0.06	0.1	—



■ C30-TSPG-T

ISO cutting material	0	1.0	2	3	20
WIDIA C30-TSPG-T1000-W	0.05	0.05	0.06	0.1	—
WIDIA C30-TSPG-T1000-W	0.05	0.05	0.06	0.1	—
WIDIA C30-TSPG-T1000-W	0.05	0.05	0.06	0.1	—



face inserts
1 alternate choice



SPIN T

ISO cutting speed	5	10	15	20	25	Material	Operation
SPIN T (CUTTING)	10.0	10.0	10.0	10.0	10.0	10.0	10.0
SPIN T (CUTTING)	10.0	10.0	10.0	10.0	10.0	10.0	10.0
SPIN T (CUTTING)	10.0	10.0	10.0	10.0	10.0	10.0	10.0





Widia inserts
... always choose



Inserting

■ TNGA

ISO cutting conditions	1	1.5	2	2.5	3	Material	Operation
TNGA 080010000	0.2	0.3	0.4	0.5	0.6	Aluminum	Turning
TNGA 080010000	0.2	0.3	0.4	0.5	0.6	Aluminum	Turning
TNGA 080010000	0.2	0.3	0.4	0.5	0.6	Aluminum	Turning
TNGA 080010000	0.2	0.3	0.4	0.5	0.6	Aluminum	Turning




 * See notes
 ... always check

WVCA

E23 cutting speed	0	100	5	10	20				
WVCA 0000000000	10,0	10,0	4,0	0,7	0,4				
WVCA 0000000000	10,0	10,0	5,0	0,5	0,4				
WVCA 0000000000	10,0	10,0	4,0	1,0	0,4				
WVCA 0000000000	10,0	10,0	4,0	0,5	0,4				


WVCA

E23 cutting speed	0	100	5	10	20				
WVCA 0000000000	10,0	10,0	4,0	0,5	0,4				
WVCA 0000000000	10,0	10,0	4,0	1,0	0,4				
WVCA 0000000000	10,0	10,0	4,0	1,0	0,4				



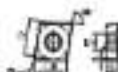


4 face inserts
100 mm x 10 mm



WIDIA

SD cutting speed	20	100	500	1000	2000
WIDIA SD 1000	10.0	4.0	1.0	0.5	—



* Feed values
in millimeters/minute

P	M	K	N	S	H	A	B	C	D	E	F	G	I	J	L	O	R	T	V	X	Z
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

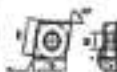
■CCGN-FWC

ISO symbol number	0	1-10	5	ϕ	20	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol
CCGN0000-FWC	0.0	0.05	0.05	0.1	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CCGN0010-FWC	0.0	0.05	0.05	0.1	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CCGN0020-FWC	0.0	0.05	0.05	0.1	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CCGN0030-FWC	0.0	0.05	0.05	0.1	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CCGN0040-FWC	0.0	0.05	0.05	0.1	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



■CCGW-M5

ISO symbol number	0	1-10	5	ϕ	20	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol	ISO 1135 symbol
CCGW0000-M5	0.0	0.05	0.05	0.1	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CCGW0010-M5	0.0	0.05	0.05	0.1	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-


 when chosen
 carbide insert

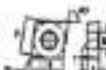
• GCMH-FST

ISO cutting condition	0	10	0	90	0	ISO cutting condition	0	10	0	90	0
GCMH100405	0.01	0.01	0.01	0.01	0.01	GCMH100405	0.01	0.01	0.01	0.01	0.01
GCMH100405	0.01	0.01	0.01	0.01	0.01	GCMH100405	0.01	0.01	0.01	0.01	0.01
GCMH100405	0.01	0.01	0.01	0.01	0.01	GCMH100405	0.01	0.01	0.01	0.01	0.01
GCMH100405	0.01	0.01	0.01	0.01	0.01	GCMH100405	0.01	0.01	0.01	0.01	0.01


• CONG-FST

ISO cutting condition	0	10	0	90	0	ISO cutting condition	0	10	0	90	0
CONG100405	0.01	0.01	0.01	0.01	0.01	CONG100405	0.01	0.01	0.01	0.01	0.01
CONG100405	0.01	0.01	0.01	0.01	0.01	CONG100405	0.01	0.01	0.01	0.01	0.01





• **Non-reducing**

7									
6									
5									
4									
3									
2									
1									

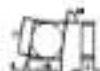
■ CNCL.FTWFW.MIT

[illegible]

■ **CNGLA-MT**

Einzelkriterien	D	1,00	0	1,00	0
Einzelkriterien	0,00	1,00	0,00	0,00	1,00
Einzelkriterien	0,00	1,00	0,00	0,00	1,00
Einzelkriterien	0,00	1,00	0,00	0,00	1,00
Einzelkriterien	0,00	1,00	0,00	0,00	1,00





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Journal of Internal Medicine 255: 103–110

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48
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421	422	423	424	425	426	427	428	429	430	431	432
433	434	435	436	437	438						

 CRM

(50)	2	1.0	3	4	50
CHANGING	1.0	1.0	1.0	1.0	1.0
CHANGING	1.0	1.0	1.0	1.0	1.0
CHANGING	1.0	1.0	1.0	1.0	1.0

[illegible]

CMMS-FEI

2022 calendar quarter	Q	1st	2nd	3rd	4th	2022 annual	2021 annual	2020 annual	2019 annual	2018 annual
Operating income	0	1.0	2	4	20	27	10	10	10	10


 with inserts
 = alternate choice


■ CPGR

ISO cutting condition	3	1.6	5	η_p	PS	CPGR 3	CPGR 1.6	CPGR 5	CPGR 1.6	CPGR 5	CPGR 1.6	CPGR 5
CPGR 32006	11.0	11.0	1.0	1.0	—	—	—	—	—	—	—	—
CPGR 32008	11.0	11.0	1.0	1.0	—	—	—	—	—	—	—	—



■ CPGR-C

ISO cutting condition	3	1.6	5	η_p	PS	CPGR-C 3	CPGR-C 1.6	CPGR-C 5	CPGR-C 1.6	CPGR-C 5	CPGR-C 1.6	CPGR-C 5
CPGR32006C	11.0	11.0	1.0	1.0	1.0	—	—	—	—	—	—	—
CPGR32008C	11.0	11.0	1.0	1.0	1.0	—	—	—	—	—	—	—
CPGR32010C	11.0	11.0	1.0	1.0	1.0	—	—	—	—	—	—	—
CPGR32012C	11.0	11.0	1.0	1.0	1.0	—	—	—	—	—	—	—
CPGR32015C	11.0	11.0	1.0	1.0	1.0	—	—	—	—	—	—	—
CPGR32020C	11.0	11.0	1.0	1.0	1.0	—	—	—	—	—	—	—
CPGR32025C	11.0	11.0	1.0	1.0	1.0	—	—	—	—	—	—	—





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◆ DNMS-F SE

ISO catalogue number	0	1.00	0	76	03
DNMS-F SE01	11.0	11.0	11.0	11.0	11.0
DNMS-F SE02	11.0	11.0	11.0	11.0	11.0



◆ DPCW-C

ISO catalogue number	0	1.00	0	76	03
DPCW-C01	11.0	11.0	11.0	11.0	11.0
DPCW-C02	11.0	11.0	11.0	11.0	11.0
DPCW-C03	11.0	11.0	11.0	11.0	11.0




 Blade series
 □ alternate choice


■ E23A-MT

ISO catalogue number	0	1.00	2	4	25	ISO catalogue number	0	1.00	2	4	25
WIDIA E23A-MT-0000000	11.0	11.0	4.0	1.0	1.0	WIDIA E23A-MT-0000000	11.0	11.0	4.0	1.0	1.0
WIDIA E23A-MT-0000000	11.0	11.0	4.0	1.0	1.0	WIDIA E23A-MT-0000000	11.0	11.0	4.0	1.0	1.0
WIDIA E23A-MT-0000000	11.0	11.0	4.0	1.0	1.0	WIDIA E23A-MT-0000000	11.0	11.0	4.0	1.0	1.0



■ E23M

ISO catalogue number	0	1.00	2	4	25	ISO catalogue number	0	1.00	2	4	25
WIDIA E23M-0000000	11.0	11.0	4.0	1.0	—	WIDIA E23M-0000000	11.0	11.0	4.0	1.0	—
WIDIA E23M-0000000	11.0	11.0	4.0	1.0	—	WIDIA E23M-0000000	11.0	11.0	4.0	1.0	—





* Heat-treated
... alternative choice

Material	Cast iron	Steel	Aluminum	Copper	Titanium	Inconel	Stainless steel	Cast steel	Tool steel	High speed steel	Maraging steel	Superalloy	Composites	Other
CBN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PCD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PCBN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PCD/PCBN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

■ TNCA-MT

ISO cutting conditions	2	1.00	5	75	200	Material	Cast iron	Steel	Aluminum	Copper	Titanium	Inconel	Stainless steel	Cast steel	Tool steel	High speed steel	Maraging steel	Superalloy	Composites	Other
TNCA-MT400010001	0.10	0.10	0.10	0.1	0.10	Cast iron	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNCA-MT400010001	0.10	0.10	0.10	0.1	0.10	Steel	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNCA-MT400010001	0.10	0.10	0.10	0.1	0.10	Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-	-



■ TNMS-TST

ISO cutting conditions	2	1.00	5	75	200	Material	Cast iron	Steel	Aluminum	Copper	Titanium	Inconel	Stainless steel	Cast steel	Tool steel	High speed steel	Maraging steel	Superalloy	Composites	Other
TNMS-TST400010001	0.10	0.10	0.10	0.1	0.10	Cast iron	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TNMS-TST400010001	0.10	0.10	0.10	0.1	0.10	Steel	-	-	-	-	-	-	-	-	-	-	-	-	-	-


 023 Insert
 1.5mm x 1.5mm

WCMW-TST

ISO coating grade number	3	1.00	0	90	03
WCMW-TST010	0.01	0.01	0.01	0.01	0.01


WVGA-TST

ISO coating grade number	3	1.00	0	90	03
WVGA-TST010	0.01	0.01	0.01	0.01	0.01
WVGA-TST011	0.01	0.01	0.01	0.01	0.01


WVGA-MT

ISO coating grade number	3	1.00	0	90	03
WVGA-MT010	0.01	0.01	0.01	0.01	0.01
WVGA-MT011	0.01	0.01	0.01	0.01	0.01





Victory™ -UR Geometry

EXTREME CHALLENGES.
EXTREME RESULTS.

-UR geometry offers a roughing solution for high-temp materials.

Available in WD 8P™ and WS 8P™, the -UR geometry provides smooth chip forming and improved coolant flow for increased tool life. This positive geometry, with its unique chipbreaker without interference points, reduces cutting forces and improves depth of cut (DOC) cutting resistance, while still providing superior edge stability.

To learn more, contact your local distributor or visit widia.com.

 **WIDIA
VICTORY**



Turning • Tools for External Turning and Internal Boring

Tools for External Turning.....	C3-C46
Tools for Internal Boring.....	C33-C34
Turnable Boring Bars.....	C33-C34
Cartridges.....	C35-C39

Modern machining operations performed on CNC machine tools and flexible production facilities require high-performance tools that provide straightforward design and application versatility. WIDIA® offers an extensive range of toolholders for external turning to meet even the most exacting production demands across a broad spectrum of workplace shapes and sizes.

Tools for External Turning



Whatever your operation requirements — from light finishing cuts at very high cutting speeds to heavy roughing applications — there is a WIDIA solution to meet your needs. The complete programme includes toolholders for pin-, screw-, or clamp-type holding.

D-Style Clamping

- Used for negative style inserts.
- Clamp assembly contains clamp, screw, and retaining ring.
- Locks insert securely.
- Insert is inserted axially and locked.
- Reduces chatter and extends tool life.

P-Style Clamping

- Clamp type clamping system for negative insertable inserts.
- Not convenient to change tool.
- Fast insert change job.

P style available in metric sizes only.



S-Style Clamping

- Corner clamping option for positive isotropic inserts
- Compact design for high stability and cost efficiency
- Carbide shims for additional tool protection

C-Style Clamping

- Height adjustable clamp permits use of additional chipbreakers
- Inner slot clamping option for positive and negative face inserts
- Recessed engineering makes it easy to handle
- Carbide shims for extra tool protection



C-Style Clamping



For clamping work on regular and profile materials from 1 to 100 mm. The universal clamping system is ideal for use in many cases. Some major adjustable clamping units are also available. Additionally, a variety of other products including one position toolholders with rotating edge weights, angled or fixed and fixed C-plates from 100 mm.

	COLN-MK		COLN-MK		COLN-MK		COLN-MK
40°	40°	40°	40°	40°	40°	40°	40°
Page:	Page:	Page:	Page:	Page:	Page:	Page:	Page:
C30	C30	C30	C30	C30	C30	C30	C30
	COLN-MK		COLN-MK		COLN-MK		COLN
40°	40°	40°	40°	40°	40°	40°	40°
Page:	Page:	Page:	Page:	Page:	Page:	Page:	Page:
C30	C30	C30	C30	C30	C30	C30	C30
	COLN-MK		COLN-MK		COLN		COLN
40°	40°	40°	40°	40°	40°	40°	40°
Page:	Page:	Page:	Page:	Page:	Page:	Page:	Page:
C30	C30	C30	C30	C30	C30	C30	C30
	COLN		COLN		COLN		COLN
40°	40°	40°	40°	40°	40°	40°	40°
Page:	Page:	Page:	Page:	Page:	Page:	Page:	Page:
C30	C30	C30	C30	C30	C30	C30	C30
	COLN		COLN		COLN		COLN
40°	40°	40°	40°	40°	40°	40°	40°
Page:	Page:	Page:	Page:	Page:	Page:	Page:	Page:
C30	C30	C30	C30	C30	C30	C30	C30

Fixed Clamping System and others

S-Style Clamping



From clamping system for profile materials made with conventional tools to 100 mm. Compact design using a minimum of space. Perfect for high stability and good efficiency. Available with profiles additional tool holders. Toolholders with rotating edge weights and fixed C-plates from 100 mm are available by means of a fixed clamping.

	SCLL		SCLP		SCLP		SCLP
40°	40°	40°	40°	40°	40°	40°	40°
Page:	Page:	Page:	Page:	Page:	Page:	Page:	Page:
C40	C40	C40	C40	C40	C40	C40	C40
	SCLC		SCLC		SCLC		SCLC
40°	40°	40°	40°	40°	40°	40°	40°
Page:	Page:	Page:	Page:	Page:	Page:	Page:	Page:
C40	C40	C40	C40	C40	C40	C40	C40
	SCLC		SCLC		SCLC		SCLC
40°	40°	40°	40°	40°	40°	40°	40°
Page:	Page:	Page:	Page:	Page:	Page:	Page:	Page:
C40	C40	C40	C40	C40	C40	C40	C40
	SCLC		SCLC		SCLC		SCLC
40°	40°	40°	40°	40°	40°	40°	40°
Page:	Page:	Page:	Page:	Page:	Page:	Page:	Page:
C40	C40	C40	C40	C40	C40	C40	C40
	SCLC		SCLC		SCLC		SCLC
40°	40°	40°	40°	40°	40°	40°	40°
Page:	Page:	Page:	Page:	Page:	Page:	Page:	Page:
C40	C40	C40	C40	C40	C40	C40	C40

How Do Catalogue Numbers Work?

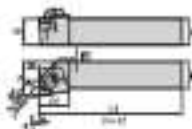
Each character in our catalogue number signifies a specific tool or tool product. Use the following key columns and corresponding images to easily identify which attributes apply.



D	C	L	N	R	
Insert mounting method	Insert shape	Insert shape or load angle	Insert clearance angle	Insert or ball	Additional information
   	            	            	            	            	            



Two-point fixturing for inserts

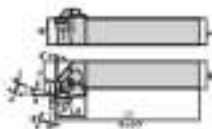


■ DCLN 90°

order number	catalogue number	B	B ₁	F	L ₁	L ₂	L ₃	LN	max. insert	min.	max. allow.	Tool Plus	Clamp assembly	Tool Plus	external jet	optional tool jet
right hand																
900100	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900101	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900102	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900103	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900104	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900105	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900106	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900107	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900108	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
left hand																
900109	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900110	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900111	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900112	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900113	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900114	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900115	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900116	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900117	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125
900118	DCLN900000000000	40	40	30.0	100	100	100	100	125, 160, 200	125	125	125	125	125	125	125



See page 84-85 for details

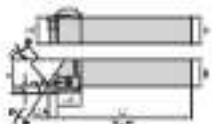


■ CCBN 35°

order number	catalogue number	D	B	F	L1	L2	L3	part factor	draw	draw scale	Tool Flute	clamp assembly	Tool Flute	drilled pin	optional lockpin
right hand															
508353	CCBN3508030000000000	10	10	15.2	17.5	22.2	27.8	1.0000	508353	1:1	1	1	1	1	1
508354	CCBN3508040000000000	15	15	22.9	25.2	30.2	35.8	1.0000	508354	1:1	1	1	1	1	1
508355	CCBN3508050000000000	20	20	30.2	32.5	37.2	42.8	1.0000	508355	1:1	1	1	1	1	1
508356	CCBN3508060000000000	25	25	37.2	39.5	44.2	49.8	1.0000	508356	1:1	1	1	1	1	1
508357	CCBN3508070000000000	30	30	44.2	46.5	51.2	56.8	1.0000	508357	1:1	1	1	1	1	1
508358	CCBN3508080000000000	35	35	51.2	53.5	58.2	63.8	1.0000	508358	1:1	1	1	1	1	1
left hand															
508359	CCBN3508090000000000	10	10	15.2	17.5	22.2	27.8	1.0000	508359	1:1	1	1	1	1	1
508360	CCBN3508100000000000	15	15	22.9	25.2	30.2	35.8	1.0000	508360	1:1	1	1	1	1	1
508361	CCBN3508110000000000	20	20	30.2	32.5	37.2	42.8	1.0000	508361	1:1	1	1	1	1	1
508362	CCBN3508120000000000	25	25	37.2	39.5	44.2	49.8	1.0000	508362	1:1	1	1	1	1	1
508363	CCBN3508130000000000	30	30	44.2	46.5	51.2	56.8	1.0000	508363	1:1	1	1	1	1	1
508364	CCBN3508140000000000	35	35	51.2	53.5	58.2	63.8	1.0000	508364	1:1	1	1	1	1	1



See page 84-85 for details

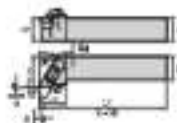


■ CCBN 40°

order number	catalogue number	D	B	F	L1	L2	L3	part factor	draw	draw scale	Tool Flute	clamp assembly	Tool Flute	drilled pin	optional lockpin
right hand															
508365	CCBN4008050000000000	10	10	15.2	17.5	22.2	27.8	1.0000	508365	1:1	1	1	1	1	1
508366	CCBN4008100000000000	15	15	22.9	25.2	30.2	35.8	1.0000	508366	1:1	1	1	1	1	1
left hand															
508367	CCBN4008060000000000	10	10	15.2	17.5	22.2	27.8	1.0000	508367	1:1	1	1	1	1	1
508368	CCBN4008110000000000	15	15	22.9	25.2	30.2	35.8	1.0000	508368	1:1	1	1	1	1	1



See pages 154-155 for details

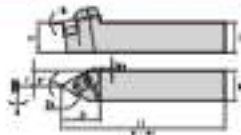


#DCUN 52°

order number	catalogue number	D	B	E	L	L2	W	max. depth of cut	min. chip	min. stroke	max. feed	chip. velocity	max. flow	min. coolant jet	optional tool pin
right hand															
500704	DCUN520504WCL04	25	25	25.2	125	202	1.6	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
500705	DCUN520505WCL05	30	30	30.2	155	232	4.0	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
500706	DCUN520506WCL06	35	35	35.2	185	262	-	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
500707	DCUN520507WCL07	40	40	40.2	215	292	-	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
500708	DCUN520508WCL08	45	45	45.2	245	322	-	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
500709	DCUN520509WCL09	50	50	50.2	275	352	-	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
500710	DCUN520510WCL10	55	55	55.2	305	382	-	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
left hand															
500711	DCUN520511WCL11	25	25	25.2	125	202	1.6	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
500712	DCUN520512WCL12	30	30	30.2	155	232	4.0	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
500713	DCUN520513WCL13	35	35	35.2	185	262	-	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
500714	DCUN520514WCL14	40	40	40.2	215	292	-	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
500715	DCUN520515WCL15	45	45	45.2	245	322	-	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
500716	DCUN520516WCL16	50	50	50.2	275	352	-	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
500717	DCUN520517WCL17	55	55	55.2	305	382	-	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
500718	DCUN520518WCL18	60	60	60.2	335	412	-	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635



See pages 154-155 for details

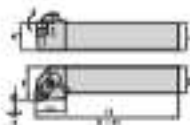


#DCUN 52°

order number	catalogue number	D	B	E	L	L2	W	max. depth of cut	min. chip	min. stroke	max. feed	chip. velocity	max. flow	min. coolant jet	optional tool pin
right hand															
500719	DCUN520519WCL19	25	25	25.2	125	202	1.6	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
500720	DCUN520520WCL20	30	30	30.2	155	232	4.0	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
left hand															
500721	DCUN520521WCL21	25	25	25.2	125	202	1.6	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
500722	DCUN520522WCL22	30	30	30.2	155	232	4.0	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635
500723	DCUN520523WCL23	35	35	35.2	185	262	-	DN 1.0004	0.0635	0.0635	0.1	150	0.0635	0.1	0.0635



See pages 340-342 for details.

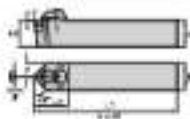


CRON

order number	catalogue number	B	D	L	L1	SPMT height	shape	shape code	Tool Flute	clamp assembly	Tool Flute	shank dia.	optional tool job
right hand													
220708	2207080000000000	25	31	100	100	26	CRON	AMDPH10P	0.0	CRONH100T	0.0	2270000000	0.0400 CR
220709	2207090000000000	25	31	100	110	26	CRON	AMDPH10P	0.0	CRONH100T	0.0	2270000000	0.0400 CR
220710	2207100000000000	40	40	100	100	26	CRON	AMDPH20P	0.0	—	0.0	2270000000	0.0400 CR
left hand													
220708	2207080000000000	25	31	100	100	26	CRON	AMDPH10P	0.0	CRONH100T	0.0	2270000000	0.0400 LH
220709	2207090000000000	25	31	100	110	26	CRON	AMDPH10P	0.0	CRONH100T	0.0	2270000000	0.0400 LH



See pages 340-342 for details.

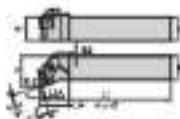


CRON 40°

order number	catalogue number	B	D	L	L1	SPMT height	shape	shape code	Tool Flute	clamp assembly	Tool Flute	shank dia.	optional tool job
220708	2207080000000000	25	31	100	100	26	CRON	AMDPH10P	0.0	CRONH100T	0.0	2270000000	0.0400 CR
220709	2207090000000000	25	31	100	110	26	CRON	AMDPH10P	0.0	CRONH100T	0.0	2270000000	0.0400 CR
220710	2207100000000000	40	40	100	100	26	CRON	AMDPH20P	0.0	CRONH100T	0.0	2270000000	0.0400 CR
220708	2207080000000000	25	31	100	100	26	CRON	AMDPH10P	0.0	CRONH100T	0.0	2270000000	0.0400 LH
220709	2207090000000000	25	31	100	110	26	CRON	AMDPH10P	0.0	CRONH100T	0.0	2270000000	0.0400 LH
220710	2207100000000000	40	40	100	100	26	CRON	AMDPH20P	0.0	CRONH100T	0.0	2270000000	0.0400 LH



Two-piece design for inserts

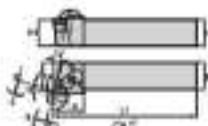


■ DISKN TS[®]

order number	catalogue number	H	B	P	L	L1	L2	L3	max. insert	ISO	max. clamping force	max. clamping force	max. clamping force	max. clamping force	max. clamping force	max. clamping force
right-hand																
939000	DISKN120P08000	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
939002	DISKN120P08000	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
939004	DISKN120P08000	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
939006	DISKN120P08000	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
939008	DISKN120P08000	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
939010	DISKN120P08000	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
left-hand																
939012	DISKN120P08000	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
939014	DISKN120P08000	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
939016	DISKN120P08000	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12



See page 166-168 for details

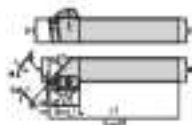


■ COGN 70°

														
order number	catalogue number	10	16	20	25	32	part number	shape	size range	Tool class	clamp mounting	Tool class	shank dia.	optional feature
right hand														
500076	COGN0000000000000000	10	16	20	25	32	0A 000000	COGN00	COGN0000P	10°	COGN00	10°	COGN0000	CLAMP00P
500078	COGN0000000000000000	10	16	20	25	32	0A 000000	COGN00	COGN0000P	10°	COGN00	10°	COGN0000	CLAMP00P
500079	COGN0000000000000000	10	16	20	25	32	0A 000000	COGN00	COGN0000P	10°	COGN00	10°	COGN0000	CLAMP00P
500076	COGN0000000000000000	10	16	20	25	32	0A 000000	COGN00	COGN0000P	10°	COGN00	10°	COGN0000	CLAMP00P
500078	COGN0000000000000000	10	16	20	25	32	0A 000000	COGN00	COGN0000P	10°	COGN00	10°	COGN0000	CLAMP00P
500079	COGN0000000000000000	10	16	20	25	32	0A 000000	COGN00	COGN0000P	10°	COGN00	10°	COGN0000	CLAMP00P
left hand														
500076	COGN0000000000000000	10	16	20	25	32	0A 000000	COGN00	COGN0000P	10°	COGN00	10°	COGN0000	CLAMP00P
500078	COGN0000000000000000	10	16	20	25	32	0A 000000	COGN00	COGN0000P	10°	COGN00	10°	COGN0000	CLAMP00P
500079	COGN0000000000000000	10	16	20	25	32	0A 000000	COGN00	COGN0000P	10°	COGN00	10°	COGN0000	CLAMP00P



Two pieces (two-plate) toolholders

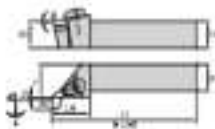


■ DSSN 45°

																	
order number	catalog number	12	8	6	11	10	5A	1/4	page	name	size	type	type	clamp	type	material	colored
right hand																	
300013	0000000000000000	10	12	100	10	12	100	10	12	100	000000	000000	000000	000000	000000	000000	000000
300014	0000000000000000	10	12	100	10	12	100	10	12	100	000000	000000	000000	000000	000000	000000	000000
300015	0000000000000000	10	12	100	10	12	100	10	12	100	000000	000000	000000	000000	000000	000000	000000
300016	0000000000000000	10	12	100	10	12	100	10	12	100	000000	000000	000000	000000	000000	000000	000000
300017	0000000000000000	10	12	100	10	12	100	10	12	100	000000	000000	000000	000000	000000	000000	000000
300018	0000000000000000	10	12	100	10	12	100	10	12	100	000000	000000	000000	000000	000000	000000	000000
left hand																	
300019	0000000000000000	10	12	100	10	12	100	10	12	100	000000	000000	000000	000000	000000	000000	000000
300020	0000000000000000	10	12	100	10	12	100	10	12	100	000000	000000	000000	000000	000000	000000	000000
300021	0000000000000000	10	12	100	10	12	100	10	12	100	000000	000000	000000	000000	000000	000000	000000
300022	0000000000000000	10	12	100	10	12	100	10	12	100	000000	000000	000000	000000	000000	000000	000000



Two-piece design for inserts

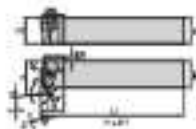


■ DIN 22°

order number	catalogue number	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
right hand																											
5000131	50-000131-000000	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
5000132	50-000132-000000	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
5000133	50-000133-000000	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
5000134	50-000134-000000	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
5000135	50-000135-000000	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
left hand																											
5000136	50-000136-000000	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
5000137	50-000137-000000	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
5000138	50-000138-000000	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
5000139	50-000139-000000	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
5000140	50-000140-000000	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40



For papers 1000–1099



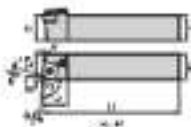
■ **DWARF NIP**

[illegible]

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See page 360-361 for details



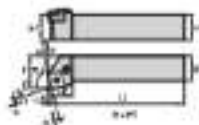
PCDN 20°



order number	catalogue number	L	W	H	11	12	14	type insert	shape	width mm	depth mm	width mm	height mm	max. width	max. depth
right hand															
301001	PCDN00000002	40	20	12,5	100	50,0	0,1	CB 100000	001100	001000	001000	001000	001000	001000	0,01
301002	PCDN00000003	50	20	12,5	100	50,0	0,1	CB 100000	002100	002000	002000	002000	002000	002000	0,01
301003	PCDN00000004	60	20	12,5	100	50,0	0,1	CB 100000	003100	003000	003000	003000	003000	003000	0,01
301007	PCDN00000010	80	20	12,5	100	50,0	0,1	CB 100000	005100	005000	005000	005000	005000	005000	0,01
301008	PCDN00000014	90	20	12,5	100	50,0	0,1	CB 100000	006100	006000	006000	006000	006000	006000	0,01
301009	PCDN00000016	100	20	12,5	100	50,0	0,1	CB 100000	007100	007000	007000	007000	007000	007000	0,01
301010	PCDN00000019	120	20	12,5	100	50,0	0,1	CB 100000	008100	008000	008000	008000	008000	008000	0,01
left hand															
301020	PCDL00000010	40	20	12,5	100	50,0	0,1	CB 100000	001100	001000	001000	001000	001000	001000	0,01
301024	PCDL00000012	50	20	12,5	100	50,0	0,1	CB 100000	002100	002000	002000	002000	002000	002000	0,01
301025	PCDL00000013	60	20	12,5	100	50,0	0,1	CB 100000	003100	003000	003000	003000	003000	003000	0,01
301029	PCDL00000016	80	20	12,5	100	50,0	0,1	CB 100000	005100	005000	005000	005000	005000	005000	0,01
301030	PCDL00000019	90	20	12,5	100	50,0	0,1	CB 100000	006100	006000	006000	006000	006000	006000	0,01
301031	PCDL00000020	100	20	12,5	100	50,0	0,1	CB 100000	007100	007000	007000	007000	007000	007000	0,01



Two-point fixturing for inserts



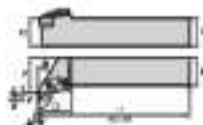
PCBN 70°

									    								
order number	catalogue number	h	d	l	l1	l2	l3	shape insert	max. speed	max. feed	max. depth	max. force	max. torque	max. power			
right hand																	
201001	PCBN100001-01	40	40	100	100	100	100	CN 100001	30000	100.000	20.000	20.000	20.000	10.0			
201002	PCBN100001-02	20	20	50	50	50	50	CN 100002	30000	100.000	20.000	20.000	20.000	10.0			
201003	PCBN100001-03	40	40	100	100	100	100	CN 100003	30000	100.000	20.000	20.000	20.000	10.0			
201004	PCBN100001-04	20	20	50	50	50	50	CN 100004	30000	100.000	20.000	20.000	20.000	10.0			
201005	PCBN100001-05	20	20	50	50	50	50	CN 100005	30000	100.000	20.000	20.000	20.000	10.0			
201006	PCBN100001-06	20	20	50	50	50	50	CN 100006	30000	100.000	20.000	20.000	20.000	10.0			
201007	PCBN100001-07	20	20	50	50	50	50	CN 100007	30000	100.000	20.000	20.000	20.000	10.0			
201008	PCBN100001-08	20	20	50	50	50	50	CN 100008	30000	100.000	20.000	20.000	20.000	10.0			
201009	PCBN100001-09	20	20	50	50	50	50	CN 100009	30000	100.000	20.000	20.000	20.000	10.0			
201010	PCBN100001-10	20	20	50	50	50	50	CN 100010	30000	100.000	20.000	20.000	20.000	10.0			
left hand																	
201011	PCBN100001-11	40	40	100	100	100	100	CN 100011	30000	100.000	20.000	20.000	20.000	10.0			
201012	PCBN100001-12	20	20	50	50	50	50	CN 100012	30000	100.000	20.000	20.000	20.000	10.0			
201013	PCBN100001-13	40	40	100	100	100	100	CN 100013	30000	100.000	20.000	20.000	20.000	10.0			
201014	PCBN100001-14	20	20	50	50	50	50	CN 100014	30000	100.000	20.000	20.000	20.000	10.0			
201015	PCBN100001-15	20	20	50	50	50	50	CN 100015	30000	100.000	20.000	20.000	20.000	10.0			
201016	PCBN100001-16	20	20	50	50	50	50	CN 100016	30000	100.000	20.000	20.000	20.000	10.0			
201017	PCBN100001-17	20	20	50	50	50	50	CN 100017	30000	100.000	20.000	20.000	20.000	10.0			
201018	PCBN100001-18	20	20	50	50	50	50	CN 100018	30000	100.000	20.000	20.000	20.000	10.0			
201019	PCBN100001-19	20	20	50	50	50	50	CN 100019	30000	100.000	20.000	20.000	20.000	10.0			
201020	PCBN100001-20	20	20	50	50	50	50	CN 100020	30000	100.000	20.000	20.000	20.000	10.0			

Tool for turning and internal boring



See pages 164-165 for details

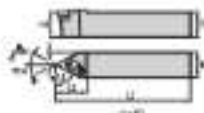


WIDIA

										    						
order number	catalogue number	R	B	F	L1	L2	W	page count	drill	reamer	tap	bro	turn	tool price	tool price	
right hand																
307543	PS-M80200-V1	40	40	30.0	100	100	4.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		
307546	PS-M80200-H1	30	30	25.0	100	100	3.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		
307548	PS-M80200-F1	30	30	25.0	100	100	3.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		
307549	PS-M80200-W1	30	30	25.0	100	100	3.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		
307440	PS-M80200-V1	30	30	20.0	100	100	3.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		
307441	PS-M80200-H1	20	20	16.0	100	100	2.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		
307442	PS-M80200-F1	40	40	30.0	100	100	4.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		
307443	PS-M80200-W1	30	30	25.0	100	100	3.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		
left hand																
307540	PS-M80200-V1	30	30	25.0	100	100	3.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		
307547	PS-M80200-H1	30	30	25.0	100	100	3.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		
307547	PS-M80200-F1	30	30	25.0	100	100	3.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		
307548	PS-M80200-W1	30	30	25.0	100	100	3.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		
307549	PS-M80200-V1	30	30	25.0	100	100	3.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		
307440	PS-M80200-V1	30	30	20.0	100	100	3.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		
307441	PS-M80200-H1	20	20	16.0	100	100	2.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		
307442	PS-M80200-F1	40	40	30.0	100	100	4.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		
307443	PS-M80200-W1	30	30	25.0	100	100	3.0	106.1	142.000	142.000	142.000	142.000	144.100	14.0		



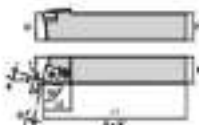
See pages 447-448 for details

PCBN G2,2[®]

order number	catalogue number	W	D	L	W ₁	L ₁	weight [g]	stock price	stock price	stock price	stock price	stock price	stock price
right hand													
381004	PCBN G2,2 381004	10	10	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
381010	PCBN G2,2 381010	12	12	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
381016	PCBN G2,2 381016	16	16	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
381020	PCBN G2,2 381020	20	20	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
381025	PCBN G2,2 381025	25	25	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
381030	PCBN G2,2 381030	30	30	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
381035	PCBN G2,2 381035	35	35	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
381040	PCBN G2,2 381040	40	40	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
381045	PCBN G2,2 381045	45	45	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
381050	PCBN G2,2 381050	50	50	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
381055	PCBN G2,2 381055	55	55	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0
381060	PCBN G2,2 381060	60	60	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
381065	PCBN G2,2 381065	65	65	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
381070	PCBN G2,2 381070	70	70	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0
381075	PCBN G2,2 381075	75	75	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
381080	PCBN G2,2 381080	80	80	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
381085	PCBN G2,2 381085	85	85	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
381090	PCBN G2,2 381090	90	90	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
381095	PCBN G2,2 381095	95	95	95.0	95.0	95.0	95.0	95.0	95.0	95.0	95.0	95.0	95.0
381100	PCBN G2,2 381100	100	100	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0



Two-piece design for inserts



■ PDM TS[®]

								    						
order number	catalogue number	14	16	18	20	22	24	graph insert	max. length	max. width	max. height	max. weight	max. speed	max. feed
right hand														
301300	PDM03000000	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301310	PDM03000001	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301320	PDM03000002	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301330	PDM03000003	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301340	PDM03000004	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301350	PDM03000005	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301360	PDM03000006	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301370	PDM03000007	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301380	PDM03000008	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301390	PDM03000009	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
left hand														
301400	PDM03000010	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301410	PDM03000011	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301420	PDM03000012	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301430	PDM03000013	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301440	PDM03000014	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301450	PDM03000015	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301460	PDM03000016	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301470	PDM03000017	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301480	PDM03000018	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301490	PDM03000019	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0
301500	PDM03000020	14	16	18	20	22	24	01.100000	310.000	010.000	101.000	011.000	014.000	010.0



See pages 354-355 for details

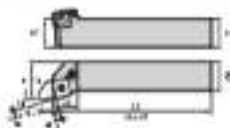


FSDN 40°

order number	catalogue number							shape code						Total Price
		H	B	L	L1	L2	L3		drill size	drill dia	plunge dia	flank face	total length	
307000	FTDNNF000000	50	70	60.0	50.0	50.0	25.0	000000	21.0	21.0	21.0	21.0	214.7	1.37
307001	FTDNNF000010	50	70	70.0	60.0	60.0	25.0	000000	21.0	21.0	21.0	21.0	224.7	1.37
307002	FTDNNF000020	50	70	80.0	60.0	70.0	25.0	000000	21.0	21.0	21.0	21.0	234.7	1.37
307003	FTDNNF000030	50	70	90.0	60.0	80.0	25.0	000000	21.0	21.0	21.0	21.0	244.7	1.37
307004	FTDNNF000040	50	70	100.0	60.0	90.0	25.0	000000	21.0	21.0	21.0	21.0	254.7	1.37
307005	FTDNNF000050	50	70	110.0	60.0	100.0	25.0	000000	21.0	21.0	21.0	21.0	264.7	1.37



See pages 354-355 for details

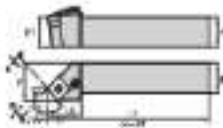


FSDN 75°

														
order number	catalogue number	H	B	L	L1	L2	L3	depth mm	drill size	drill dia	plunge dia	flank face	total length	total price
right hand														
307006	FTDNNF000060	50	70	70.0	60.0	70.0	25.0	000000	21.0	21.0	21.0	21.0	224.7	1.37
307007	FTDNNF000070	50	70	80.0	60.0	80.0	25.0	000000	21.0	21.0	21.0	21.0	234.7	1.37
307008	FTDNNF000080	50	70	90.0	60.0	90.0	25.0	000000	21.0	21.0	21.0	21.0	244.7	1.37
307009	FTDNNF000090	50	70	100.0	60.0	100.0	25.0	000000	21.0	21.0	21.0	21.0	254.7	1.37
307010	FTDNNF000100	50	70	110.0	60.0	110.0	25.0	000000	21.0	21.0	21.0	21.0	264.7	1.37
left hand														
307011	FTDNL000000	50	70	70.0	60.0	70.0	25.0	000000	21.0	21.0	21.0	21.0	224.7	1.37
307012	FTDNL000010	50	70	80.0	60.0	80.0	25.0	000000	21.0	21.0	21.0	21.0	234.7	1.37
307013	FTDNL000020	50	70	90.0	60.0	90.0	25.0	000000	21.0	21.0	21.0	21.0	244.7	1.37
307014	FTDNL000030	50	70	100.0	60.0	100.0	25.0	000000	21.0	21.0	21.0	21.0	254.7	1.37
307015	FTDNL000040	50	70	110.0	60.0	110.0	25.0	000000	21.0	21.0	21.0	21.0	264.7	1.37



See pages 444-445 for details

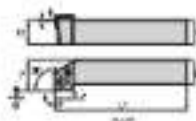


■ PORN 45°

								    							
order number	catalog number	8	9	10	11	12	14	15A	max insert	size mm	max psi	max bar	max ton	ISO 13381	
right hand															
207001	PORN000040	40	40	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207002	PORN000060	60	60	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207003	PORN000080	80	80	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207004	PORN000100	100	100	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207005	PORN000120	120	120	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207006	PORN000140	140	140	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207007	PORN000160	160	160	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207008	PORN000180	180	180	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207009	PORN000200	200	200	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207010	PORN000220	220	220	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207011	PORN000240	240	240	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
left hand															
207012	PORN000040	40	40	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207013	PORN000060	60	60	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207014	PORN000080	80	80	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207015	PORN000100	100	100	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207016	PORN000120	120	120	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207017	PORN000140	140	140	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207018	PORN000160	160	160	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207019	PORN000180	180	180	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207020	PORN000200	200	200	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207021	PORN000220	220	220	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	
207022	PORN000240	240	240	30.0	100	30.0	6.1	6.1	DN, 000000	000.000	000.000	000.000	000.000	10.0	



See pages 466-468 for details



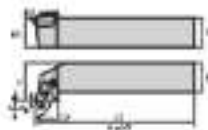
PTCN 90°



Order number	Catalogue number	R	R	A	L1	L2	Spindle holder	Width	Width psi	Width psi	Length	Spindle holder	Spindle holder
Right hand													
32-0002	PTCN010000-0	16	16	30.0	100	100	76.10000	00000	000.000	000.000	000.000	000.000	0.00
32-0001	PTCN010000-0	16	16	30.0	100	100	76.10000	00000	000.000	000.000	000.000	000.000	0.00
32-0004	PTCN010000-0	16	16	30.0	100	100	76.10000	00000	000.000	000.000	000.000	000.000	0.00
32-0010	PTCN010000-0	16	16	30.0	100	100	76.10000	00000	000.000	000.000	000.000	000.000	0.00
32-0014	PTCN010000-0	16	16	30.0	100	100	76.10000	00000	000.000	000.000	000.000	000.000	0.00
32-0001	PTCN010000-0	16	16	30.0	100	100	76.10000	00000	000.000	000.000	000.000	000.000	0.00
Left hand													
32-0002	PTCN010000-0	16	16	30.0	100	100	76.10000	00000	000.000	000.000	000.000	000.000	0.00
32-0001	PTCN010000-0	16	16	30.0	100	100	76.10000	00000	000.000	000.000	000.000	000.000	0.00
32-0004	PTCN010000-0	16	16	30.0	100	100	76.10000	00000	000.000	000.000	000.000	000.000	0.00



Two stages (10-15) for inserts

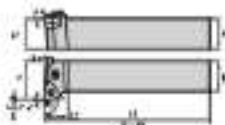


■ PTCN 90°

							    						
order number	catalogue number	H	B	F	L1	L2	page count	max	max L1	max L2	max	max L1+L2	Total PCD
right hand													
307000	PTCN00000000	50	50	50,0	00	50,0	70,00000	50,000	00,000	50,000	50,000	100,000	11,0°
307020	PTCN00000000	50	50	50,0	00	50,0	70,00000	50,000	00,000	50,000	50,000	100,000	11,0°
307030	PTCN00000000	50	50	50,0	00	50,0	70,00000	50,000	00,000	50,000	50,000	100,000	11,0°
307027	PTCN00000000	50	50	50,0	00	50,0	70,00000	50,000	00,000	50,000	50,000	100,000	11,0°
307040	PTCN00000000	50	50	50,0	100	50,0	70,00000	50,000	00,000	50,000	50,000	100,000	11,0°
307050	PTCN00000000	50	50	50,0	100	50,0	70,00000	50,000	00,000	50,000	50,000	100,000	11,0°
307053	PTCN00000000	50	50	50,0	00	50,0	70,00000	50,000	00,000	50,000	50,000	100,000	11,0°
left hand													
307024	PTCN00000000	50	50	50,0	00	50,0	70,00000	50,000	00,000	50,000	50,000	100,000	11,0°
307034	PTCN00000000	50	50	50,0	00	50,0	70,00000	50,000	00,000	50,000	50,000	100,000	11,0°
307039	PTCN00000000	50	50	50,0	00	50,0	70,00000	50,000	00,000	50,000	50,000	100,000	11,0°
307036	PTCN00000000	50	50	50,0	00	50,0	70,00000	50,000	00,000	50,000	50,000	100,000	11,0°
307037	PTCN00000000	50	50	50,0	100	50,0	70,00000	50,000	00,000	50,000	50,000	100,000	11,0°
307038	PTCN00000000	50	50	50,0	100	50,0	70,00000	50,000	00,000	50,000	50,000	100,000	11,0°



See page 164-165 for details



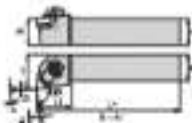
F-PWLN 90°



Order number	Toolholder number	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
right hand																											
303940	FNL-303940-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303941	FNL-303941-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303942	FNL-303942-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303943	FNL-303943-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303944	FNL-303944-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303945	FNL-303945-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303946	FNL-303946-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303947	FNL-303947-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303948	FNL-303948-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303949	FNL-303949-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303950	FNL-303950-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303951	FNL-303951-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303952	FNL-303952-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303953	FNL-303953-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303954	FNL-303954-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303955	FNL-303955-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303956	FNL-303956-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303957	FNL-303957-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303958	FNL-303958-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303959	FNL-303959-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303960	FNL-303960-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
303961	FNL-303961-00	40	40	30.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10



See pages 10 to 12 for details
about clamping methods.



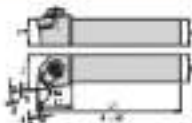
W CCL M-MX 90°

												
Order number	Catalogue number	A	B	C	D	E	max. insert	max. width	max. depth	max. length	max. weight	
right hand												
3022001	CCL M-MX2000M-20001	45	55	20.0	100	20.0	CN65101010	302.201	304.201	11.0 mm	304.240	4 mm
3022110	CCL M-MX2000P-20001	45	55	20.0	100	20.0	CN65101010	302.201	304.201	11.0 mm	304.240	4 mm
left hand												
3022002	CCL M-MX2000M-20002	45	55	20.0	100	20.0	CN65101010	302.201	304.201	11.0 mm	304.240	4 mm

WTS: 3.65 - clamping method is shown



See pages 10 to 12 for details
about clamping methods.



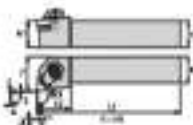
W CCL M-MN 90°

																	
order number	catalogue number	A	B	C	D	E	max. insert	max. width	max. depth	max. length	max. weight	max. length	max. weight	max. length	max. weight	max. length	max. weight
right hand																	
3022111	CCL M-MN2000M-20001	45	55	20.0	100	20.0	CN65101010	302.201	304.201	11.0 mm	304.240	302.240	304.240	11.0 mm	304.240	302.240	304.240
3022117	CCL M-MN2000M-20007	45	55	20.0	100	20.0	CN65101010	302.201	304.201	11.0 mm	304.240	302.240	304.240	11.0 mm	304.240	302.240	304.240
3022118	CCL M-MN2000P-20001	45	55	20.0	100	20.0	CN65101010	302.201	304.201	11.0 mm	304.240	302.240	304.240	11.0 mm	304.240	302.240	304.240
left hand																	
3022116	CCL M-MN2000M-20004	45	55	20.0	100	20.0	CN65101010	302.201	304.201	11.0 mm	304.240	302.240	304.240	11.0 mm	304.240	302.240	304.240

WTS: 3.65 - clamping method is shown



See pages 40 to 43 for tool holder selection charts.



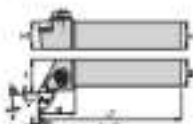
■ COLN-MF 50°

order number	catalogue number	6	8	10	12	16	20	25	32	40	50	63	80	100	125	160	200
right hand																	
500270	COLN-MF50-63MKT	15	20	25.0	32.0	40.0	50.0	63.0	80.0	100.0	125.0	160.0	200.0	250.0	315.0	400.0	500.0

WCT-50° — clamping pressure is shown.



See pages 40 to 43 for tool holder selection charts.



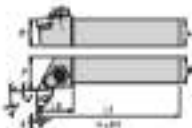
■ COLN-MX 50°

order number	catalogue number	6	8	10	12	16	20	25	32	40	50	63	80	100	125	160	200
right hand																	
500270	COLN-MX50-63MKT	15	20	25.0	32.0	40.0	50.0	63.0	80.0	100.0	125.0	160.0	200.0	250.0	315.0	400.0	500.0
left hand																	
500270	COLN-MX50-63MKT	15	20	25.0	32.0	40.0	50.0	63.0	80.0	100.0	125.0	160.0	200.0	250.0	315.0	400.0	500.0

WCT-50° — clamping pressure is shown.



The upper flange of the toolholder is for inserts.



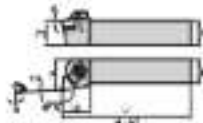
■ CCUN-MN 321

order number	catalogue number	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
right hand																											
901030	CCUN-MN321-1000	10	10	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
901040	CCUN-MN321-1000	10	10	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
left hand																											
901034	CCUN-MN321-1000	10	10	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
901044	CCUN-MN321-1000	10	10	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

WTC - 321 - clamping method in draw



The upper flange of the toolholder is for inserts.



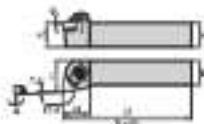
■ CCUN-MF 31.51

order number	catalogue number	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
right hand																											
901030	CCUN-MF31.51-1000	10	10	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
901040	CCUN-MF31.51-1000	10	10	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
left hand																											
901034	CCUN-MF31.51-1000	10	10	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
901044	CCUN-MF31.51-1000	10	10	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

WTC - 31.51 - clamping method in draw



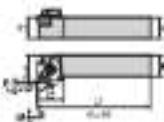
for negative inserts



CELIN-MN 97.5°

order number	catalogue number	0	8	1	1.1	1.2	SPR insert	shape	size mm	max. feed	clamping length	max. clamping force
right hand												
38.0011	CELIN-MN97.5°-0801	12	12	16.5	100	40.5	40.5 x 16.5	100.000	100.000	12.000	100.000	100.000
left hand												
38.0001	CELIN-MN97.5°-0801	12	12	16.5	100	40.5	40.5 x 16.5	100.000	100.000	12.000	100.000	100.000

SPR: 97.5° - clamping position is shown

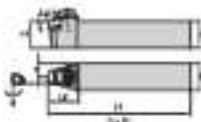


CKLN

order number	catalogue number	0	8	1	1.1	1.2	SPR insert	shape	size mm	clamping length	clamping force	max. clamping force
right hand												
37.0004	CKLN-0100-0801	12	12	16.5	100	40.5	40.5 x 16.5	100.000	100.000	12.000	100.000	100.000
37.0001	CKLN-0100-0801	12	12	16.5	100	40.5	40.5 x 16.5	100.000	100.000	12.000	100.000	100.000
left hand												
37.0001	CKLN-0100-0801	12	12	16.5	100	40.5	40.5 x 16.5	100.000	100.000	12.000	100.000	100.000
37.0002	CKLN-0100-0801	12	12	16.5	100	40.5	40.5 x 16.5	100.000	100.000	12.000	100.000	100.000



See pages 1010 to 1012 and 1013 for details.



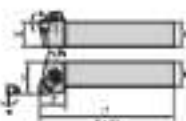
■ C-Style MN

order number	catalog number	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
300004	C-Style MN (C-Style MN)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
300005	C-Style MN (C-Style MN)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
300006	C-Style MN (C-Style MN)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
300007	C-Style MN (C-Style MN)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15

QTY: 100 — corresponding to 1000



See pages 1010 to 1012 and 1013 for details.



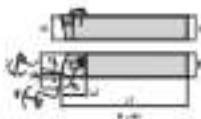
■ C-Style MN

order number	catalog number	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
300007	C-Style MN (C-Style MN)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
300008	C-Style MN (C-Style MN)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
300009	C-Style MN (C-Style MN)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
300010	C-Style MN (C-Style MN)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
300011	C-Style MN (C-Style MN)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15

QTY: 100 — corresponding to 1000



See pages 616-617 and 620-621 for details.

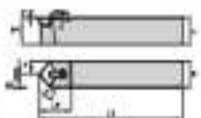


■ CSEF 75°

order number	catalogue number	8	10	12	16	20	25	32	40	50	63	80	100	125	160	200
right hand																
20 0004	732PFCSEF0004	40	45	50	60	75	90	110	140	180	220	280	355	450	560	710
20 0005	732PFCSEF0005	40	45	50	60	75	90	110	140	180	220	280	355	450	560	710
left hand																
20 0006	732PFCSEF0006	40	45	50	60	75	90	110	140	180	220	280	355	450	560	710



See pages 616-617 and 620-621 for details.

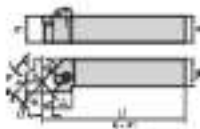


■ CSEF 45°

order number	catalogue number	8	10	12	16	20	25	32	40	50	63	80	100	125	160	200
20 0007	732PFCSEF0007	40	45	50	60	75	90	110	140	180	220	280	355	450	560	710
20 0008	732PFCSEF0008	40	45	50	60	75	90	110	140	180	220	280	355	450	560	710
20 0009	732PFCSEF0009	40	45	50	60	75	90	110	140	180	220	280	355	450	560	710



The upper hole is 2 mm and 2.5 mm for inserts.

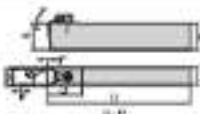


■ CSCP 45°

order number	catalogue number							part number	   						
		R	Q	T	L1	L2	CL		size	size range	hole	clamping	clamping device	type	
right hand															
307604	CSCP4500040	20	30	15.0	100	20.0	4.7	4.0	17-17.040	16040	16010	1 mm	CX400	CTC400	4 mm
307605	CSCP4500042	20	30	16.0	100	20.0	4.7	4.0	17-17.040	16040	16010	1 mm	CX400	CTC400	4 mm
left hand															
307606	CSCP4500041	20	30	16.0	100	20.0	4.7	4.0	17-17.040	16040	16010	1 mm	CX400	CTC400	4 mm



The upper hole is 2 mm and 2.5 mm for inserts.

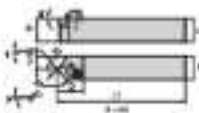


■ CTCF 90°

order number	catalogue number							part number						
		R	Q	T	L1	L2	CL		size	size range	hole	clamping	clamping device	type
307608	CTCF9000020	20	30	16.0	100	11.0	4.7	17-17.040	16020	16010	1.0 mm	CX400	CTC400	4 mm
307609	CTCF9000040	20	30	16.0	100	11.0	4.7	17-17.040	16040	16010	1.0 mm	CX400	CTC400	4 mm
307610	CTCF9000042	20	30	16.0	100	11.0	4.7	17-17.040	16040	16010	1.0 mm	CX400	CTC400	4 mm
307611	CTCF9000045	20	30	16.0	100	11.0	4.7	17-17.040	16040	16010	1.0 mm	CX400	CTC400	4 mm
307612	CTCF9000048	20	30	16.0	100	11.0	4.7	17-17.040	16040	16010	1.0 mm	CX400	CTC400	4 mm
307613	CTCF9000050	20	30	16.0	100	11.0	4.7	17-17.040	16040	16010	1.0 mm	CX400	CTC400	4 mm



Two pieces: C-style Clamped
Insert-Clamped inserts

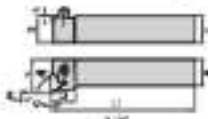


CTDP 45°

order number	catalogue number	H	B	T	L1	L2	approx. weight	holder	insert holder	clamping device	clamping screw	hex
right hand												
301000	CTDP450000H	11	11	4,0	40	10,0	19,00000	30000	30100	CG45H	31000	17mm
left hand												
301001	CTDP450000L	11	11	4,0	40	10,0	19,00000	30000	30100	CG45L	31000	17mm



Two pieces: C-style Clamped
Insert-Clamped inserts

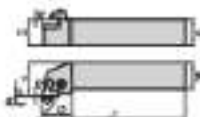


CTDP 90°

order number	catalogue number	H	B	T	L1	L2	approx. weight	holder	insert holder	hex	clamping device	clamping screw	hex
right hand													
301002	CTDP900000H	11	11	10,0	10,0	10,0	19,00000	30000	30104	17mm	CG90H	31000	17mm
301003	CTDP900000L	11	11	10,0	10,0	10,0	19,00000	30000	30104	17mm	CG90L	31000	17mm
left hand													
301004	CTDP900000H	11	11	10,0	10,0	10,0	19,00000	30000	30104	17mm	CG90H	31000	17mm



The upper flange of the toolholder is used to clamp the insert.

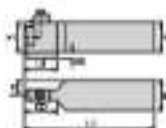


CTGP 90°

																
order number	catalogue number	D	B	T	L1	L2	CTGP front	shape	max. insert	max.	clamping	CTGP max.	max.			
right hand																
307030	CTGP903014	30	14	30.0	40	33.0	17.1 x 3.04	3000	4000	—	CT9015	370.360	2.0 mm			
307032	CTGP903015	30	15	30.0	40	33.0	17.1 x 3.04	3000	4000	—	CT9015	370.360	2.0 mm			
307034	CTGP903018	30	18	30.0	40	33.0	17.1 x 3.04	3000	4000	—	CT9015	370.360	2.0 mm			
307036	CTGP903016	30	16	30.0	40	33.0	17.1 x 3.04	3000	4000	0 mm	CT9015	370.360	4 mm			
307038	CTGP903018	30	18	30.0	40	33.0	17.1 x 3.04	3000	4000	0 mm	CT9015	370.360	4 mm			
307039	CTGP903020	30	20	30.0	40	33.0	17.1 x 3.04	3000	4000	0 mm	CT9015	370.360	4 mm			
left hand																
307035	CTGP903014	30	14	30.0	40	33.0	17.1 x 3.04	3000	4000	—	CT9015	370.360	2.0 mm			
307037	CTGP903016	30	16	30.0	40	33.0	17.1 x 3.04	3000	4000	0 mm	CT9015	370.360	4 mm			
307039	CTGP903020	30	20	30.0	40	33.0	17.1 x 3.04	3000	4000	0 mm	CT9015	370.360	4 mm			



No clamp (only for inserts)



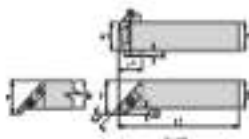
CTDP

													
order number	refrigerant number	H	B	Z	L1	L2	L3	gap insert	coolant	clamp	clamping force	type	
307109	1302P60220000	12	16	12.2	50	—	—	160	0.3X0.4X0.5	RT1	CM19	MT101	CT100
307110	1302P60220100	12	16	16.0	51	—	—	160	0.3X0.5X0.6	RT1	CM19	CM10	604
307111	1302P60220000	16	16	12.2	50	—	—	260	0.3X0.4X0.5	RT1	CM29	CM10	604
307114	1302P60220100	16	16	16.0	51	—	—	260	0.3X0.5X0.6	RT1	CM29	CM10	604
307143	1302P60220000	16	16	12.2	50	25.7	5.5	260	0.3X0.5X0.6	RT1	CM29	CM10	604

RT1: 120° coolant injection; RT2: 120° and 180° coolant injection



See page 11 for inserts



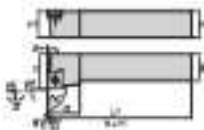
CR27

												  	
order number	catalogue number	R	S	T	L1	L2	L3	L4	CR27 insert	see	clamp	change screw	see
right hand													
WY110	CR2702200000	10	10	10.0	10.0	—	—	1.0	10.000000	WY11	CR2714	WY1201	1.0 mm
WY116	CR2702200000	16	16	16.0	16.0	—	—	1.0	10.000000	WY12	CR2716	CR2712	16.0
WY120	CR2702200000	20	20	20.0	20.0	—	—	1.0	10.000000	WY13	CR2718	CR2712	20.0
WY120	CR2702200000	20	20	20.0	20.0	10.0	10.0	1.0	10.000000	WY15	CR2720	CR2712	20.0
left hand													
WY116	CR2702200000	16	16	16.0	16.0	—	—	1.0	10.000000	WY17	CR2716	WY1201	1.0 mm
WY120	CR2702200000	20	20	20.0	20.0	—	—	1.0	10.000000	WY18	CR2718	CR2712	16.0
WY116	CR2702200000	16	16	16.0	16.0	—	—	1.0	10.000000	WY19	CR2716	CR2712	16.0
WY120	CR2702200000	20	20	20.0	20.0	10.0	—	1.0	10.000000	WY20	CR2718	CR2712	16.0
WY120	CR2702200000	20	20	20.0	20.0	10.0	10.0	1.0	10.000000	WY21	CR2718	CR2712	16.0

WY11, WY12 toolholders are able to use WY12 and WY13 insert types.



See pages 36-38 for details

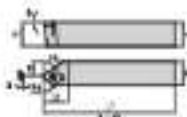


■ SCLC 40°

order number	catalogue number	D	D1	L	L1	L2	chip breaker	clamping screw	key	insert screw	Type
right hand											
3209-05	WCL12100005	10	10	10.0	10	10.0	CC-100004	—	—	—	W9102 11
3209-12	WCL12100012	12	12	10.0	12	12.0	CC-100004	—	—	—	W9103 11
3209-16	WCL12100016	16	16	10.0	16	16.0	CC-101006	—	—	—	W9103 16
3209-20	WCL12100020	20	20	10.0	20	20.0	CC-101006	ISO7090	ISO2	1.0 mm	W9103 16
3209-25	WCL12100025	25	25	10.0	25	25.0	CC-101006	ISO7090	ISO2	1.0 mm	W9103 16
3209-32	WCL12100032	32	32	10.0	32	32.0	CC-101006	ISO7090	ISO4	1 mm	W9103 16
3209-40	WCL12100040	40	40	10.0	40	40.0	CC-101006	ISO7090	ISO4	1 mm	W9103 16
left hand											
3209-05	WCL12100005	10	10	10.0	10	10.0	CC-100004	—	—	—	W9102 11
3209-12	WCL12100012	12	12	10.0	12	12.0	CC-100004	—	—	—	W9103 11
3209-16	WCL12100016	16	16	10.0	16	16.0	CC-101006	—	—	—	W9103 16
3209-20	WCL12100020	20	20	10.0	20	20.0	CC-101006	ISO7090	ISO2	1.0 mm	W9103 16
3209-25	WCL12100025	25	25	10.0	25	25.0	CC-101006	ISO7090	ISO2	1.0 mm	W9103 16
3209-32	WCL12100032	32	32	10.0	32	32.0	CC-101006	ISO7090	ISO4	1 mm	W9103 16
3209-40	WCL12100040	40	40	10.0	40	40.0	CC-101006	ISO7090	ISO4	1 mm	W9103 16



See pages 36-38 for details

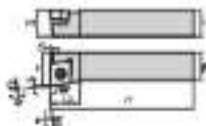


■ SCLP 40°

order number	catalogue number	D	D1	L	L1	L2	chip breaker	insert screw	Type
right hand									
3209-05	WCL12100005	10	10	10.0	10	10.0	CC-100004	W9103	11
left hand									
3209-05	WCL12100005	10	10	10.0	10	10.0	CC-100004	W9103	11



Two pieces fit - fit in inserts

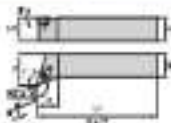


■ SCLP 90°

order number	catalogue number	8	8	9	1.1	1.2	grind wheel	insert width	Tool
right hand									
3819071	38190710000	16	16	11.5	150	14.5	12 mm	400 P12	1.1
3819076	38190760000	12	12	12.5	150	14.5	12 mm	400 P12	1.1
left hand									
3819072	38190720000	12	12	12.5	150	14.5	12 mm	400 P12	1.1



Two pieces fit - fit in inserts

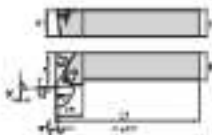


■ SCLC 107.3°

order number	catalogue number	8	8	9	1.1	1.2	grind wheel	insert width	grind wheel	Tool	Insert width	Tool
  												
right hand												
3819402	38194020000	16	16	12.5	150	15.5	12 mm	400 P12	1.1	mm	400 P12	1.1
3819407	38194070000	16	16	12.5	150	15.5	12 mm	400 P12	1.1	mm	400 P12	1.1
3819408	38194080000	16	16	12.5	150	15.5	12 mm	400 P12	1.1	mm	400 P12	1.1
3819409	38194090000	16	16	12.5	150	15.5	12 mm	400 P12	1.1	mm	400 P12	1.1
left hand												
3819403	38194030000	16	16	12.5	150	15.5	12 mm	400 P12	1.1	mm	400 P12	1.1
3819408	38194080000	16	16	12.5	150	15.5	12 mm	400 P12	1.1	mm	400 P12	1.1
3819409	38194090000	16	16	12.5	150	15.5	12 mm	400 P12	1.1	mm	400 P12	1.1
3819410	38194100000	16	16	12.5	150	15.5	12 mm	400 P12	1.1	mm	400 P12	1.1



See pages 447-448 for details

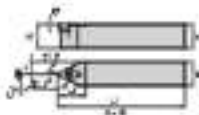


S-STYLE S*

												
order number	catalogue number	H	E	T	L1	L2	screw thread	size	flank form	hex	insert screw	Tor
right hand												
307000	30.010.000000	10	10	10	10	10,0	SC 17000	—	—	—	M5x10	17
308000	30.010.010000	10	10	10	10	10,0	SC 17000	—	—	—	M5x10	17
309010	30.010.010010	10	10	10	10	10,0	SC 17000	—	—	—	M5x10	17
307010	30.010.000010	10	10	10	10	10,0	SC 17000	—	—	—	M5x10	17
307020	30.010.000020	10	10	10	10	10,0	SC 17000	1000100	1000	3.5mm	M5x10	17
307030	30.010.000030	10	10	10	10	10,0	SC 17000	—	—	—	M5x10	17
307040	30.010.000040	10	10	10	10	10,0	SC 17000	1000100	1000	3.5mm	M5x10	17
307050	30.010.000050	10	10	10	10	10,0	SC 17000	1000100	1000	4mm	M5x10	17
307060	30.010.000060	10	10	10	10	10,0	SC 17000	1000100	1000	3.5mm	M5x10	17
307070	30.010.000070	10	10	10	10	10,0	SC 17000	1000100	1000	4mm	M5x10	17
307080	30.010.000080	10	10	10	10	10,0	SC 17000	1000100	1000	3.5mm	M5x10	17
307090	30.010.000090	10	10	10	10	10,0	SC 17000	1000100	1000	4mm	M5x10	17
308010	30.010.010010	10	10	10	10	10,0	SC 17000	1000100	1000	4mm	M5x10	17
left hand												
307000	30.010.000000	10	10	10	10	10,0	SC 17000	—	—	—	M5x10	17
308000	30.010.010000	10	10	10	10	10,0	SC 17000	—	—	—	M5x10	17
309010	30.010.010010	10	10	10	10	10,0	SC 17000	—	—	—	M5x10	17
307010	30.010.000010	10	10	10	10	10,0	SC 17000	—	—	—	M5x10	17
307020	30.010.000020	10	10	10	10	10,0	SC 17000	—	—	—	M5x10	17
307030	30.010.000030	10	10	10	10	10,0	SC 17000	1000100	1000	3.5mm	M5x10	17
307040	30.010.000040	10	10	10	10	10,0	SC 17000	1000100	1000	4mm	M5x10	17
307050	30.010.000050	10	10	10	10	10,0	SC 17000	1000100	1000	3.5mm	M5x10	17
307060	30.010.000060	10	10	10	10	10,0	SC 17000	1000100	1000	4mm	M5x10	17
307070	30.010.000070	10	10	10	10	10,0	SC 17000	1000100	1000	3.5mm	M5x10	17
307080	30.010.000080	10	10	10	10	10,0	SC 17000	1000100	1000	4mm	M5x10	17
307090	30.010.000090	10	10	10	10	10,0	SC 17000	1000100	1000	3.5mm	M5x10	17



See pages 154-155 for details.

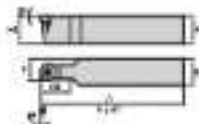


W S23NC 42.5°

order number	catalogue number	A	B	C	D	E	F	max. insert	max. width	max. height	max. length	max. weight
W S23NC 42.5°	W S23NC 42.5°	8	8	4.0	4.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23NC 42.5°	W S23NC 42.5°	10	10	5.0	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23NC 42.5°	W S23NC 42.5°	12	12	6.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23NC 42.5°	W S23NC 42.5°	14	14	8.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23NC 42.5°	W S23NC 42.5°	16	16	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23NC 42.5°	W S23NC 42.5°	20	20	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23NC 42.5°	W S23NC 42.5°	25	25	15.0	15.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23NC 42.5°	W S23NC 42.5°	30	30	18.0	18.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23NC 42.5°	W S23NC 42.5°	40	40	25.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0



See pages 154-155 for details.



W S23C

order number	catalogue number	A	B	C	D	E	F	max. insert	max. width	max. height	max. length	max. weight
W S23C	W S23C	8	8	4.0	4.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	10	10	5.0	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	12	12	6.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	14	14	8.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	16	16	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	20	20	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	25	25	15.0	15.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	30	30	18.0	18.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	40	40	25.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	50	50	32.0	32.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	60	60	40.0	40.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	80	80	50.0	50.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	100	100	60.0	60.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	120	120	70.0	70.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	150	150	85.0	85.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	200	200	110.0	110.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	250	250	135.0	135.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	300	300	160.0	160.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	400	400	210.0	210.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	500	500	260.0	260.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	600	600	310.0	310.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	800	800	400.0	400.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
W S23C	W S23C	1000	1000	500.0	500.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0



See page 160-161 for details

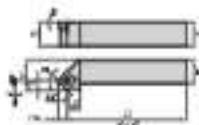


SSSC 70°

order number	catalogue number	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
right hand																											
SS700	SS700000000	16	16	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
SS710	SS710000000	20	20	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
SS720	SS720000000	25	25	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
left hand																											
SS710	SS710000000	16	16	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
SS720	SS720000000	20	20	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
SS730	SS730000000	25	25	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0



Two pieces (S&L) for inserts

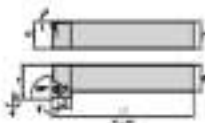


■ SSC-40°

																		
order number	catalogue number	R	R	A	L1	L2	L4	L10	graph number	type	shape	size	lead angle	lead angle	lead angle			
right hand																		
SSC401	SSC40100000	40	40	100	100	40.0	6.0	6.0	CC-100100	SSC401	SSC40	3.0 mm	SSC401	115				
SSC402	SSC40200010	40	40	100	100	40.0	6.0	6.0	CC-100100	SSC402	SSC40	4 mm	SSC402	115				
SSC404	SSC40400010	40	40	100	100	40.0	6.0	6.0	CC-100100	SSC403	SSC40	4 mm	SSC403	115				
left hand																		
SSC405	SSC40500000	40	40	100	100	40.0	6.0	6.0	CC-100100	SSC405	SSC40	3.0 mm	SSC405	115				
SSC406	SSC40600010	40	40	100	100	40.0	6.0	6.0	CC-100100	SSC406	SSC40	4 mm	SSC406	115				
SSC408	SSC40800010	40	40	100	100	40.0	6.0	6.0	CC-100100	SSC408	SSC40	4 mm	SSC408	115				



See pages 346-348 for details

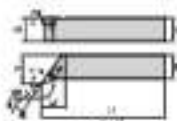


STFC 90°

order number	catalogue number	W	B	L	L1	L2	spindle thread	shape	clamping system	feed	insert system	range
right hand												
307008	STFC 900008	30	30	30,0	40	10,0	TC 1/2-16 UNF	—	—	—	MTX 130	10
307009	STFC 900009	30	30	30,0	50	10,0	TC 1/2-16 UNF	STFC 900	STFC	0,2 mm	MTX 130	10
307010	STFC 900010	30	30	30,0	50	10,0	TC 1/2-16 UNF	STFC 900	STFC	0,2 mm	MTX 130	10
left hand												
307014	STFC 900014	30	30	30,0	40	10,0	TC 1/2-16 UNF	STFC 900	STFC	0,2 mm	MTX 130	10
307015	STFC 900015	30	30	30,0	50	10,0	TC 1/2-16 UNF	STFC 900	STFC	0,2 mm	MTX 130	10
307016	STFC 900016	30	30	30,0	50	10,0	TC 1/2-16 UNF	STFC 900	STFC	0,2 mm	MTX 130	10



See pages 346-348 for details

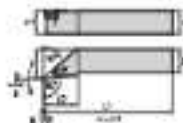


SWH 107,5°

order number	catalogue number	W	B	L	L1	L2	spindle thread	shape	clamping system	feed	insert system	range
right hand												
307017	SWH 107500	30	30	30,0	40	10,0	TC 1/2-16 UNF	SWH 107,5	STFC	0,2 mm	MTX 130	10
307018	SWH 107501	30	30	30,0	50	10,0	TC 1/2-16 UNF	SWH 107,5	STFC	0,2 mm	MTX 130	10
307019	SWH 107502	30	30	30,0	50	10,0	TC 1/2-16 UNF	SWH 107,5	STFC	0,2 mm	MTX 130	10
left hand												
307024	SWH 107504	30	30	30,0	40	10,0	TC 1/2-16 UNF	SWH 107,5	STFC	0,2 mm	MTX 130	10
307025	SWH 107505	30	30	30,0	50	10,0	TC 1/2-16 UNF	SWH 107,5	STFC	0,2 mm	MTX 130	10
307026	SWH 107506	30	30	30,0	50	10,0	TC 1/2-16 UNF	SWH 107,5	STFC	0,2 mm	MTX 130	10



See pages 156-158 for details

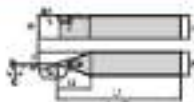


■ SWB 92°

to the number	catalogue number	R	D	L	L1	L2	graph element	shape	SWB clamping	feed	insert clamping	feed
right hand												
SWB 92/16	SWB92160000-16	16	16	20.0	1.0	20.0	SW 16/16/16	SWB9216	2700	0.2 mm	SW 16/16	1.0
SWB 92/18	SWB92180000-18	18	18	20.0	1.0	20.0	SW 18/18/18	SWB9218	2700	0.2 mm	SW 18/18	1.0
SWB 92/20	SWB92200000-20	20	20	20.0	1.0	20.0	SW 20/20/20	SWB9220	2700	0.2 mm	SW 20/20	1.0
SWB 92/25	SWB92250000-25	25	25	20.0	1.0	20.0	SW 25/25/25	SWB9225	2700	0.2 mm	SW 25/25	1.0
left hand												
SWB 92/16	SWB92160000-16	16	16	20.0	1.0	20.0	SW 16/16/16	SWB9216	2700	0.2 mm	SW 16/16	1.0
SWB 92/18	SWB92180000-18	18	18	20.0	1.0	20.0	SW 18/18/18	SWB9218	2700	0.2 mm	SW 18/18	1.0
SWB 92/20	SWB92200000-20	20	20	20.0	1.0	20.0	SW 20/20/20	SWB9220	2700	0.2 mm	SW 20/20	1.0
SWB 92/25	SWB92250000-25	25	25	20.0	1.0	20.0	SW 25/25/25	SWB9225	2700	0.2 mm	SW 25/25	1.0



See pages 156-158 for details



■ SWB 72.5°

to the number	catalogue number	R	D	L	L1	L2	graph element	shape	SWB clamping	feed	insert clamping	feed
right hand												
SWB 72/16	SWB72160000-16	16	16	20.0	1.0	20.0	SW 16/16/16	SWB7216	2700	0.2 mm	SW 16/16	1.0
SWB 72/18	SWB72180000-18	18	18	20.0	1.0	20.0	SW 18/18/18	SWB7218	2700	0.2 mm	SW 18/18	1.0
SWB 72/20	SWB72200000-20	20	20	20.0	1.0	20.0	SW 20/20/20	SWB7220	2700	0.2 mm	SW 20/20	1.0
left hand												
SWB 72/16	SWB72160000-16	16	16	20.0	1.0	20.0	SW 16/16/16	SWB7216	2700	0.2 mm	SW 16/16	1.0

Today's modern boring operations require the most reliable, high-performance tools. WIDIA® offers an extensive range of toolholders for internal boring to meet even the most precise production demands across a broad spectrum of workplace shapes and sizes.

Tools for Internal Boring



WIDIA boring bars, available with both a conventional steel shank or a vibration-resistant outside shank and coolant hole, guarantee consistent results and enhanced production reliability.

D-Style Clamping

- Insert for negative angle inserts.
- Clamp assembly contains clamp, screw, and retaining ring.
- Simple insert changing.
- Inserts insert axially and radially.
- Reduced chatter and extended tool life.

P-Style Clamping

- Lever type clamping system for negative insertable inserts.
- No adjustment to chip flow.
- Tool insert changes.

P style available in metric sizes only.



S-Style Clamping

- Corner clamping option for positive isotropic inserts
- Compact design for high stability and cost efficiency
- Carbide shims for additional tool protection

C-Style Clamping

- Height adjustable clamp permits use of additional chipbreakers
- Universal clamping option for positive and negative face inserts
- Retract engineering makes it easy to handle
- Carbide shims for extra tool protection



Each system/clamping system offers various options to fit your specific industrial needs. Visit the Illustration Tool for your application and navigate to the corresponding page to get the correct selection.



D-Style Clamping



The D-style clamping system is used for welding with negative electrode. An extremely high clamping force. The tool is produced by a reliable manufacturer.

	A-0028		A-0029		A-0030		A-0031
	97		100		102		107
	Page		Page		Page		Page
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	A-0032		A-0033		A-0034		
	97		97		97		
	Page		Page		Page		
	108		108		108		

P-Style Clamping



The P-style clamping system for negative electrode is used with negative electrode. An extremely high clamping force. The tool is produced by a reliable manufacturer. The tool is produced by a reliable manufacturer.

	A-0035		A-0036		A-0037
	97		97		97
	Page		Page		Page
	108		108		108

C-Style Clamping



For clamping systems on regular and custom toolholders to ISO 505. This universal clamping system is suited best when to handle cross-shaped workpieces. It can handle the use of standard toolholders. A clamping pin provides additional tool protection. In addition, with cooling edge design systems, it can be used for greater tool life.

	C-CC16-M80		C-CC16-M80		C-CC16-M80		C-CC16-M80
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	Page		Page		Page		Page
	120		120		120		120
	C-CC16-M80		C-CC16-M80		C-CC16-M80		C-CC16-M80
	97		97		97		97
	Page		Page		Page		Page
	120		120		120		120

S-Style Clamping



Cross clamping system for regular toolholders. It is suited for use with ISO 505 tool. Custom design using a minimum of 3 parts for high reliability and cost efficiency. It can handle the use of standard toolholders. In addition, with cooling edge design systems, it can be used for greater tool life. Custom JTC can be used for greater tool life.

	S-0010		S-0010		S-0010		S-0010
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	S-0010		S-0010		S-0010		S-0010
	97		97		97		97
	Page		Page		Page		Page
	120		120		120		120
	S-0010		S-0010		S-0010		S-0010
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	Page		Page		Page		Page
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	S-0010		S-0010		S-0010		S-0010
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	S-0010		S-0010		S-0010		S-0010
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	Page		Page		Page		Page
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How Do Catalogue Numbers Work?

Each character in our catalogue number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.



A	32	S	D	C
Size Type	Size Number	Size Length**	Tool Holding Method	Tool Shape
A  Tool free with round B  Tool free with square C  Toolholder D  Toolholder for lock control E  Toolholder with lock control F  Toolholder with lock control G  Toolholder H  Toolholder (new) I  Toolholder with lock control	 Notes: A two-digit number indicates the size diameter in mm. If the diameter is represented by a one-digit number, a 0 must still be used in front of it. Example: 10mm → 10 16mm → 16	1 → 1 2.5 → 2.5 4 → 4 4.5 → 4.5 5 → 5 5.5 → 5.5 6 → 6 6.5 → 6.5 7 → 7 8 → 8 8.5 → 8.5 10 → 10 11 → 11 12 → 12 14 → 14 16 → 16 18 → 18 20 → 20 22 → 22 **Used only when more than one length is available or a special length is required.	B  C  E  F 	A  B  C  D  E  F  G  H  I  J  K 

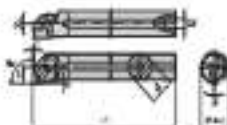
By following the way-to-use guide, you can identify the correct product to meet your needs



L	N	L	12	KC04
See Chips in Insert Keys	Insert Clearance Angle	Standard Tool	Insert Size Cutting Edge Length L10	Additional Information
1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12



Tool shank with through coolant
See pages 300-305 for details

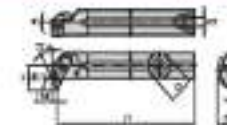


■ A DCLN 95°

order number	catalogue number	D	Shank	2	1.1	1.2	95°	graph sheet	draw	draw	Tool File	Clamp assembly	drilled pin	Tool File
right hand														
3386571	A0000000000000000	12	100	27.0	300	18	1000000	12	1000000	12	1000000	12	1000000	12
3386572	A0000000000000000	16	100	27.0	300	18	1000000	12	1000000	12	1000000	12	1000000	12
3386573	A0000000000000000	20	100	27.0	300	18	1000000	12	1000000	12	1000000	12	1000000	12
3386574	A0000000000000000	25	100	27.0	300	18	1000000	12	1000000	12	1000000	12	1000000	12
left hand														
3386575	A0000000000000000	12	100	27.0	300	18	1000000	12	1000000	12	1000000	12	1000000	12
3386576	A0000000000000000	16	100	27.0	300	18	1000000	12	1000000	12	1000000	12	1000000	12
3386577	A0000000000000000	20	100	27.0	300	18	1000000	12	1000000	12	1000000	12	1000000	12
3386578	A0000000000000000	25	100	27.0	300	18	1000000	12	1000000	12	1000000	12	1000000	12



Tool shank with through coolant
See pages 300-305 for details

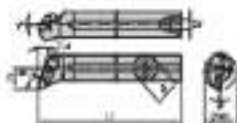


■ A DCPN 117.3°

order number	catalogue number	D	Shank	2	1.1	1.2	117.3°	graph sheet	draw	draw	Tool File	Clamp assembly	drilled pin	Tool File
right hand														
3386579	A0000000000000000	12	100	27.0	300	18	1000000	12	1000000	12	1000000	12	1000000	12
3386580	A0000000000000000	16	100	27.0	300	18	1000000	12	1000000	12	1000000	12	1000000	12
3386581	A0000000000000000	20	100	27.0	300	18	1000000	12	1000000	12	1000000	12	1000000	12
left hand														
3386582	A0000000000000000	12	100	27.0	300	18	1000000	12	1000000	12	1000000	12	1000000	12
3386583	A0000000000000000	16	100	27.0	300	18	1000000	12	1000000	12	1000000	12	1000000	12



Short shank with through coolant.
 See pages 104-105 for details.

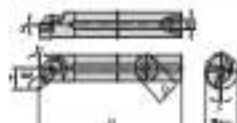


WA-CD30 107.5°

order number	catalogue number	D	ØD	L	ØL	ØD	ØL	high insert	side	side screw	Tool Plus	clamp assembly	adjusted job	Tool Plus
right hand														
500000	ACD300000000000	16	16.0	110.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
500001	ACD300000000000	16	16.0	110.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
left hand														
500000	ACD300000000000	16	16.0	110.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
500001	ACD300000000000	16	16.0	110.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0



Short shank with through coolant.
 See pages 104-105 for details.

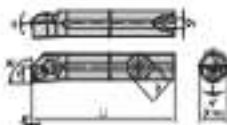


WA-CD30 102°

order number	catalogue number	D	ØD	L	ØL	ØD	ØL	high insert	side	side screw	Tool Plus	clamp assembly	adjusted job	Tool Plus
right hand														
500000	ACD300000000000	16	16.0	110.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
500001	ACD300000000000	16	16.0	110.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
500002	ACD300000000000	16	16.0	110.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
500003	ACD300000000000	16	16.0	110.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
500004	ACD300000000000	16	16.0	110.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
left hand														
500000	ACD300000000000	16	16.0	110.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
500001	ACD300000000000	16	16.0	110.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
500002	ACD300000000000	16	16.0	110.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
500003	ACD300000000000	16	16.0	110.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
500004	ACD300000000000	16	16.0	110.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0



Steel shank with through coolant.
See pages 494-500 for details.

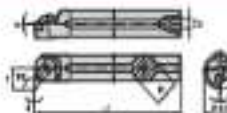


■ A-DT1N 90°

order number	catalogue number	D-Style						part number	size	size code	Tool Flute	chip geometry	shank dia.	Tool Flute
		D	Flute	T	L	TS	W							
right hand														
200000	A-DT1N90-000000	12	0.02	0.2	200	18	14.97	14.0	16.0000	16	16	160000	16	16
200000	A-DT1N90-000000	12	0.02	0.2	200	18	14.97	14.0	16.0000	16	16	160000	16	16
left hand														
200000	A-DT1N90-000000	12	0.02	0.2	200	18	14.97	14.0	16.0000	16	16	160000	16	16
200000	A-DT1N90-000000	12	0.02	0.2	200	18	14.97	14.0	16.0000	16	16	160000	16	16



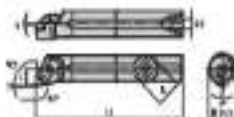
Steel shank with through coolant.
See pages 494-500 for details.



■ A-DT1N 10°



Clamp shank with through coolant
See page 106-107 for details

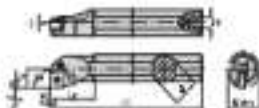


■ A DIN 95°

order number	catalog number	D	Series	4	15	15	90°	high insert	shape	draw screw	Tool Plus	clamping assembly	cooled job	Tool Plus
right hand														
500001	A000WUNL000100	15	100	110	100	100	100	100	100	100	100	100	100	100
500002	A000WUNL000100	15	100	110	100	100	100	100	100	100	100	100	100	100
500003	A000WUNL000100	15	100	110	100	100	100	100	100	100	100	100	100	100
500004	A000WUNL000100	15	100	110	100	100	100	100	100	100	100	100	100	100
left hand														
500005	A000WUNL000100	15	100	110	100	100	100	100	100	100	100	100	100	100
500006	A000WUNL000100	15	100	110	100	100	100	100	100	100	100	100	100	100
500007	A000WUNL000100	15	100	110	100	100	100	100	100	100	100	100	100	100
500008	A000WUNL000100	15	100	110	100	100	100	100	100	100	100	100	100	100



Cool shank with
through coolant.
See page 360-365
for details.

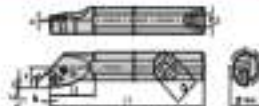


■ A PCLN 95°

														
order number	reference number	2	3	4	5	6	8	depth mm	drill mm	drill size	size	single piece	with handle	Tool Life
right hand														
320400	ASDPTCLN95.01	25	32.0	40.0	50.0	63.0	80.0	100	0.15	100,000	—	—	—	100,000
320405	ASDPTCLN95.02	32	40.0	50.0	63.0	80.0	100	120	0.15	100,000	100,000	100,000	100,000	100,000
320410	ASDPTCLN95.03	40	50.0	63.0	80.0	100	120	150	0.15	100,000	100,000	100,000	100,000	100,000
320415	ASDPTCLN95.04	50	63.0	80.0	100	120	150	180	0.15	100,000	100,000	100,000	100,000	100,000
left hand														
320400	ASDPTCLN95.01	25	32.0	40.0	50.0	63.0	80.0	100	0.15	100,000	—	—	—	100,000
320405	ASDPTCLN95.02	32	40.0	50.0	63.0	80.0	100	120	0.15	100,000	100,000	100,000	100,000	100,000
320410	ASDPTCLN95.03	40	50.0	63.0	80.0	100	120	150	0.15	100,000	100,000	100,000	100,000	100,000
320415	ASDPTCLN95.04	50	63.0	80.0	100	120	150	180	0.15	100,000	100,000	100,000	100,000	100,000



Cool shank with
through coolant.
See page 360-365
for details.

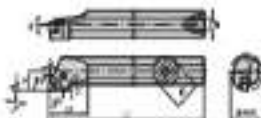


■ A PTN 30°

														
Order number	Reference number	2	3	4	5	6	8	Depth mm	mm	mm	mm	mm	mm	mm
Right hand														
320500	ASDPTTN30.01	25	32.0	40.0	50.0	63.0	80.0	100	0.15	100,000	100,000	100,000	100,000	100,000
320505	ASDPTTN30.02	32	40.0	50.0	63.0	80.0	100	120	0.15	100,000	100,000	100,000	100,000	100,000
320510	ASDPTTN30.03	40	50.0	63.0	80.0	100	120	150	0.15	100,000	100,000	100,000	100,000	100,000
Left hand														
320500	ASDPTTN30.01	25	32.0	40.0	50.0	63.0	80.0	100	0.15	100,000	100,000	100,000	100,000	100,000
320505	ASDPTTN30.02	32	40.0	50.0	63.0	80.0	100	120	0.15	100,000	100,000	100,000	100,000	100,000
320510	ASDPTTN30.03	40	50.0	63.0	80.0	100	120	150	0.15	100,000	100,000	100,000	100,000	100,000



Steel insert with through coolant
See page 166 (see 11 0000)



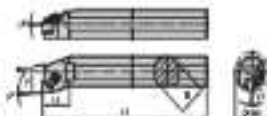
■ A PWLN 20°

															
order number	catalogue reference	R	Class	0	1	2	3	4	length	mm	inch	mm	length	inch	total
right hand															
500000	ALUMINUM BLADE	16	20.0	11.0	20.0	10	16.0 17.50°	140	400.00000	—	—	—	311.000	304.110	—
500001	ALUMINUM BLADE	16	20.0	11.0	20.0	—	16.0 17.50°	140	400.00000	—	—	—	311.000	304.110	0.0°
500002	ALUMINUM BLADE	16	20.0	11.0	20.0	—	16.0 16.50°	140	400.00000	302.000	310.000	300.000	311.000	304.100	0.0°
500003	ALUMINUM BLADE	16	20.0	11.0	20.0	—	16.0 12.50°	140	400.00000	302.000	310.000	300.000	311.000	304.100	—
left hand															
500004	ALUMINUM BLADE	16	20.0	11.0	20.0	10	16.0 17.50°	140	400.00000	—	—	—	311.000	304.110	—
500005	ALUMINUM BLADE	16	20.0	11.0	20.0	—	16.0 17.50°	140	400.00000	—	—	—	311.000	304.110	0.0°
500006	ALUMINUM BLADE	16	20.0	11.0	20.0	—	16.0 16.50°	140	400.00000	302.000	310.000	300.000	311.000	304.100	—



See pages 40-41 for coolant
flow direction details.

Steel shank with
through coolant



■ C-CLIN-MX 90°

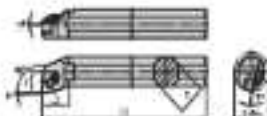
order number	catalogue number	D	D max	F	L1	L2	R°	R°	graph detail	shape	max. clamping force	max. force	clamping possibility	note
right hand														
322001	322011 C-CLIN-MX 90°	40	40.2	27.2	200	40	+0.3	-0.2	Technical data	322 001	304 200	11 mm	327 191	324 200 4 mm
322004	322014 C-CLIN-MX 90°	40	40.2	27.2	200	40	+0.3	-0.2	Technical data	322 001	304 200	11 mm	327 191	324 200 4 mm
left hand														
322004	322014 C-CLIN-MX 90°	40	40.2	27.2	200	40	+0.3	-0.2	Technical data	322 001	304 200	11 mm	327 191	324 200 4 mm
322001	322011 C-CLIN-MX 90°	40	40.2	27.2	200	40	+0.3	-0.2	Technical data	322 001	304 200	11 mm	327 191	324 200 4 mm

MX 90° 90° - clamping direction is shown



See pages 40-41 for coolant
flow direction details.

Steel shank with
through coolant

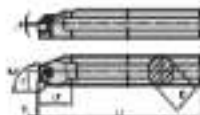


■ C-CLIN-MN 90°

order number	catalogue number	D	D max	F	L1	L2	R°	R°	graph detail	shape	max. clamping force	max. force	clamping possibility	note
right hand														
322001	322011 C-CLIN-MN 90°	40	40.2	27.2	200	40	+0.3	-0.2	Technical data	322 001	304 200	11 mm	327 191	324 200 4 mm
322004	322014 C-CLIN-MN 90°	40	40.2	27.2	200	40	+0.3	-0.2	Technical data	322 001	304 200	11 mm	327 191	324 200 4 mm
left hand														
322001	322011 C-CLIN-MN 90°	40	40.2	27.2	200	40	+0.3	-0.2	Technical data	322 001	304 200	11 mm	327 191	324 200 4 mm
322004	322014 C-CLIN-MN 90°	40	40.2	27.2	200	40	+0.3	-0.2	Technical data	322 001	304 200	11 mm	327 191	324 200 4 mm

MX 90° 90° - clamping direction is shown

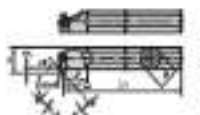

 Two passages (16 mm) per
 16 mm 16 mm for inserts

 Steel shank with
 through coolant

#S-CCSN-MX

order number	catalogue number	D	D max	L	L1	L2	W	H	max insert	min	max	max	clamp	max
right hand														
3001001	3001001000000000	40	16.2	17.0	300	16.0	16.0	16.0	20.0 (10000)	20.0 (20)	20.0 (20)	2.0 mm	20.0 (20)	4 mm
left hand														
3001000	3001000000000000	40	16.2	17.0	300	16.0	16.0	16.0	20.0 (10000)	20.0 (20)	20.0 (20)	2.0 mm	20.0 (20)	4 mm

ATC: 400 — clamping system is shown


 Two passages (16 mm) per
 16 mm 16 mm for inserts

 Steel shank with
 through coolant

#S-CCSN-MX 45°

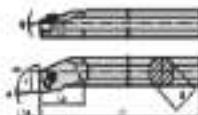
order number	catalogue number	D	D max	L	L1	L2	W	H	max insert	min	max	max	clamp	max
right hand														
3001011	3001011000000000	40	16.2	17.0	300	16.0	16.0	16.0	20.0 (10000)	20.0 (20)	20.0 (20)	2.0 mm	20.0 (20)	4 mm
left hand														
3001010	3001010000000000	40	16.2	17.0	300	16.0	16.0	16.0	20.0 (10000)	20.0 (20)	20.0 (20)	2.0 mm	20.0 (20)	4 mm

ATC: 400 — clamping system is shown



Two pieces: Bore Clasp and Shim + Shim for inserts

Steel shank with through coolant



■ S-COBN-MN 80°

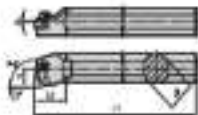
order number	catalogue number	D	D max	L	L1	L2	L3	L4	graph insert	shim	shim driver	key	clamping screw	key
right hand														
300000	3407027000000000	40	40.2	11.0	200	47.0	10.0	1.0	20.0/00110	300.000	300.000	1.0 mm	300.000	300.000
left hand														
300000	3407027000000000	40	40.2	11.0	200	47.0	10.0	1.0	20.0/00110	300.000	300.000	1.0 mm	300.000	300.000

WIDIA 80° - clamping inserts is shown



Two pieces: Bore Clasp and Shim for inserts

Steel shank with through coolant



■ S-CWLM-MX 05°

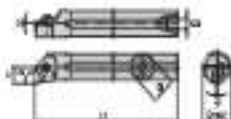
order number	catalogue number	D	D max	L	L1	L2	graph insert	shim	shim driver	key	clamping screw	key
right hand												
300000	3407020000000000	40	40.2	11.0	200	10.0	20.0/00110	300.000	300.000	1.0 mm	300.000	300.000
left hand												
300000	3407020000000000	40	40.2	11.0	200	10.0	20.0/00110	300.000	300.000	1.0 mm	300.000	300.000

WIDIA 05° - clamping inserts is shown



The upper 10 mm of the end
is not 20 mm for inserts.

Steel plate with
through coolant

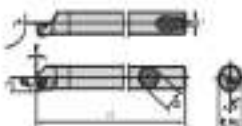


■ A-CTP 90°

order number	catalogue number	D	D min	L	L1	L2	p	graph insert									
									type	type corner	feed	clamping	insert corner	feed			
right hand																	
36401	A-CTP 36401	40	30.0	11.0	300	50-11.000	40	10, 10000	—	—	—	CANIS	10.000	1.0 mm			
36402	A-CTP 36402	50	30.0	11.0	300	50-11.000	50	10, 10000	36401	36.100	1 mm	CANIS	10.000	1 mm			
left hand																	
36403	A-CTP 36403	40	30.0	11.0	300	50-11.000	40	10, 10000	—	—	—	CANIS	10.000	1.0 mm			
36404	A-CTP 36404	50	30.0	11.0	300	50-11.000	50	10, 10000	36401	36.100	1 mm	CANIS	10.000	1 mm			



Carbide shank with through coolant
See page 830-836 for details



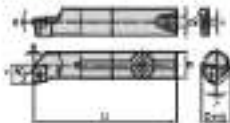
■ E-SCFC 90°

order number	catalogue number	D	D max	F	L	A	D1	R	grind length	tool angle	type
right hand											
300000	3000000000	6	11.0	4.0	100	5.0	10.0	0.05	100-10000	10°/45°/55°	10
left hand											
300000	3000000000	6	11.0	4.0	100	5.0	10.0	0.05	100-10000	10°/45°/55°	10

Steel Shank with Through Coolant



Steel shank with through coolant
See page 830-836 for details



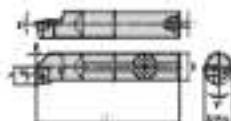
■ A-SCFP 90°

order number	catalogue number	D	D max	F	L	A	D1	R	grind length	tool angle	type
right hand											
307040	3070400000	6	11.0	100	100	5.0	—	0.05	100-10000	10°/45°	10
307040	3070400000	6	11.0	70	100	5.0	—	0.05	100-10000	10°/45°	10
307040	3070400000	6	11.0	40	100	—	100-10000	0.05	100-10000	10°/45°	10
307050	3070500000	6	11.0	100	100	—	100-10000	0.05	100-10000	10°/45°	10
307050	3070500000	6	11.0	100	100	—	100-10000	0.05	100-10000	10°/45°	10
307040	3070400000	10	15.0	100	100	—	100-10000	0.05	100-10000	10°/45°	10
307050	3070500000	10	15.0	100	100	—	100-10000	0.05	100-10000	10°/45°	10
left hand											
307040	3070400000	6	11.0	100	100	5.0	—	0.05	100-10000	10°/45°	10
307040	3070400000	6	11.0	70	100	5.0	—	0.05	100-10000	10°/45°	10
307040	3070400000	6	11.0	40	100	—	100-10000	0.05	100-10000	10°/45°	10
307050	3070500000	6	11.0	100	100	—	100-10000	0.05	100-10000	10°/45°	10
307050	3070500000	6	11.0	100	100	—	100-10000	0.05	100-10000	10°/45°	10
307040	3070400000	10	15.0	100	100	—	100-10000	0.05	100-10000	10°/45°	10
307050	3070500000	10	15.0	100	100	—	100-10000	0.05	100-10000	10°/45°	10



Carbide insert with through coolant.
See pages 104-105 for details.

W E-SCIP 90°



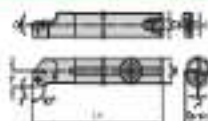
order number	catalogue number	D	D max	F	L1	A	A1	q ¹⁾	max. feed	max. speed	Tool
right hand											
300000	W E-SCIP 90°	6	6.0	6.0	110.0	3.0	1.5	100	17,000/min	500 m/min	11
300070	W E-SCIP 90°	8	8.0	8.0	170.0	3.0	—	40	17,000/min	500 m/min	11
300001	W E-SCIP 90°	10	10.0	10	240.0	3.0	—	40	17,000/min	500 m/min	11
300002	W E-SCIP 90°	12	12.0	12	310.0	3.0	—	40	17,000/min	500 m/min	11
left hand											
300000	W E-SCIP 90°	6	6.0	6.0	110.0	3.0	1.5	100	17,000/min	500 m/min	11
300070	W E-SCIP 90°	8	8.0	8.0	170.0	3.0	—	40	17,000/min	500 m/min	11
300001	W E-SCIP 90°	10	10.0	10	240.0	3.0	—	40	17,000/min	500 m/min	11
300002	W E-SCIP 90°	12	12.0	12	310.0	3.0	—	40	17,000/min	500 m/min	11

Steel Shank with Through Coolant



Steel shank with through coolant.
See pages 104-105 for details.

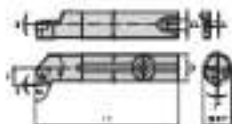
W A-SCIC 90°



order number	catalogue number	D	D max	F	L1	A	L2	q ¹⁾	max. feed	max. speed	max. tool	max. tool	Tool
right hand													
300000	W A-SCIC 90°	6	6.0	6.0	110.0	3.0	—	40	17,000/min	—	—	—	500 m/min 11
300001	W A-SCIC 90°	8	8.0	8.0	170.0	3.0	—	40	17,000/min	—	—	—	500 m/min 11
300070	W A-SCIC 90°	10	10.0	10	240.0	3.0	—	40	17,000/min	—	—	—	500 m/min 11
300000	W A-SCIC 90°	12	12.0	12	310.0	3.0	—	40	17,000/min	—	—	—	500 m/min 11
300001	W A-SCIC 90°	15	15.0	15	380.0	3.0	—	40	17,000/min	—	—	—	500 m/min 11
300002	W A-SCIC 90°	18	18.0	18	450.0	3.0	—	40	17,000/min	1000	1000	1000	500 m/min 11
left hand													
300000	W A-SCIC 90°	6	6.0	6.0	110.0	3.0	—	40	17,000/min	—	—	—	500 m/min 11
300001	W A-SCIC 90°	8	8.0	8.0	170.0	3.0	—	40	17,000/min	—	—	—	500 m/min 11
300070	W A-SCIC 90°	10	10.0	10	240.0	3.0	—	40	17,000/min	—	—	—	500 m/min 11
300001	W A-SCIC 90°	12	12.0	12	310.0	3.0	—	40	17,000/min	—	—	—	500 m/min 11
300002	W A-SCIC 90°	15	15.0	15	380.0	3.0	—	40	17,000/min	—	—	—	500 m/min 11
300000	W A-SCIC 90°	18	18.0	18	450.0	3.0	—	40	17,000/min	1000	1000	1000	500 m/min 11



Steel shank with through coolant.
See pages 156-158 for details.

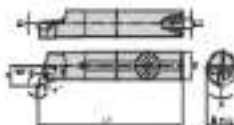


■ A SCLP 95°

order number	catalogue number	Ø	Clamp	L	l ₁	Δ	l ₂	W	max. feed	max. rpm	bars
right hand											
327 999	WIDIA SCLP 95°	6	11.0	50	100	0.5	—	4.0	0.05 mm	3000 rpm	11
327 999	A SCLP 95°	6	11.0	50	100	0.5	—	4.0	0.05 mm	3000 rpm	11
327 999	A SCLP 95°	10	15.0	80	150	0.5	—	5.0	0.05 mm	3000 rpm	11
327 999	A SCLP 95°	16	20.0	110	200	—	100-170 RPM	6.0	0.05 mm	3000 rpm	11
327 999	A SCLP 95°	20	25.0	140	250	—	100-170 RPM	6.0	0.05 mm	3000 rpm	11
327 999	A SCLP 95°	25	30.0	170	300	—	100-170 RPM	6.0	0.05 mm	3000 rpm	11
left hand											
327 999	WIDIA SCLP 95°	6	11.0	50	100	0.5	—	4.0	0.05 mm	3000 rpm	11
327 999	A SCLP 95°	10	15.0	80	150	0.5	—	5.0	0.05 mm	3000 rpm	11
327 999	A SCLP 95°	16	20.0	110	200	—	100-170 RPM	6.0	0.05 mm	3000 rpm	11
327 999	A SCLP 95°	20	25.0	140	250	—	100-170 RPM	6.0	0.05 mm	3000 rpm	11
327 999	A SCLP 95°	25	30.0	170	300	—	100-170 RPM	6.0	0.05 mm	3000 rpm	11



Steel shank with through coolant.
See pages 164-165 for details.



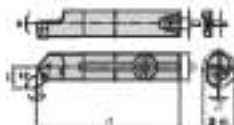
WA-SDQC 110 V₃



order number	catalogue number	D	D max	L	L1	L2	q ¹⁾	max. feed	max. clamping force	Feed
right hand										
380401	400000000001	30	30.6	110	50	16.07 MPa	0.0	0.0000	1000 N	7
380404	400000000004	30	30.6	110	50	16.07 MPa	0.0	0.0000	1000 N	10
380405	400000000005	30	30.6	110	50	16.07 MPa	0.0	0.0000	1000 N	15
left hand										
380407	400000000007	30	30.6	110	50	16.07 MPa	0.0	0.0000	1000 N	7
380410	400000000010	30	30.6	110	50	16.07 MPa	0.0	0.0000	1000 N	10
380415	400000000015	30	30.6	110	50	16.07 MPa	0.0	0.0000	1000 N	15



Steel shank with through coolant.
See page 161-162 for details.



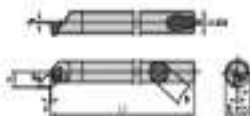
■ A 8000 00°

order number	catalogue number	D	D max	L	L1	R	CD	q _{min}	max feed	min	min	max	max	max
right hand														
300000	A 8000 000000	16	16.0	1.0	100	30	—	0.6	0.1-0.050	—	—	—	0.01-0.02	11
300000	A 8000 000000	16	16.0	1.0	100	—	16.0° M7	4.0	0.1-0.050	—	—	—	0.01-0.02	11
300000	A 8000 000000	16	16.0	1.0	100	—	16.0° M7	4.0	0.1-0.050	—	—	—	0.01-0.02	11C
300000	A 8000 000000 M7	16	16.0	1.00	100	—	16.0° M7	4.0	0.1-0.050	—	—	—	0.01-0.02	11C
300000	A 8000 000000 M7	16	16.0	1.00	100	—	16.0° M7	4.0	0.1-0.050	—	—	—	0.01-0.02	11C
300000	A 8000 000000	16	16.0	1.00	100	—	16.0° M7	4.0	0.1-0.050	0.02-0.010	0.010	0.005	0.01-0.02	11C
left hand														
300000	A 8000 000000	16	16.0	1.0	100	30	—	0.6	0.1-0.050	—	—	—	0.01-0.02	11
300000	A 8000 000000	16	16.0	1.0	100	—	16.0° M7	4.0	0.1-0.050	—	—	—	0.01-0.02	11
300000	A 8000 000000	16	16.0	1.0	100	—	16.0° M7	4.0	0.1-0.050	—	—	—	0.01-0.02	11C
300000	A 8000 000000	16	16.0	1.00	100	—	16.0° M7	4.0	0.1-0.050	—	—	—	0.01-0.02	11C
300000	A 8000 000000	16	16.0	1.0	100	—	16.0° M7	4.0	0.1-0.050	—	—	—	0.01-0.02	11C
300000	A 8000 000000	16	16.0	1.00	100	—	16.0° M7	4.0	0.1-0.050	0.02-0.010	0.010	0.005	0.01-0.02	11C



Carbide insert with through coolant

See pages 300-301 for details



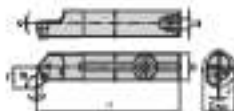
■ E-SDUC 90°

order number	catalogue number	D	Order	T	LT	R	CT	q1°	q2°	SDUC insert	Insert name	Type
right hand												
000000	000000000000	5	50.0	5.0	50	4.0	—	0.0	0.0	02.1.01000	0204000000	10
000010	000000000000	6	50.0	10.0	50	4.0	—	0.0	0.0	02.1.01000	0204000000	10
000020	000000000000	7	50.0	10.0	50	—	0.0	0.0	0.0	02.1.01000	0204000000	10
000030	000000000000	8	50.0	10.0	50	—	0.0	0.0	0.0	02.1.01000	0204000000	10
left hand												
000000	000000000000	5	50.0	5.0	50	4.0	—	0.0	0.0	02.1.01000	0204000000	10
000010	000000000000	6	50.0	10.0	50	4.0	—	0.0	0.0	02.1.01000	0204000000	10
000020	000000000000	7	50.0	10.0	50	—	0.0	0.0	0.0	02.1.01000	0204000000	10
000030	000000000000	8	50.0	10.0	50	—	0.0	0.0	0.0	02.1.01000	0204000000	10



Short shank with through coolant

See pages 16-19 for details


■ A-GRUP 93*


order number	catalogue number	D	Flank	F	L	G	g"	graph number	insert width	Tool
right hand										
207000	A1000007000	32	90.0	9.0	100	176.0 (7.34")	0.0	207_20000	MSX 133	11
207004	A1000007000	36	90.0	11.0	100	181.0 (7.13")	0.0	207_20000	MSX 133	11
207008	A1000007000	40	90.0	13.0	100	186.0 (7.32")	0.0	207_20000	MSX 133	11.5
207012	A1000007000	45	90.0	15.0	100	191.0 (7.52")	0.0	207_20000	MSX 133	12.5
left hand										
207006	A1000007000	32	90.0	9.0	100	176.0 (7.34")	0.0	207_20000	MSX 133	11
207010	A1000007000	36	90.0	11.0	100	181.0 (7.13")	0.0	207_20000	MSX 133	11
207014	A1000007000	40	90.0	13.0	100	186.0 (7.32")	0.0	207_20000	MSX 133	11.5
207018	A1000007000	45	90.0	15.0	100	191.0 (7.52")	0.0	207_20000	MSX 133	12.5

External Shank with Through Coolant


External shank with through coolant

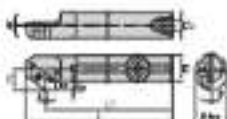
See pages 16-19 for details


■ C-GRUP 93*


order number	catalogue number	D	Flank	F	L	G	g"	graph number	insert width	Tool
right hand										
208000	C1000007000	32	90.0	9.0	100	176.0	0.0	207_20000	MSX 133	11
208004	C1000007000	36	90.0	11.0	100	181.0	0.0	207_20000	MSX 133	11
208008	C1000007000	40	90.0	13.0	100	186.0	0.0	207_20000	MSX 133	11.5
left hand										
208002	C1000007000	32	90.0	9.0	100	176.0	0.0	207_20000	MSX 133	11
208006	C1000007000	36	90.0	11.0	100	181.0	0.0	207_20000	MSX 133	11
208010	C1000007000	40	90.0	13.0	100	186.0	0.0	207_20000	MSX 133	11.5



Through hole with
through coolant
(see page 601-602
for details)

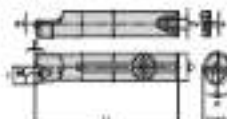


■ A-ST300 90°

order number	catalogue number	D	Dmax	A	C	L	C2	coolant	insert number	Tool
right hand										
323400	A-ST300-0100	40	44.5	10	3.0	100	2.0	11.5-17.5 MPa	MT3000	11
323401	A-ST300-0102	45	50.0	11.5	3.0	110	2.0	14-17.5 MPa	MT3002	11
323402	A-ST300-0104	50	55.0	13.0	3.0	120	2.0	14-17.5 MPa	MT3003	11
left hand										
323403	A-ST300-0101	40	45.0	10	3.0	100	2.0	11.5-17.5 MPa	MT3001	11
323404	A-ST300-0103	45	50.0	11.5	3.0	110	2.0	14-17.5 MPa	MT3002	11
323405	A-ST300-0105	50	55.0	13.0	3.0	120	2.0	14-17.5 MPa	MT3003	11



Through hole with
through coolant
(see page 601-602
for details)

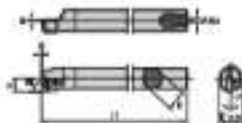


■ A-STFC 90°

order number	catalogue number	D	Dmax	A	C	L	C2	coolant	insert number	Tool
right hand										
323406	A-STFC-0100	40	45.0	10	3.0	100	2.0	11.5-17.5 MPa	MT3001	11
left hand										
323407	A-STFC-0101	40	45.0	10	3.0	100	2.0	11.5-17.5 MPa	MT3002	11



Carbide inserts with
through coolant
Two square inserts (100°)
for inserts



■ E-ISO C 90°

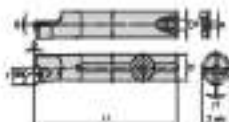


order number	catalogue number	D	D min	L	L1	A	CS	g ¹	max speed	feed range	turns
right hand											
220000	22000010001	30	29,5	100	100	3,2	—	400	70...1000	0,05-0,20	14
220000	22000010001	30	29,5	60	60	3,2	—	400	70...1000	0,05-0,20	14
220000	22000010001	30	29,5	110	100	3,2	—	400	70...1000	0,05-0,20	110
220000	22000010001	30	29,5	100	100	—	0,16	470	70...1000	0,05-0,20	110
220000	22000010001	30	29,5	110	100	—	0,16	470	70...1000	0,05-0,20	110
left hand											
220000	22000010001	30	29,5	100	100	3,2	—	400	70...1000	0,05-0,20	14
220000	22000010001	30	29,5	60	60	3,2	—	400	70...1000	0,05-0,20	14
220000	22000010001	30	29,5	110	100	3,2	—	400	70...1000	0,05-0,20	110
220000	22000010001	30	29,5	100	100	—	0,16	470	70...1000	0,05-0,20	110
220000	22000010001	30	29,5	110	100	—	0,16	470	70...1000	0,05-0,20	110

Tool for Internal Turning and Internal Boring



Steel shank with
through coolant.
See pages 516-519
for details.



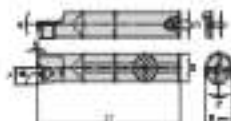
■ A-STEP 90°



order number	catalogue number	D	D max	L	L1	Δ	Δ1	Δ2	2000 Feed	insert width	Type
right hand											
000000	0000000000	6	11.5	60	140	—	—	4.0	0.150/0.14	W01002	11
000040	0000000000	10	16.0	100	220	10	—	4.0	0.150/0.14	W01002	11
000000	0000000000	16	25.0	160	350	10	—	4.0	0.150/0.14	W01002	11
000040	0000000000	20	30.0	200	—	10/10/10/10	10	4.0	0.150/0.14	W01002	11
000007	0000000000	30	35.0	300	—	—	—	4.0	0.150/0.14	W01002	11
000000	0000000000	40	45.0	400	500	10	10/10/10/10	4.0	0.150/0.14	W01002	11
left hand											
000000	0000000000	6	11.5	60	140	—	—	4.0	0.150/0.14	W01002	11
000040	0000000000	10	16.0	100	220	10	—	4.0	0.150/0.14	W01002	11
000000	0000000000	16	25.0	160	350	10	—	4.0	0.150/0.14	W01002	11
000040	0000000000	20	30.0	200	—	10/10/10/10	10	4.0	0.150/0.14	W01002	11
000000	0000000000	30	35.0	300	—	—	—	4.0	0.150/0.14	W01002	11
000000	0000000000	40	45.0	400	500	10	10/10/10/10	4.0	0.150/0.14	W01002	11



Clamping made with through coolant.
See page 165-166 for details.



■ E-STOP 90°

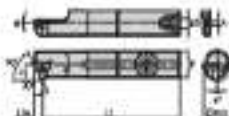


Order number	Clamping number	Ø	Ø max	L	L1	Ø	g ¹	2000 Pilot	Insert Type	Type
right hand										
000000	0000000000	6	11.0	6.0	40	0.5	0.0	17.00004	MT000	11
000100	0000000010	8	14.0	8.0	50	0.7	0.0	17.10004	MT010	11
000200	0000000020	10	16.0	9.0	60	0.8	0.0	17.10004	MT010	12
000300	0000000030	12	18.0	11.0	80	0.0	0.0	17.10004	MT010	13
000400	0000000040	16	22.0	14.0	100	1.0	0.0	17.40004	MT010	13.5
left hand										
000000	0000000000	6	11.0	6.0	40	0.5	0.0	17.00000	MT000	11
000100	0000000010	8	14.0	8.0	50	0.7	0.0	17.10000	MT010	11
000200	0000000020	10	16.0	9.0	60	0.8	0.0	17.10000	MT010	12
000300	0000000030	12	18.0	11.0	80	0.0	0.0	17.10000	MT010	13
000400	0000000040	16	22.0	14.0	100	1.0	0.0	17.40000	MT010	13.5

Tool for Internal Turning and Internal Boring



Clamped with through coolant
See pages 456-460 for details



■ A-STWP 60°

order number	catalogue number	D	D min	F	L1	L2	L	ØD	max. speed	max. torque	Total
right hand											
000001	A-STWP 60° 10	10	9.0	0.5	100	—	—	10.0	20,000/min	800 Nm	10
000002	A-STWP 60° 15	15	14.0	1.0	150	—	—	15.0	20,000/min	1600 Nm	15
left hand											
000004	A-STWP 60° 10	10	9.0	1.0	100	0.5	0.5	10.0	20,000/min	800 Nm	10
000005	A-STWP 60° 15	15	14.0	1.0	150	—	—	15.0	20,000/min	1600 Nm	15
000006	A-STWP 60° 20	20	19.0	1.0	200	—	—	20.0	20,000/min	3200 Nm	20



Clamped with through coolant
See pages 456-460 for details

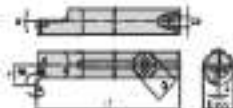


■ A-SVQB 107.5°

order number	catalogue number	D	D min	F	L1	L2	L	ØD	max. speed	max. torque	Total
right hand											
000008	A-SVQB 107.5° 10	10	9.0	0.5	100	0.5 (10°)	—	10.0	20,000/min	800 Nm	10
000009	A-SVQB 107.5° 15	15	14.0	1.0	150	0.5 (10°)	—	15.0	20,000/min	1600 Nm	15
left hand											
000010	A-SVQB 107.5° 10	10	9.0	1.0	100	0.5 (10°)	—	10.0	20,000/min	800 Nm	10



Slant Shank with
Through Coolant
See pages 86-90 for details



■ A 5V12 93°

order number	catalogue number	Ø	Ø max	L	L1	L2	max feed	max rpm	Feed rate
right hand									
200404	A2004040011	20	22.0	120	100	140-170	0.1-0.2 mm	800-1200	1.0
200408	A2004080010	20	22.0	150	100	140-170	0.1-0.2 mm	800-1200	1.0
left hand									
200408	A2004080010	20	22.0	150	100	140-170	0.1-0.2 mm	800-1200	1.0

Tool for Internal Turning and Internal Boring

Tunable Boring Bars with Front End KM™ Quick Change Adaptor

Reduce vibrations and enhance productivity in deep boring applications with KM Quick Change heads and tunable boring bars.

Tunable Boring Bars



Parameter	Function	Result
Adjust machine clamping settings	• Increase clamping force • Adjust clamping rate • Change clamping time	• High clamping force • High clamping rate • Increased productivity • Reduced wear exposure
Enable clamping assistance	The machine used for the machine will not have to work	Reduced clamping force and time for all work of machine condition
40° Quick Clamping rate and change	• Quick clamping rate • Quick clamping rate 40° Quick Clamping rate	Quick clamping rate and change

■ Tuning Procedure

1. Connect the two testing sensors on the bar.
2. Turn the adjusting screw in the positive direction until it becomes easy. The adjusting screw becomes easy when it enters the hole.
3. Turn the screw into clockwise turn in the negative direction and take a test cut.
4. Repeat step 2 until the hole is determined.
5. Check machine is determined and that the hole size between the normal screw cutting and one turn in the positive direction. Make 1/4 turn adjustments within this range, taking test cuts in each setting, until you can identify the adjusting screw setting that makes the hole to cut.
6. Check the adjusting screw setting that makes the hole is determined. Turn the adjusting screw off a 1/4 turn in the negative direction.
7. Repeat both clamping screws and take a test cut to confirm correct result.



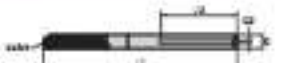
Twisting and stress will be brought down into the "normal" cutting edge



• G-TTB-KM • Metric

order number	catalogue number	Ø	L	Ø2	L-Ø2	L1 mm	TCMG system size
200700	200MT T2020KMS	10	125	Ø7.54-10	100	120	100-10
200707	200MT T2025KMS	10	147	Ø7.54-10	140	120	100-10
200708	200MT T2020KMS	10	160	Ø7.54-10	150	120	100-10
200709	200MT T2010KMS	10	160	Ø7.54-10	150	120	100-10
200720	200MT T2020KMS	12.5	120	Ø7.54-10	100	120	100-10

NOTE: All solutions can be found in the WIDIA™ Tooling System Catalogue (p. 46-47) or on page



Twisting and stress will be brought down into the "normal" cutting edge



• G-KM-TTB • Metric

order number	catalogue number	Ø	L	Ø2	L-Ø2	TCMG system size
200700	200MT T2020KMS	10	140	Ø7.54-10	130	100-10
200708	200MT T2020KMS	10	160	Ø7.54-10	150	100-10
200720	200MT T2020KMS	12.5	120	Ø7.54-10	100	100-10
200720	200MT T2020KMS	12.5	140	Ø7.54-10	120	100-10

NOTE: All solutions can be found in the WIDIA™ Tooling System Catalogue (p. 46-47) or on page

Separator™ Toolholders and Inserts



EXTREME CHALLENGES.
EXTREME RESULTS.

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

- Insert widths 2–4mm.
- Toolholder shank sizes 10, 24, 31mm.
- Can cut up to 10mm bar capacity.
- Quick, reliable insert indexing.
- Facilitates mechanical clamping.
- CNC square shank, screw-machine, and HLT blade-style toolholders.

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

WIDIA

Modern machining operations demand high-quality, high-performance toolholders that provide straightforward design and application versatility.

Standard WDM™ cartridges are ideal for holding tools with one, or several, cutting edges. A wide range of cartridge sizes and styles provide numerous combinations and application possibilities.

Cartridges



Clamping System M

- Constant pressure clamping for negative inserts.
- An extremely sturdy clamping system, specially designed for interrupted cuts.
- The tool is protected by a cartridge sleeve.

Clamping System P

- Lever-type clamping system for negative inserts: inserts with hole to DIN 4368 and positive insert thicknesses from 30mm to 40mm.
- Inserts with zero- and two-side chip control geometries have positive rake from 0° to 10°.
- Advantages of this system are tool insert changes and no interference with chip flow.

† 1° style available in metric sizes only





Clamping System C

- Top clamping system for negative and positive rake tools to 100 APM.
- The universal clamping system is robust and easy to handle.
- Three height adjustable clamps enable the use of additional chipbreakers.
- A ceramic strip provides additional tool protection.



Clamping System S

- Screw clamping system for positive rake tools to 100 APM.
- Compact design using a minimum of spare parts for high reliability and cost efficiency.
- A ceramic strip provides additional tool protection.
- Toolholders with cutting edge heights upwards of 16mm (62%) and down to 3.5mm (14%) are successfully suited for a thousand turning.

How Do Catalogue Numbers Work?

Each character in our catalogue number signifies a specific part of your product. Use the following key columns and corresponding images to easily identify which attributes apply.



M	C	F	N	R
Insert Clamping System	Insert Shape	Cartridge Style	Insert Orientation Angle	Insert at Tool
C Top clamping for standard single inserts. M Top clamping for inserts with slots. P Insert clamping for double inserts. D Cartridge clamping for inserts with slots.	C D S F T V	1 2 3 4 5 6 7 8	C' M' P'	Right-hand cartridge R Left-hand cartridge L

By following this easy-to-use guide, you can identify the correct product to meet your needs.



10	C	A	3	
Cartridge Size	Identifying Code of Cartridge	Mounting Design of Cartridge	Insert Size	Additional Information
 40 WIDIA - Cartridge length of working, in inches	3 - Cartridge	Available mounting to ISO 50-1 	 16.2-16 Insert of Material of Grade of TCT	

Each cartridge clamping system allows product options to fit your specific toolholder needs. Visit the illustrations for the your application and navigate to the corresponding page to get the correct solution.

	MC10	Product Name
		Application Illustration
	Page 120	Page Number

Clamping System M

M



Continued cartridge design for regular inserts. An extremely strong clamping system, specially designed for interrupted cuts. The tool is supported by a robotic arm.



MC10H
40°
Page
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MC10B
10°
Page
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MC10L
40°
Page
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MC10R
40°
Page
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MC10H
10°
Page
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MC10B
10°
Page
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MC10L
10°
Page
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MC10R
10°
Page
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MC10H
40°
Page
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MC10B
40°
Page
120



MC10L
40°
Page
120



MC10R
40°
Page
120

F-Style Clamping

F



Low cost clamping system for regular toolholder inserts with hole in 100 mm and 150 mm. The system is designed for interrupted cuts with one and two inserts. The tool is supported by a robotic arm. Advantages of the system are: fast tool change with the interface with the tool.



F100H
40°
Page
120



F100B
10°
Page
120

Damping System C

C



For damping system for hydraulic and pneumatic cylinders in C-TR 8000. This universal damping system is a full pressure C-TR 8000. It has a height adjustable design made for use in additional applications. It is also able to provide additional protection.



C1007
10"
Page
C106



C1008
10"
Page
C107



C1009
40"
Page
C108



C1010
40"
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C109

Damping System S

S



Combined pressure relief for hydraulic and pneumatic cylinders in S-TR 8000. This universal damping system is designed to interrupt the flow of the fluid in the cylinder.



S1007
10"
Page
C110



S1008
10"
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C111



S1009
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C112



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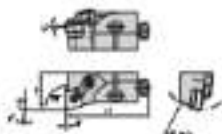
S1025
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C128



S1026
40"
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C129



See page 360-361 for details



■ MCTN 90°

order number	catalogue number	Clamp	F	L	W	H	part number
301400	MCTN90TAD	40	14.0	30	3.0	40	CR_3000070_300
301405	MCTN90CA1	50	15.0	35	3.0	50	CR_3000070_400
301410	MCTN90CA1	50	15.0	35	4.0	50	CR_3000070_410
301415	MCTN90CA1	55	15.0	40	4.0	50	CR_3000070_410
301420	MCTN90CA1	60	15.0	45	4.0	50	CR_3000070_410

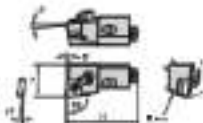
■ Spare Parts



Clamp	Order	Part	Size	Clamp	Clamp	Size	Order	Size	Order	Size	Order	Size
40	—	301400	14.0mm	50	301405	15.0mm	301405	15.0mm	301405	—	15.0mm	301405
50	—	301410	15.0mm	50	301410	15.0mm	301410	15.0mm	301410	15.0mm	15.0mm	301410
55	301415	301415	15.0mm	55	301415	15.0mm	301415	15.0mm	301415	15.0mm	15.0mm	301415
60	301420	301420	15.0mm	60	301420	15.0mm	301420	15.0mm	301420	15.0mm	15.0mm	301420



See page 84-85 for details



■ MCLN 95°

order number	catalogue number	Ø max	L	L1	95°	95°	95° insert
201440	MCLN95TA-H	30	70.0	30	40	3.0	CB...insert30...H
201443	MCLN95CA-H	30	70.0	30	40	3.0	CB...insert30...H
201446	MCLN95CH-H	70	70.0	70	40	3.0	CB...insert30...H
201447	MCLN95TA-H	100	100.0	100	40	3.0	CB...insert100...H
201449	MCLN100-H	30	70.0	30	40	3.0	CB...insert30...H
201450	MCLN100-H	50	70.0	50	40	3.0	CB...insert30...H
201451	MCLN100-H	70	70.0	70	40	3.0	CB...insert30...H
201451	MCLN100-H	100	100.0	100	40	3.0	CB...insert100...H

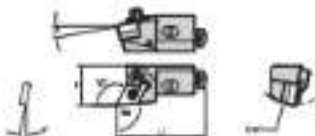
■ Spare Parts



Order	size	insert pilot	size	clamping screw	size	radius adjusting screw	size	pilot adjusting screw	securing screw	locking screw	size	washer	
01	—	0.0400	1 mm	0.0400	0.0400	3 mm	0.0400	3 mm	0.0400	0.0400	—	4 mm	0.0400 000 000
02	0.0400	0.0400	2.2 mm	0.0400	0.0400	2.2 mm	0.0400	2.2 mm	0.0400	0.0400	—	2 mm	0.0400 000 000
03	0.0400	0.0400	2.2 mm	0.0400	0.0400	2.2 mm	0.0400	2.2 mm	0.0400	0.0400	—	2 mm	0.0400 000 000
04	0.0400	0.0400	4 mm	0.0400	0.0400	4 mm	0.0400	4 mm	0.0400	—	0.0400	2 mm	0.0400 100 000



See pages 124-125 for details



MOUNT 92°

order code	catalogue number	Clamp	F	L	F'	F''	order code
right hand							
927900	MTL097900-1	30	70	30	40	40	92L-10000790-1000
927909	MTL097909-1	30	70	30	40	40	92L-10000790-1000
left hand							
927908	MTL097908-1	30	70	30	40	40	92L-10000790-1000

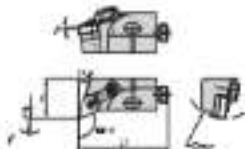
Spare Parts



Clamp	Insert	Tool holder	Clamp	Insert	Tool holder	Clamp	Insert	Tool holder	Clamp	Insert	Tool holder	Clamp	Insert	Tool holder
30	927900	927900	30	927900	927900	30	927900	927900	30	927900	927900	30	927900	927900
30	927909	927909	30	927909	927909	30	927909	927909	30	927909	927909	30	927909	927909



See pages 647-654 for details



■MQDN 137.2'

order number	catalogue number	Ø max	L	L1	R ¹	R ²	SPR front
right hand							
307130	MQDN137A1	40	75.0	52	40	40	DN, ISO4762, 5/16"
307135	MQDN137A1	75	75.0	52	40	40	DN, ISO4762, 5/16"
left hand							
307140	MQDN137L1	40	75.0	52	40	40	DN, ISO4762, 5/16"
307145	MQDN137L1	75	75.0	52	40	40	DN, ISO4762, 5/16"

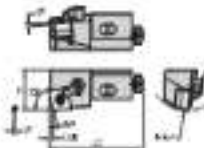
■Spare Parts



Ø max	Ø hole	lock pin	lock	clamp	clamping screw	lock	center adjusting screw	lock	center adjusting screw	securing screw	lock	washer
40	33.640	6.350	1.1 mm	12.440	17.000	1.1 mm	6.350	1.1 mm	6.350	10.400	1 mm	17.000 00 000
75	33.640	6.350	1.1 mm	12.440	17.000	1.1 mm	6.350	1.1 mm	6.350	10.400	1 mm	17.000 00 000



Two-piece M-Style cartridge



M-Style

order number	catalogue number	2.5x6	3	3.5	4.5	6"	8"	part number
321020	WIDIA M-2.5x6	45.0	45.0	50	5.7	40	5.0	DN 321020-001
321021	WIDIA M-3x6	55.0	55.0	60	5.8	40	5.0	DN 321021-001
321022	WIDIA M-3.5x6	65.0	65.0	70	5.9	40	5.0	DN 321022-001
321023	WIDIA M-4.5x6	75.0	75.0	75	6.7	40	5.0	DN 321023-001
321024	WIDIA M-6x6	100.0	100.0	100	6.6	40	5.0	DN 321024-001
321025	WIDIA M-6x8	95.0	95.0	95	6.7	40	5.0	DN 321025-001
321026	WIDIA M-8x8	120.0	120.0	95	6.8	40	5.0	DN 321026-001
321027	WIDIA M-8x10	120.0	120.0	95	6.7	40	5.0	DN 321027-001

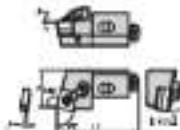
M-Style Parts



Order	part	part	part	part	part	part	part	part	part	part	part
1	—	ALUMINUM	1.5mm	CLAMP	321020	1.5mm	CLAMP	321020	1.5mm	CLAMP	321020
2	—	ALUMINUM	1.5mm	CLAMP	321021	1.5mm	CLAMP	321021	1.5mm	CLAMP	321021
3	321022	CLAMP	1.5mm	CLAMP	321022	1.5mm	CLAMP	321022	1.5mm	CLAMP	321022
4	321023	CLAMP	1.5mm	CLAMP	321023	1.5mm	CLAMP	321023	1.5mm	CLAMP	321023
5	321024	CLAMP	1.5mm	CLAMP	321024	1.5mm	CLAMP	321024	1.5mm	CLAMP	321024
6	321025	CLAMP	1.5mm	CLAMP	321025	1.5mm	CLAMP	321025	1.5mm	CLAMP	321025
7	321026	CLAMP	1.5mm	CLAMP	321026	1.5mm	CLAMP	321026	1.5mm	CLAMP	321026



See page 554-555 for details



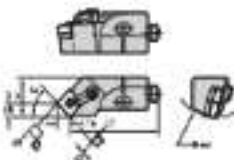
■ MGN 75°

order number	catalogue number	Clamp	F	L1	W*	H*	max. clamping force
right hand							
301046	WDMN075A2	M12	M12	30	40	12.5	28,000 N (2.5 t)
301049	WDMN075A7	M16	M16	35	45	12.5	79,000 N (8.5 t)
301050	WDMN075A8	M12	M12	75	40	12.5	12,000 N (1.3 t)
left hand							
301047	WDMN075A2	M12	M12	30	40	12.5	28,000 N (2.5 t)
301048	WDMN075A7	M16	M16	35	45	12.5	79,000 N (8.5 t)
301045	WDMN075A2	M12	M12	10	40	12.5	28,000 N (2.5 t)

■ Spare Parts



Clamp	Order	Ball bearing	Pin	Pin	Pin	Pin	Pin	Pin	Pin	Pin	Pin	Pin	Pin
M12	—	W1000	1 mm	W1000	W1000	1 mm	W1000	1 mm	W1000	1 mm	W1000	1 mm	W1000
M16	—	W1000	1 mm	W1000	W1000	1 mm	W1000	1 mm	W1000	1 mm	W1000	1 mm	W1000
M12	W1000	W1000	1 mm	W1000	W1000	1 mm	W1000	1 mm	W1000	1 mm	W1000	1 mm	W1000
M16	W1000	W1000	1 mm	W1000	W1000	1 mm	W1000	1 mm	W1000	1 mm	W1000	1 mm	W1000


 Two steps for inserting
the inserts

M-Style 42°

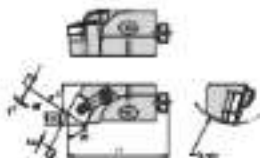
order number	catalogue number	2 mm	5	10	15	20°	30°	part number
right hand								
321000	MTCM100A-05	400	14.0	34	6.5	<100	50	DL 0000070-004
321005	MTCM100A-10	500	16.0	47	8.0	<100	50	DL 0000070-010
321010	MTCM100A-15	600	18.0	55	9.0	<100	50	DL 0000070-015
321015	MTCM100A-20	700	20.0	66	10.0	<100	50	DL 0000070-020
left hand								
321006	MTCM100L-05	400	14.0	44	6.5	<100	50	DL 0000070-005
321011	MTCM100L-10	500	16.0	47	8.0	<100	50	DL 0000070-010
321016	MTCM100L-20	600	18.0	55	9.0	<100	50	DL 0000070-020

M-Style Parts


2 mm	5 mm	lock pin	lock nut	clamping screw	lock nut	lock pin	lock nut	lock pin	lock nut	lock pin	lock nut	lock pin	lock nut
40	—	KL-MS	0.100	0.000	0.000	KL-MS	0.100	KL-MS	0.100	KL-MS	0.100	KL-MS	0.100
50	—	KL-MS	0.100	0.000	0.000	KL-MS	0.100	KL-MS	0.100	KL-MS	0.100	KL-MS	0.100
60	0.000	KL-MS	0.100	0.000	0.000	KL-MS	0.100	KL-MS	0.100	KL-MS	0.100	KL-MS	0.100
70	0.000	KL-MS	0.100	0.000	0.000	KL-MS	0.100	KL-MS	0.100	KL-MS	0.100	KL-MS	0.100



The proper fix-fix technique

■ MCTN 00¹

side feature	catalogue number	Clamp	Ø	L	H	W ²	W ³	Spacer
right hand								
307501	MCTN-ECAB	40.0	5.0	30	50.0	11.0	5.0	100.0x100x16.0
307501	MCTN-ECAB	50.0	5.0	30	50.0	11.0	5.0	100.0x100x16.0
307501	MCTN-ECAB	60.0	5.0	30	50.0	11.0	5.0	100.0x100x16.0

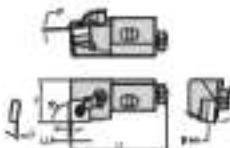
■ Spare Parts



clamp	side	lock pin	fix	clamp	clamp screw	fix	nut	nut adjusting screw	fix	nut adjusting screw	sealing screw	fix	washer
40	—	40.000	1 mm	30.000	30.000	1 mm	40.000	1 mm	40.000	100.000	1 mm	100.000	100.000
50	—	50.000	1 mm	30.000	30.000	1 mm	50.000	1 mm	50.000	100.000	1 mm	100.000	100.000
60	40.000	40.000	1 mm	30.000	30.000	1 mm	60.000	1 mm	60.000	100.000	1 mm	100.000	100.000



Two stages (1-2) of the M-Style



M-Style 02

order number	catalogue number	0 mm	1	2	2.5	3	3.5	gap mm
right hand								
301009	WCM020000	40.0	45.0	50	55.0	60	65.0	10.0000079.337
301007	WCM020000-D	45.0	50.0	55	60	65.0	70.0	10.0000079.430
301006	WCM020000-D	50.0	55.0	60	65	70.0	75.0	10.0000079.430
301005	WCM020000-D	55.0	60.0	65	70	75.0	80.0	10.0000079.430
left hand								
301008	WCM020000	40.0	45.0	50	55.0	60	65.0	10.0000079.337

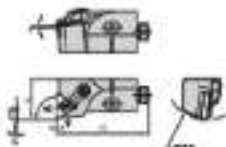
Spares Parts



Order	size	lock pin	hex	clamping screw	hex	hex adjusting screw	hex	hex adjusting screw	hex	hex adjusting screw	hex	hex	hex	hex
40	—	AL-001	1 mm	CM-001	17.0000	1 mm	AL-001	1 mm	AL-001	10.000	—	4 mm	10.000	10.000
50	—	AL-001	1 mm	CM-001	17.0000	1 mm	AL-001	1 mm	AL-001	10.000	—	4 mm	10.000	10.000
60	10.0000	AL-001	2.5 mm	CM-001	17.0000	2.5 mm	AL-001	2.5 mm	AL-001	10.000	—	1 mm	10.000	10.000
70	10.0000	AL-001	4 mm	CM-001	17.0000	4 mm	AL-001	4 mm	AL-001	—	10.000	1 mm	10.000	10.000



For pages 466-468
Accessories



■ MTFN 50°

order number	catalogue number	2 hole	3	2.5	3"	3"	page 466
right hand							
301100	MTFN50H-4-6	100	10.0	50	40	2.0	PL 30100/PL 301
301100	MTFN50H-6-6	400	10.0	40	40	2.0	PL 30100/PL 301
301100	MTFN50H-8-6	200	10.0	50	40	2.0	PL 30100/PL 301
301100	MTFN50H-6-8	1000	10.0	40	40	2.0	PL 30100/PL 301
left hand							
301100	MTFN50L-6-6	200	10.0	50	40	2.0	PL 30100/PL 301
301100	MTFN50L-6-8	400	10.0	40	40	2.0	PL 30100/PL 301

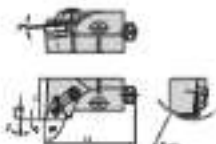
■ Spare Parts



Clamp	Insert	Back grip	Back	Clamp	Clamp screw	Back	Back adjusting screw	Back	Back adjusting screw	Inserting screw	Inserting screw	Inserting screw	Back	Back
30	—	0.0000	1 mm	0.0000	0.0000	1 mm	0.0000	1 mm	0.0000	0.0000	—	—	1 mm	0.0000 0.0000
30	0.0000	0.0000	1 mm	0.0000	0.0000	1 mm	0.0000	1 mm	0.0000	0.0000	—	—	1 mm	0.0000 0.0000
30	0.0000	0.0000	1.0 mm	0.0000	0.0000	1.0 mm	0.0000	1.0 mm	0.0000	0.0000	—	—	1 mm	0.0000 0.0000
30	0.0000	0.0000	1 mm	0.0000	0.0000	1 mm	0.0000	1 mm	0.0000	—	0.0000	0.0000	1 mm	0.0000 0.0000



See pages 180-181 for details



■ MTGN 32°

size (mm)	clamping number	L (mm)	L ₁	L ₂	W ₁	W ₂	gap (mm)
right hand							
321100	MTGN110A00	10.0	10.0	10	4.0	4.0	76.1400/76.120
321100	MTGN110CA00	10.0	10.0	10	4.0	4.0	76.1400/76.120
321100	MTGN110CA20	10.0	10.0	10	4.0	4.0	76.1400/76.120
left hand							
321100	MTGN110A00	10.0	10.0	10	4.0	4.0	76.1400/76.120
321100	MTGN110CA00	10.0	10.0	10	4.0	4.0	76.1400/76.120
321100	MTGN110CA20	10.0	10.0	10	4.0	4.0	76.1400/76.120

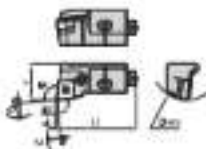
■ Spare Parts



Clamp	size	lock pin	hex	clamping screw	hex	lock adjusting screw	hex	lock adjusting screw	hex	locking screw	hex	washer
32	—	314010	1 mm	314010	1 mm	314010	1 mm	314010	30.00	1 mm	314010	—
32	314010	314010	1 mm	314010	1 mm	314010	1 mm	314010	30.00	1 mm	314010	—
32	314010	314010	1 mm	314010	1 mm	314010	1 mm	314010	30.00	1 mm	314010	—



For more 3D-CAD
drawings



PCBN 52°

order number	catalogue number	Clamp	F	L	R ¹	R ²	chip height
right hand							
301100	FTLW52H-C	50	25.0	50	-4.0	-4.0	0.6 (max) 0.5 (ref)
301100	FTLW52H-C	50	25.0	50	-4.0	-10	0.6 (max) 0.5 (ref)
left hand							
301100	FTLW52L-C	50	25.0	50	-4.0	-10	0.6 (max) 0.5 (ref)
301100	FTLW52L-C	50	25.0	50	—	—	0.6 (max) 0.5 (ref)

Spare Parts



Clamp	Pin	Pin pin	Pin nut	Pin screw	Pin nut	Pin screw	Pin nut	Pin screw	Pin nut	Pin screw	Pin nut	Pin screw
50	—	—	014.002	014.002	0.07	014.002	0.07	014.002	0.07	014.002	0.07	014.002
50	010.100	010.000	014.002	014.002	0.07	014.002	0.07	014.002	0.07	014.002	0.07	014.002
50	010.100	010.000	014.002	014.002	0.07	014.002	0.07	014.002	0.07	014.002	0.07	014.002



Two pieces (A+B) fit the insert



POKN 79

order number	clamping device	0 mm	5	10	15	20	25	30	35
right hand									
301107	POKNC07A-05	10.0	15.0	20	2.5	4.0	4.0	5.0	5.0
301108	POKNC07A-05	40.0	45.0	50	2.5	4.0	4.0	5.0	5.0
301109	POKNC07A-05	70.0	75.0	75	5.0	—	—	—	—
left hand									
301106	POKN-06L-05	10.0	15.0	20	2.5	4.0	4.0	5.0	5.0

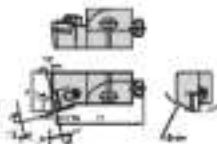
Spares Parts



Order	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
30	—	—	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000
40	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000
50	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000



The upper C-style Clam and the C-style insert.



CSKP 75°

order number	catalogue number	2 mm	4	12	25	40	63	order number
light base								
301007	CSKP75-02-040	4.0	4.0	10	2.0	4.0	5.0	37-301007-001
301008	CSKP75-02-040	4.0	4.0	10	2.0	4.0	5.0	37-301007-001

Spacers Parts



1 mm	2 mm	4 mm	6 mm	12 mm	25 mm	40 mm	63 mm	100 mm	150 mm
30	301004	301005	301006	301007	301008	301009	301010	301011	301012
30	301004	301005	301006	301007	301008	301009	301010	301011	301012

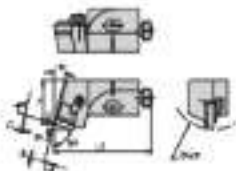


Options for C-Style Cartridges

Insert	Options	effective width	width
301000000-001	CSK-40	0.4	
	CSK-63	0.4	
301000000-001	CSK-40	0.4	
	CSK-63	0.6	
	CSK-63	0.6	
	CSK-63	0.6	



The upper limit is 2 mm per 25 mm, 2.5 mm for inserts.



■ COSP 75°

order number	catalogue number	2 mm	3	1.1	1.6	30°	75°	price (unit)
right hand								
381400	COSP75R1400	40.0	44.0	50	50.0	100	100	127 - 000000750 000
381408	COSP75R1408	50.0	55.0	60	60.0	100	100	127 - 000000750 000

■ Spare Parts



Ø mm	COSP	clamp	Ø mm	part	wedge	Ø mm	part	wedge	Ø mm	part	wedge
40	COSP40	371500	1 mm	371500	1 mm	371500	1 mm	371500	1 mm	371500	1 mm
50	COSP50	371500	1 mm	371500	1 mm	371500	1 mm	371500	1 mm	371500	1 mm



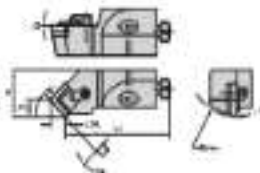
inserted into

■ Chipbreakers for C-Style Cartridges

Chipbreaker		effective width	note
insert	chipbreaker		
16 - 000000750 000	COS-40	3.0	*For chipbreaking on both primary and secondary cutting edges
	COS-45°	3.0	
20 - 000000750 000	COS-50	4.0	*For chipbreaking on both primary and secondary cutting edges
	COS-55°	4.0	
	COS-60	4.0	
	COS-65	4.0	



The proper C-style Clat and 30° x 30° for inserts



■ C-Style 40°

width	clamping width	2-hole	3	4	5	6	8	10	12	16	20
right hand											
30° x 30°	30° x 30° (40° x 40°)	40	40	40	40	40	40	40	40	40	30° x 30° (40° x 40°)
30° x 40°	30° x 40° (40° x 40°)	40	40	40	40	40	40	40	40	40	30° x 40° (40° x 40°)
left hand											
30° x 30°	30° x 30° (40° x 40°)	40	40	40	40	40	40	40	40	40	30° x 30° (40° x 40°)
30° x 40°	30° x 40° (40° x 40°)	40	40	40	40	40	40	40	40	40	30° x 40° (40° x 40°)
30° x 50°	30° x 50° (40° x 40°)	40	40	40	40	40	40	40	40	40	30° x 50° (40° x 40°)

■ Spare Parts



2 mm	3 mm	4 mm	5 mm	6 mm	8 mm	10 mm	12 mm	16 mm	20 mm	25 mm	30 mm	40 mm	50 mm	60 mm	80 mm	100 mm
40	—	—	—	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°
40	—	—	—	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°
40	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°	30° x 30°

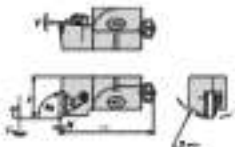


■ Clamping for C-Style Cartridges

Clamping			Notes	
Insert	Clamping	Effective width		
30° x 30° (40° x 40°)	30° x 30°	3.0		
30° x 40°	30° x 40°	3.0	*The clamping is both primary and secondary cutting edges	
30° x 50°	30° x 50°	3.0		
30° x 60°	30° x 60°	3.0	*The clamping is both primary and secondary cutting edges	
30° x 80°	30° x 80°	3.0		



The upper flange of the end flange is for inserts.



CTTP 30°

order number	clamping holder	2 mm	3	5	8"	8"	gap mm
right hand							
010501	CTTP300501	40.0	40.0	50	6.0	6.0	31.400000000000002
010502	CTTP300502	40.0	40.0	50	6.0	6.0	31.400000000000002
010503	CTTP300503	40.0	40.0	50	6.0	6.0	31.400000000000002
left hand							
010504	CTTP300504	40.0	40.0	50	6.0	6.0	31.400000000000002

Spare Parts



2 mm	3 mm	5 mm	8 mm	10 mm	12 mm	14 mm	16 mm	18 mm	20 mm	22 mm	24 mm	26 mm	28 mm	30 mm
010501	010502	010503	010504	010505	010506	010507	010508	010509	010510	010511	010512	010513	010514	010515



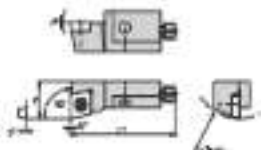
positive action

Clampers for C-Style Cartridges

insert	clamping holder	adjuster width	note
01.4000000000000000	CTC 4	0.0	
01.4000000000000000	CTC 10"	4.0	1.5x with CTC clamping holder
	CTC 12"	5.1	1.5x with CTC clamping holder
	CTC 15"	6.3	1.5x with CTC clamping holder
01.4000000000000000	CTC 4	0.0	
	CTC 10"	4.0	
	CTC 12"	5.1	



See page 360 for details



■ SC1P BP

order number	catalogue number	Ø hole	Ø	L	F	F'	part insert
right hand							
301100	6277000000	20	5,0	30	100	0,0	CP 62000007-4000
301100	6277000000	25	6,0	30	100	0,0	CP 62000007-2100
301101	6277000000	40	10,0	30	100	0,0	CP 62000007-3000
left hand							
301100	6277000000	20	5,0	30	100	0,0	CP 62000007-2100

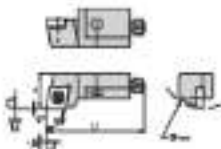
■ Spare Parts



Order	Insert	Tool	Tool	Tool	Tool	Tool	Tool	Tool	Tool
30	601100	10	620000	10 mm	620000	—	620000	10 mm	620000 620000
30	601100	10	620000	10 mm	620000	—	620000	10 mm	620000 620000
30	601100	10	620000	10 mm	620000	10 mm	—	10 mm	620000 620000



Two stages (left) - One for inserts



■ SCOP 90°

order number	catalogue number	2 mm	5	12	32°	90°	part number
right hand							
SC10715	SC10715C140	15	40.0	17	1.0	0.0	75-00000000 1.00
left hand							
SC10714	SC10714C140	15	40.0	17	1.0	0.0	75-00000000 1.00

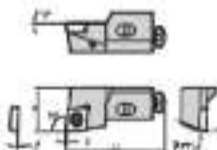
■ Spare Parts



Dr size	Insert number	Size	Insert retaining screw	Size	Insert retaining screw	Inserting screw	Size	Washer
10	SC1-H12	12	4144000	12 mm	4144000	SC10715	12 mm	75000000 000



See page 860-861 for details.



■ SCLC 80°

order number	catalogue number	Ø hole	Ø	CL	80°	80°	part name
right hand							
301100	871.029.01.400	40	44.0	30	100	50	CL. 40/44/30.100
301100	871.029.01.400	50	54.0	30	100	50	CL. 50/54/30.100
left hand							
301100	871.029.01.400	50	54.0	30	100	50	CL. 50/54/30.100
301100	871.029.01.400	50	54.0	30	100	50	CL. 50/54/30.100

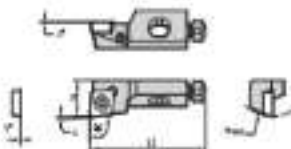
■ Spare Parts



Ø hole	thread	Type	total adjusting stroke	fix	total adjusting stroke	adjusting stroke	fix	quantity
40	M12x2	T10	60.000	0.000	60.000	10.000	4.000	10000 000 000
50	M16x2	T10	60.000	0.000	60.000	10.000	4.000	10000 000 000
50	M16x2	T10	60.000	0.000	60.000	10.000	4.000	10000 000 000



Two-piece S-Style for inserts



■ SCLP 27

order number	cartridge number	12 mm	1	12	12	12	gap width
right hand							
301101	SCLP27RCA1	10	50	20	0.8	100	CT-301101CTP-10-100
301102	SCLP27RCA2	10	50	20	0.8	100	CT-301101CTP-10-100
301103	SCLP27RCA3	40	100	50	0.8	100	CT-301101CTP-100-100
left hand							
301104	SCLP27LCA1	10	50	20	0.8	100	CT-301101CTP-10-100
301105	SCLP27LCA2	10	50	20	0.8	100	CT-301101CTP-10-100
301106	SCLP27LCA3	40	100	50	0.8	100	CT-301101CTP-100-100

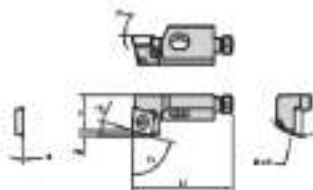
■ Spare Parts



CT no.	insert	Tool	radial adjusting	Tool	axial adjusting	Tool	mounting	Tool	Tool	Tool	Tool
10	W10101	10	SL-AB10	1.5 mm	SL-AB10	—	W10101	1.5 mm	W10101	1.5 mm	W10101
10	W10102	10	SL-AB10	1.5 mm	SL-AB10	—	W10101	1.5 mm	W10101	1.5 mm	W10101
40	W40101	100	SL-AB10	1.5 mm	SL-AB10	1.5 mm	—	—	—	—	W40101



Pre-drilled hole for the screw



■ SCSB 70°

order number	catalogue number	D min	D	L	L1	R	R1	part number
right hand								
SCS100	SCS100C-400	10	40	1.0	20	100	100	100-0000000-0-1-100
left hand								
SCS100	SCS100C-400	10	40	1.0	20	100	100	100-0000000-0-1-100

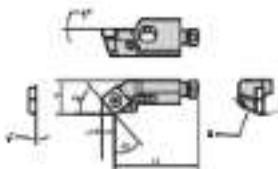
■ Spare Parts



Screw	Nut	Pin	radial adjusting	Pin	axial adjusting	Pin	Pin	Pin
SCS100	SCS100	SCS100	SCS100	SCS100	SCS100	SCS100	SCS100	SCS100



Two types (left) for inserts



#SCSP 45°

order number	catalogue number	Ø max.	F	L1	L16	Ø1	Ø2	Ø3	Ø4
right hand									
301210	SCSP450140	40	60	11	4	10	10	10	10
301214	SCSP450140	40	100	20	9	10	10	10	10

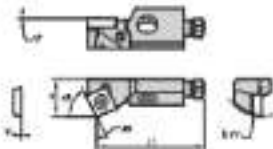
#Spins Parts



Ø max.	max. torque	Test	total adjusting screw	hex	total adjusting screw	locking screw	hex	washer
40	400 Nm	10	—	—	40x160	M10x10	10 mm	10x10x10
100	400 Nm	10	40x160	10 mm	40x160	M10x10	10 mm	10x10x10



Two pieces (left) - One for inserts



■ SCWP 00°

insert width	cartridge width	1/4" (6.35)	1/2" (12.7)	3/4" (19.05)	1" (25.4)	1 1/4" (31.75)	1 1/2" (38.1)	2" (50.8)
right hand	CONTIGUOUS	01	02	03	04	05	06	07-08-09-10-11-12
left hand	CONTIGUOUS	01	02	03	04	05	06	07-08-09-10-11-12

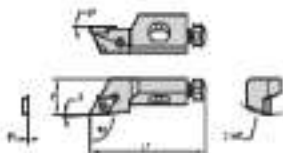
■ Spare Parts



Part	Part	Part	Part	Part	Part	Part	Part	Part
01	01-02-03	01	01-02-03	01-02-03	01-02-03	01-02-03	01-02-03	01-02-03



See pages 441-444 for details



■ SCLP 337

width (mm)	height (mm)	12 mm	6	12	6	6	SPC
right hand							
201.100	SCLP337.100	40	40	30	60	100	SP1.1000000P.100
left hand							
201.100	SCLP337.100	40	40	30	60	100	SP1.1000000P.100

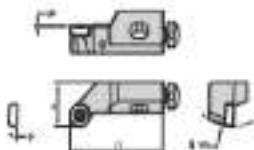
■ Spare Parts



12 mm	6 mm	12 mm	6 mm	12 mm	6 mm	12 mm	6 mm	12 mm
40	40	30	60	100	40	40	30	60
SP1.1000000P.100	SP1.1000000P.100	SP1.1000000P.100	SP1.1000000P.100	SP1.1000000P.100	SP1.1000000P.100	SP1.1000000P.100	SP1.1000000P.100	SP1.1000000P.100



See pages 344-351 for details



■ S-Style

order number	technical number	0 mm	1	1.5	2"	2 1/2"	3"
right hand							
307190	307190/00000	20	100	20	100	100	100
307194	307194/00000	40	100	20	100	100	100
left hand							
307196	307196/00000	20	100	20	100	100	100

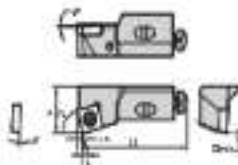
■ Spare Parts



0 mm	screw	hex	screw	hex	screw	screw	screw	hex	0 mm
20	307190	10	307190	10 mm	307190	307190	307190	10 mm	307190 000 000
40	307194	10	307194	10 mm	307194	307194	307194	10 mm	307194 000 000
20	307196	10	307196	10 mm	307196	307196	307196	10 mm	307196 000 000



See page 550-551 for details



■SSKC 72°

order number	catalogue number	2 mm	3	12	16	20	part number
right hand							
301-00	SSKC72H-01-00	40	46,5	50	43,5	51,5	IC-ANTIGATE 300
301-00	SSKC72H-01-00	50	56,5	60	53,5	61,5	IC-CHAMFIC 400
301-00	SSKC72H-01-00	60	66,5	70	63,5	71,5	IC-CHAMFIC 400
left hand							
301-00	SSKC72H-01-00	50	56,5	60	53,5	61,5	IC-CHAMFIC 400

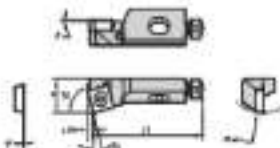
■Spare Parts



Order	part number	Type	total adjusting screw	hex	part adjusting screw	mounting screw	hex	number
40	401-010	1.1	401-010	1 mm	401-010	401-010	4 mm	COMP 401-010
50	401-010	1.1	401-010	1.2 mm	401-010	401-010	5 mm	COMP 401-010
60	401-010	1.1	401-010	1.3 mm	401-010	401-010	6 mm	COMP 401-010



Two pieces (S-Style) for inserts



■ SSKP 70

insert width	cartridge width	Ø dia	l	l.1	l.2	l.3	part code
right-hand							
SSK70R	SSK70R-01-000	40	44.0	30	40	4.0	20-SSK70R-01-000
SSK70R	SSK70R-02-000	40	54.0	35	50	5.0	20-SSK70R-02-000
left-hand							
SSK70L	SSK70L-01-000	40	44.0	30	40	4.0	20-SSK70L-01-000

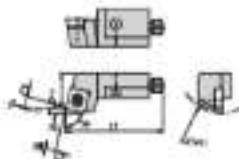
■ Spare Parts



Code	insert width	key	cartridge width	key	adjusting screw	wrench width	nut	part code
40	40 (1.57)	1.5	SSK70R	1.5 (0.06)	40 (1.57)	19 (0.75)	11 (0.43)	20-SSK70R-01-000
50	50 (1.97)	1.5	SSK70R	1.5 (0.06)	40 (1.57)	19 (0.75)	11 (0.43)	20-SSK70R-02-000



The proper fix-fix technique



■ SSRC 75°

order number	catalogue number	Ø max	7°	15°	33°	45°	60°	75°	gap max
right hand									
SSRC80	SSRC80-40-40	10	100	1.1	10	10.0	0.0		12.0 mm max
left hand									
SSLC80	SSLC80-40-40	10	100	1.1	10	10.0	0.0		12.0 mm max

■ Spare Parts



Ø max	insert number	Size	carbide adjusting screw	Size	carbide adjusting screw	inserting screw	Size	insert
10	MS110	1-10	4204000	1.1 mm	4204000	120-400	4 mm	SSRC80 40-40



Two pieces fit into the insert



■ SSCP 70

order number	catalogue number	2 x 40	2	18	1.2	8°	8°	chip board
right hand								
SSCP70R	SSCP70R-LAB	40	160	1.2	50	8.0	8.0	01-10000007-000
left hand								
SSCP70L	SSCP70L-LAB	40	160	1.2	50	8.0	8.0	01-10000007-000

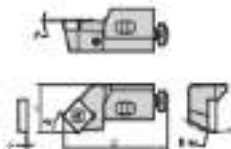
■ Spare Parts



Order	insert name	Type	order reference number	box	order reference number	working stroke	box	order
40	SSCP70	T10	0-10000007	1 mm	0-10000007	100 mm	1 mm	0-10000007-000



See page 164-165 for details



■ SSC 42°

order number	catalogue number	D mm	F	L	R°	R°	part number
right hand							
SSC1000	SSC1000-42-400	40	14.0	44	3.0	5.0	SC-40T54PCT-1000
SSC1050	SSC1050-42-410	50	15.0	47	3.0	5.0	SC-50H54PCT-410
SSC1080	SSC1080-42-410	80	15.0	50	3.0	5.0	SC-80H54PCT-410
left hand							
SSC1050	SSC1050-42-410	50	15.0	47	3.0	5.0	SL-50H54PCT-410

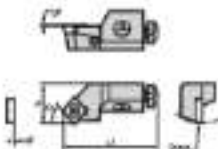
■ Spare Parts



D mm	insert size	Tap	core mounting screw	Tap	pin mounting screw	mounting screw	Tap	part number
40	MT 010	7 H	SLP4006	7 H	SLP4006	101.005	6 H	COMB-SSC1000
50	MT 010	7 H	SLP4006	7 H	SLP4006	101.005	6 H	COMB-SSC1050
80	MT 010	7 H	SLP4006	7 H	SLP4006	101.005	6 H	COMB-SSC1080



Two pieces fit into the insert



■ SSCP-40

insert width	cartridge width	D 50	5	1.1	8°	8°	part code
right hand	SSCP40RMB	40	40.0	41	40	44	101-00100001-000
left hand	SSCP40LMB	40	40.0	41	40	44	101-00100002-000

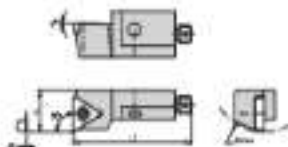
■ Spare Parts



Code	part name	Type	part drawing code	len	part drawing code	material code	len	weight
40	SSCP40	T10	0-000000	1 mm	0-000000	101-000	1 mm	1.0000 000 000



See pages 461-464 for details



STEP 90°

order number	catalogue number	Clamp	F	L	B ¹	B ²	gap front
right hand							
301010	301010AC-400	35	16.0	30	6.0	50	35.4000/35.4000
301027	301027AC-400	40	16.0	30	6.0	50	35.4000/35.4000
301015	301015AC-400	50	16.0	30	6.0	50	35.4000/35.4000
left hand							
301030	301030AC-400	35	16.0	30	6.0	50	35.4000/35.4000
301039	301039AC-400	40	16.0	30	6.0	50	35.4000/35.4000
301029	301029AC-400	50	16.0	30	6.0	50	35.4000/35.4000

Spare Parts



size	head screw	lock	nut	washer	O-ring
35	M10x30	35.4000	35.4000	35.4000	35.4000
40	M10x30	35.4000	35.4000	35.4000	35.4000
50	M10x30	35.4000	35.4000	35.4000	35.4000



Two stages (left-right) for inserts



■ STOP 90°

order number	cartridge number	2 mm	3	11	17	22	order number
right hand							
303015	CTSPH0CA08	30	44,0	30	44,0	44,0	CTSPH0ATP 303015
303017	CTSPH0CA11	40	54,0	30	54,0	44,0	CTSPH0ATP 303017
303019	CTSPH0CA16	50	64,0	30	64,0	44,0	CTSPH0ATP 303019
left hand							
303014	CTSPH0CA08	30	44,0	30	44,0	44,0	CTSPH0ATP 303014
303016	CTSPH0CA11	40	54,0	30	54,0	44,0	CTSPH0ATP 303016

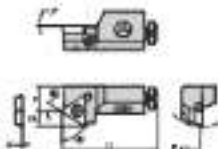
■ Spare Parts



Clamp	Screw	Washer	Locking screw	Pin	Locking screw	Inserting screw	Locking screw	Washer	Washer
30	M12x55	11	SCW400	1.0 mm	SCW400	—	M12x55	11x40mm	SCW400 1.0
40	M12x55	11	SCW400	1.0 mm	SCW400	SCW400	—	1.0 mm	SCW400 1.0
50	M12x55	11	SCW400	1.0 mm	SCW400	SCW400	—	1.0 mm	SCW400 1.0



See pages 565-566 for details



■ GTTP 60°

order number	catalogue number	3.6x1	5	7.6	11	14	17	20	25
right hand									
301000	GTTP600000	10	5.0	6.5	10	14.0	17.0	20.0	25.0
301005	GTTP600005	15	6.0	8.0	15	18.0	22.0	26.0	32.0
301010	GTTP600010	20	8.0	11.0	20	24.0	29.0	34.0	42.0

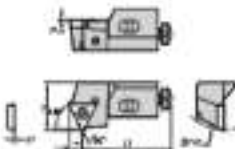
■ Spare Parts



Order	Insert size	Type	Initial mounting screw	Gap	Spacer mounting screw	Mounting screw	Spacer	Spacer	Spacer
10	W1010	11	AL-1000	1.0 mm	AL-1000	—	W1010	1.0 mm	1.0 mm
15	W1510	11	AL-1500	1.0 mm	AL-1500	—	W1510	1.0 mm	1.0 mm
20	W2010	11	AL-2000	1.0 mm	AL-2000	—	W2010	1.0 mm	1.0 mm



Two-piece S-Style Clamp Cartridge



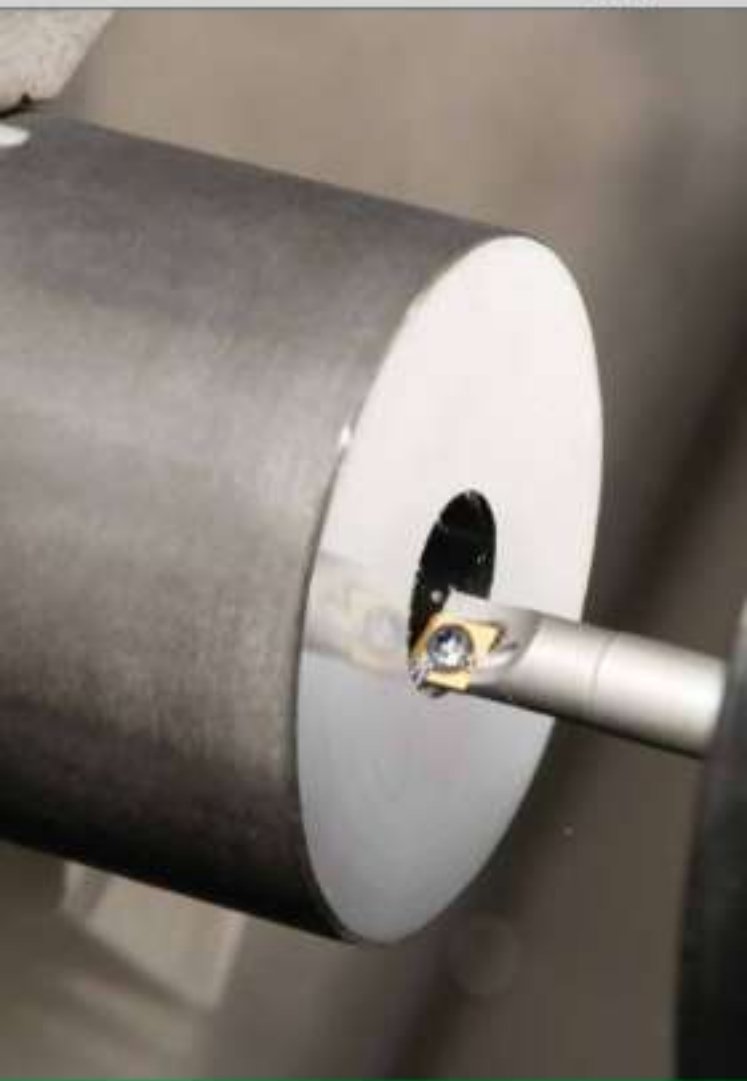
■ STHP 50°

Order number	Cartridge model	2 x 16	16	12	12.5	8"	8"	2HP mm
Right hand								
STH050	STH050CAR	35	140	16	1.7	8.0	8.0	ST-28014/ST-2801
STH052	STH052CAR	60	160	18	2.0	8.0	8.0	ST-10004/ST-2101
STH052	STH052CAR	50	200	15	1.0	8.0	8.0	ST-10004/ST-2601
Left hand								
STH050	STH050CAR	40	140	16	2.0	8.0	8.0	ST-10004/ST-2101
STH050	STH050CAR	30	200	15	1.0	8.0	8.0	ST-10004/ST-2601

■ Spare Parts



Order number	Insert	Size	Locking nut	Size	Locking nut	Inserting screw	Locking nut	Size	Order number
01	MC100	1"	CLAMP	1.2 mm	CLAMP	—	CLAMP	1.2 mm	CONN 00 000
01	MC100	1"	CLAMP	2 mm	CLAMP	VS-100	—	2 mm	CONN 00 000
02	MC100	1.5"	CLAMP	1.2 mm	CLAMP	VS-100	—	2 mm	CONN 00 000



Turning • Tools for Small Hole Boring

Small Hole Boring I.D. Indexable Insert Tooling.....	D5-D18
A-91 Series.....	D46-D71
Gasbore.....	D75-D94
Technical Information.....	D96-D98
Custom Solution Worksheet.....	D99-D101

The WIDIA™ line of micro boring tools provide accurate holemaking boring in diameters as small as 1.57mm. These economical, indexable inserts are available in both steel and carbide shanks and are stocked in both metric and inch sizes. Ideal for a wide range of applications, including precision micro boring.

Small Hole Boring • I.D. Indexable Insert Tooling



80° Diamond Insert Boring Bars

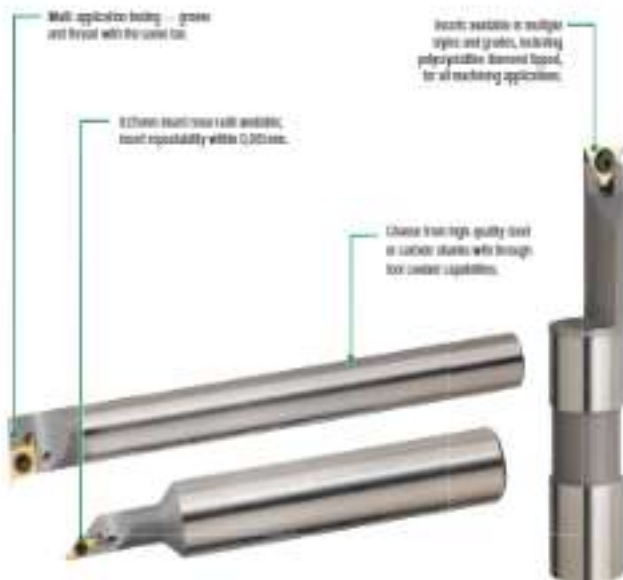
- Available in shanks as small as .009 inches >4.5/feet diameter
- Positive rake geometry for true cutting action and better surface finishes.
- Superior, undisturbed chip evacuation.
- Stocked in multiple grades to bore a wide range of materials.

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- Easy insert changes for threading and grooving.
- Thread sizes to a 48 TPI, 1/32 inch TP (pitch).
- Thread and groove capabilities to an inside bore diameter of 6.35mm.



WIDIA 



Triangle Insert Boring Bars

- Designed to ease obstruction and greater chip evacuation.
- Positive rake geometry is less than -4.5° rake diameter.
- Available in all grades, including diamond tipped and boron nitride coated styles.
- Available in shanks as small as 10mm for 300mm maximum bar diameter.



The World's Most Comprehensive Boring Solutions

Visit the WIDIA® tool line of boring tools to meet all of your demanding job requirements. Whether the work is CNC, you can count on WIDIA the most appropriate solution in the manufacturing shop floor guide.

We engineer only the BEST boring tools, guaranteed to reduce cost, maximize life, produce superior results, and outperform the competition.



Select the Correct Small Hole Boring Product Platform for Your Application

1. Determine boring system to be used (based on hole size to be bored (Ø) mm)

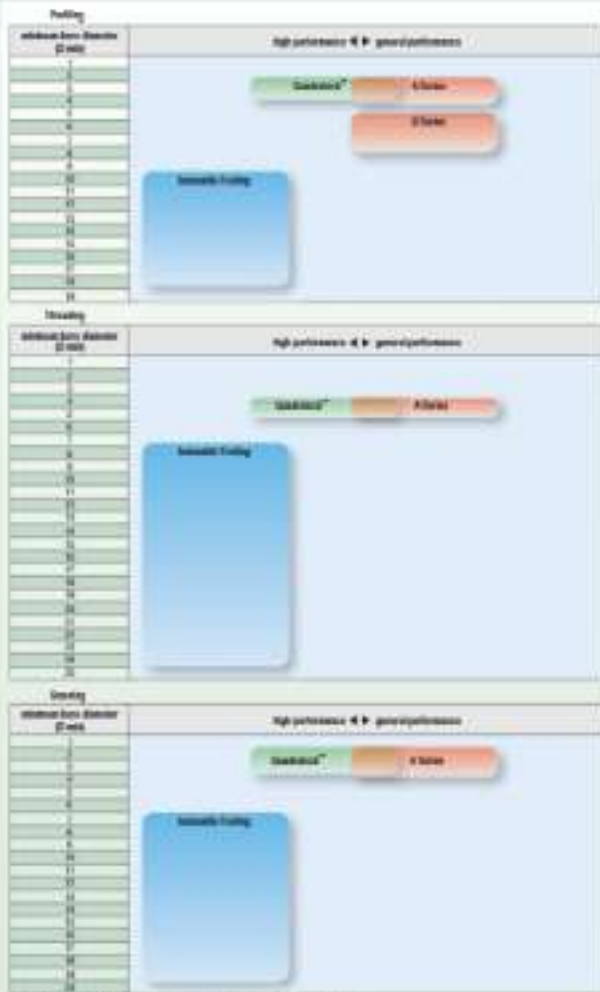
NOTE: Proper tool selection will have to get maximum from dimensions under tools due to be used.

Intralock Tooling

A-Tool

QuadraBore





NOTE: Higher feed rates will result in higher tool wear. Therefore, tool life should be tested.

2. Determine cutting tool (2):

- Selected attack angle (2): based on your machine's requirements.
- Determine hole depth (3): (for the boring bar, subtract from the holder) Multi-Flute bits operate for 4-8 times depth. A 50% wear limit for 2-flute depth generally is 1-1.5x, and a safe factor 1.5x to 2 x or 4 depending on bar selected. (For recommended maximum cutting rates on page G36-1) or reference boring, go to step 3. For all other boring systems, go directly to step 4.
- Determine feed angle (30°): how deep feed angle is feed while maximum stability is required. Feed angle may not depend on changing conditions, such as boring in a lathe.

Small Hole Boring Bar for Boring
Barrel Boring Bar for Boring

WIDIA



3. Determine which chipbreaker is best for the material to be machined.

Consult the Small Hole Boring Chipbreaker Geometry charts on pages G34-G35.

Small Hole Boring
Chipbreaker Geometry

WIDIA



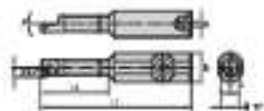
4. Determine which grade is best for the material to be machined.

Consult the Grade and Grade Descriptions charts on pages G36-G37.

Grades and Grade Descriptions
Small Hole Boring

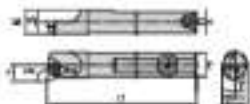
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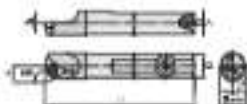
• COBM • STEPPED

order number	catalogue number	A20	B	3 mm	L	L1	L2	B	α°	α°	max. feed	max. rpm	Feed
right hand													
3023711	3123001203000	40	10.00	1.00	2.00	60.00	30.00	2.00	120°	120°	111.000000	2200	10
3023708	3123001202000	30	10.00	1.00	2.00	40.00	20.00	2.00	120°	120°	111.000000	2200	10
3023712	3123001203000	50	10.00	1.00	2.00	80.00	40.00	2.00	120°	120°	111.000000	2200	10
3023707	3123001202000	30	10.00	1.00	2.00	40.00	20.00	2.00	120°	120°	111.000000	2200	10
3023709	3123001203000	40	10.00	1.00	2.00	60.00	30.00	2.00	120°	120°	111.000000	2200	10
3024700	3123001203000	40	10.00	1.20	2.00	60.00	30.00	2.00	120°	120°	121.000000	2200	10
3024703	3123001203000	40	10.00	1.20	2.00	60.00	30.00	2.00	120°	120°	121.000000	2200	10
3024706	3123001203000	40	10.00	1.20	2.00	60.00	30.00	2.00	120°	120°	121.000000	2200	10
3024709	3123001203000	40	10.00	1.20	2.00	60.00	30.00	2.00	120°	120°	121.000000	2200	10
3025706	3123001203000	40	10.00	1.20	2.00	60.00	30.00	2.00	120°	120°	121.000000	2200	10
3025711	3123001203000	40	10.00	1.20	2.00	60.00	30.00	2.00	120°	120°	121.000000	2200	10
3026707	3123001203000	40	10.00	1.20	2.00	60.00	30.00	2.00	120°	120°	121.000000	2200	10
3026711	3123001203000	40	10.00	1.20	2.00	60.00	30.00	2.00	120°	120°	121.000000	2200	10
3027702	3123001203000	40	10.00	1.20	2.00	60.00	30.00	2.00	120°	120°	121.000000	2200	10
3027705	3123001203000	40	10.00	1.20	2.00	60.00	30.00	2.00	120°	120°	121.000000	2200	10
3027708	3123001203000	40	10.00	1.20	2.00	60.00	30.00	2.00	120°	120°	121.000000	2200	10
3027711	3123001203000	40	10.00	1.20	2.00	60.00	30.00	2.00	120°	120°	121.000000	2200	10
3028706	3123001203000	40	10.00	1.20	2.00	60.00	30.00	2.00	120°	120°	121.000000	2200	10
3028709	3123001203000	40	10.00	1.20	2.00	60.00	30.00	2.00	120°	120°	121.000000	2200	10
3029702	3123001203000	40	10.00	1.20	2.00	60.00	30.00	2.00	120°	120°	121.000000	2200	10
3029711	3123001203000	40	10.00	1.20	2.00	60.00	30.00	2.00	120°	120°	121.000000	2200	10



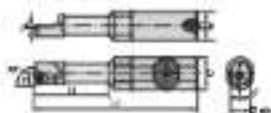
WFSM

order number	catalogue number	ØD	D	Depth	CD	Δ	L1	Δ	ψ°	ψ°	price excl. tax	stock status	type
right hand													
320004	1100001004	40	2.00	1.00	0.30	0.75	100.00	1.00	10°	10°	70,270.00	FGN	11
320008	1100001008	40	4.00	1.00	0.30	0.75	100.00	1.00	10°	10°	70,270.00	FGN	11
left hand													
320011	1100001001	40	2.00	1.00	0.30	0.75	100.00	1.00	10°	10°	70,270.00	FGN	11
320015	1100001005	40	4.00	0.14	0.30	0.60	100.00	1.00	10°	10°	70,270.00	FGN	11
320018	1100001002	40	6.00	0.14	0.30	0.60	100.00	1.00	10°	10°	70,270.00	FGN	11



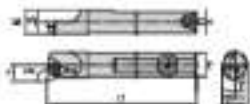
■ COTM

													
order number	catalogue number	ØD	L	Clamp	L1	L2	L3	L4	L5	graph	part name	type	
right hand													
300000	FC0000000	30	1.00	1.00	2.40	10.00	1.00	0.07	0.07	10.000.00	FC00	01	
300001	FC0000001	30	1.00	1.00	2.50	10.00	1.00	0.07	0.07	10.000.00	FC00	02	
300002	FC0000002	30	1.00	1.00	2.60	10.00	1.00	0.07	0.07	10.000.00	FC00	03	
300003	FC0000003	30	1.00	1.00	2.70	10.00	1.00	0.07	0.07	10.000.00	FC00	04	
300004	FC0000004	30	1.00	1.00	2.80	10.00	1.00	0.07	0.07	10.000.00	FC00	05	
300005	FC0000005	30	1.00	1.00	2.90	10.00	1.00	0.07	0.07	10.000.00	FC00	06	
left hand													
300006	FC0000006	30	1.00	1.00	2.40	10.00	1.00	0.07	0.07	10.000.00	FC00	07	
300007	FC0000007	30	1.00	1.00	2.50	10.00	1.00	0.07	0.07	10.000.00	FC00	08	
300008	FC0000008	30	1.00	1.00	2.60	10.00	1.00	0.07	0.07	10.000.00	FC00	09	
300009	FC0000009	30	1.00	1.00	2.70	10.00	1.00	0.07	0.07	10.000.00	FC00	10	
300010	FC0000010	30	1.00	1.00	2.80	10.00	1.00	0.07	0.07	10.000.00	FC00	11	



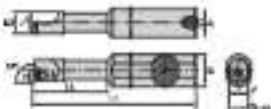
FCBM • STEPPED

order number	catalogue number	ISO	D	Dmax	L	L1	L2	A	α°	α°	max. speed	max. feed	type
right hand													
300012	FCBM0120000	M	12.01	1.21	2.01	10.00	5.00	1.0	10°	10°	10,000/min	0.04	11
300016	FCBM0160000	M	16.02	1.61	2.01	11.96	5.96	1.0	10°	10°	10,000/min	0.04	11
300020	FCBM0200000	M	20.03	1.96	2.41	16.00	10.40	1.0	10°	10°	10,000/min	0.03	11
300024	FCBM0240000	M	24.04	1.91	2.81	16.76	11.26	1.0	10°	10°	10,000/min	0.03	11
300028	FCBM0280000	M	28.05	1.86	3.21	18.00	12.00	1.0	10°	10°	10,000/min	0.03	11
300032	FCBM0320000	M	32.06	1.81	3.61	19.00	13.00	1.0	10°	10°	10,000/min	0.03	11
300036	FCBM0360000	M	36.07	1.76	4.01	20.00	14.00	1.0	10°	10°	10,000/min	0.03	11
300040	FCBM0400000	M	40.08	1.71	4.41	21.00	15.00	1.0	10°	10°	10,000/min	0.03	11
300044	FCBM0440000	M	44.09	1.66	4.81	22.00	16.00	1.0	10°	10°	10,000/min	0.03	11
300048	FCBM0480000	M	48.10	1.61	5.21	23.00	17.00	1.0	10°	10°	10,000/min	0.03	11
300052	FCBM0520000	M	52.11	1.56	5.61	24.00	18.00	1.0	10°	10°	10,000/min	0.03	11
300056	FCBM0560000	M	56.12	1.51	6.01	25.00	19.00	1.0	10°	10°	10,000/min	0.03	11
300060	FCBM0600000	M	60.13	1.46	6.41	26.00	20.00	1.0	10°	10°	10,000/min	0.03	11
300064	FCBM0640000	M	64.14	1.41	6.81	27.00	21.00	1.0	10°	10°	10,000/min	0.03	11
300068	FCBM0680000	M	68.15	1.36	7.21	28.00	22.00	1.0	10°	10°	10,000/min	0.03	11
300072	FCBM0720000	M	72.16	1.31	7.61	29.00	23.00	1.0	10°	10°	10,000/min	0.03	11
300076	FCBM0760000	M	76.17	1.26	8.01	30.00	24.00	1.0	10°	10°	10,000/min	0.03	11
300080	FCBM0800000	M	80.18	1.21	8.41	31.00	25.00	1.0	10°	10°	10,000/min	0.03	11
300084	FCBM0840000	M	84.19	1.16	8.81	32.00	26.00	1.0	10°	10°	10,000/min	0.03	11
300088	FCBM0880000	M	88.20	1.11	9.21	33.00	27.00	1.0	10°	10°	10,000/min	0.03	11
300092	FCBM0920000	M	92.21	1.06	9.61	34.00	28.00	1.0	10°	10°	10,000/min	0.03	11
300096	FCBM0960000	M	96.22	1.01	10.01	35.00	29.00	1.0	10°	10°	10,000/min	0.03	11
300100	FCBM1000000	M	100.23	1.00	10.41	36.00	30.00	1.0	10°	10°	10,000/min	0.03	11
left hand													
300012	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300016	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300020	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300024	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300028	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300032	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300036	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300040	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300044	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300048	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300052	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300056	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300060	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300064	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300068	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300072	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300076	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300080	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300084	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300088	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300092	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300096	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11
300100	FCBM1000000	M	10.00	0.96	1.81	10.00	5.00	1.0	10°	10°	10,000/min	0.03	11



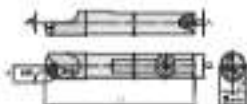
• C20E8

													
article number	catalogue number	Ød	D	D max	ØD	L	L1	Ø	Ø ¹	Ø ²	max feed	max rpm	type
right hand													
3000000	3000000000	40	50.00	12.50	16.00	2.00	100.00	2.00	0.07	0.07	15,000.00	3000	15
left hand													
3000000	3000000000	40	50.00	12.50	16.00	2.00	100.00	2.00	0.07	0.07	15,000.00	3000	15
3000000	3000000000	40	50.00	12.50	16.00	2.00	100.00	2.00	0.07	0.07	15,000.00	3000	15
3000000	3000000000	40	50.00	12.50	16.00	2.00	100.00	2.00	0.07	0.07	15,000.00	3000	15



● **CREAM • STEPPED**

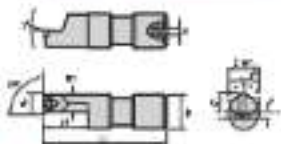
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■ GCEM

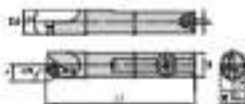
order number	catalogue number	ISO	D	D min	G	L	A	q ¹	q ²	max feed	feed rate	Feed
right hand												
3204HCL	3204HCL030HCL	H7	13.00	11.00	3.75	100.00	3.00	3.0°	3.0°	0.15 mm/min	0.20 mm/min	10
3204HCL	3204HCL040HCL	H7	16.00	11.00	3.75	100.00	3.00	3.0°	3.0°	0.15 mm/min	0.20 mm/min	10
3204HCL	3204HCL050HCL	H7	20.00	11.00	3.75	100.00	4.75	3.0°	3.0°	0.15 mm/min	0.20 mm/min	10
left hand												
3204HL	3204HL030HCL	H7	13.00	11.00	3.75	100.00	3.75	3.0°	3.0°	0.15 mm/min	0.20 mm/min	10
3204HL	3204HL040HCL	H7	16.00	11.00	3.75	100.00	4.75	3.0°	3.0°	0.15 mm/min	0.20 mm/min	10

Clamping System S • Steel



■ GSCM

order number	catalogue number	ISO	D	D min	G	L	A	q ¹	q ²	max feed	feed rate	Feed
right hand												
3204S	3204S030HCL030S	H7	13.00	11.00	3.00	100.00	3.00	3.0°	3.0°	0.15 mm/min	0.20 mm/min	10

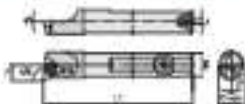


■ SSBM

order number	catalogue number	Ø10	Ø	Ø max	L	L1	Ø	α°	α°	Ø max	max. speed	feed
right hand												
300000	30000000000	40	30.0	31.0	30.0	30.0	30.0	4.0	0.0°	0.0°	10,000	0.20
300001	30000000000	50	30.0	31.0	30.0	30.0	30.0	4.0	0.0°	0.0°	10,000	0.10
300002	30000000000	60	30.0	31.0	30.0	30.0	30.0	4.0	0.0°	0.0°	10,000	0.10

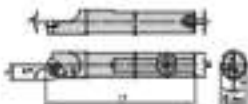
Small Hole Boring Bars

Clamping System II • Carbide



■ SSBM

order number	catalogue number	Ø10	Ø	Ø max	L	L1	Ø	α°	α°	Ø max	max. speed	feed
right hand												
300000	30000000000	40	30.0	31.0	30.0	30.0	30.0	4.0	0.0°	0.0°	10,000	0.20
300001	30000000000	50	30.0	31.0	30.0	30.0	30.0	4.0	0.0°	0.0°	10,000	0.10
300002	30000000000	60	30.0	31.0	30.0	30.0	30.0	4.0	0.0°	0.0°	10,000	0.10
left hand												
300000	30000000000	40	30.0	31.0	30.0	30.0	30.0	4.0	0.0°	0.0°	10,000	0.20
300001	30000000000	50	30.0	31.0	30.0	30.0	30.0	4.0	0.0°	0.0°	10,000	0.10
300002	30000000000	60	30.0	31.0	30.0	30.0	30.0	4.0	0.0°	0.0°	10,000	0.10

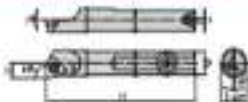


■ GSEMW

order number	catalogue number	ØD	Ø	Clamp	SB	L	L1	Δ	α°	α°	ØH1	Insert code	Type
right hand													
320112	020400010001	16	5.08	5.75	5.11	2.75	10.48	1.01	0.2°	0.2°	W1.220112	CTH	16
320116	020400010001	16	5.08	6.0	5.58	3.0	10.48	1.01	0.2°	0.2°	W1.220116	CTH	16
left hand													
320118	020400010001	16	5.08	5.75	5.11	2.81	10.48	1.01	0.2°	0.2°	W1.220118	CTH	16
320116	020400010001	16	5.08	6.0	5.58	3.0	10.48	1.01	0.2°	0.2°	W1.220116	CTH	16

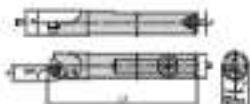
Small Hole Boring Bars for Turning

Clamping System II • Carbide



■ GCOMW

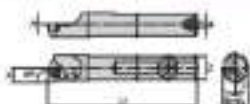
order number	catalogue number	ØD	Ø	Clamp	SB	L	L1	Δ	α°	α°	ØH1	Insert code	Type
right hand													
320114	020400010001	16	5.08	5.75	5.08	10.48	1.01	0.2°	0.2°	W1.220114	CTH	16	
320118	020400010001	16	5.08	6.31	5.45	10.48	1.01	0.2°	0.2°	W1.220118	CTH	16	
left hand													
320116	020400010001	16	5.08	6.0	5.58	10.48	1.01	0.2°	0.2°	W1.220116	CTH	16	
320118	020400010001	16	5.08	6.31	5.45	10.48	1.01	0.2°	0.2°	W1.220118	CTH	16	
320112	020400010001	16	5.08	5.75	5.11	10.48	1.01	0.2°	0.2°	W1.220112	CTH	16	



■ QCEMN

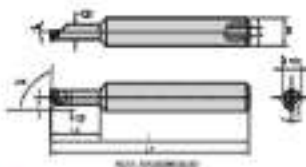
order number	catalogue number	ISO	D	D max	L	L1	A	q1°	q2°	200 mm	feed mm	type
right hand												
200000	QCEMN120000	30	12.00	12.00	10.00	0.00	20.00	0.00	0.00	10°_0.0000	0.2000	1
left hand												
200001	QCEMN120001	30	12.00	12.00	10.00	0.00	20.00	0.00	0.00	10°_0.0000	0.2000	1

Clamping System 5 • Carbide

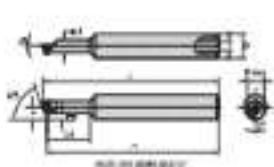


■ QCEMN

order number	catalogue number	ISO	D	D max	L	L1	A	q1°	q2°	200 mm	feed mm	type
right hand												
200000	QCEMN120000	30	12.00	12.00	0.00	0.00	20.00	0.00	0.00	10°_0.0000	0.2000	1
left hand												
200001	QCEMN120001	30	12.00	12.00	0.00	0.00	20.00	0.00	0.00	10°_0.0000	0.2000	1
200000	QCEMN120000	30	12.00	12.00	0.00	0.00	20.00	0.00	0.00	10°_0.0000	0.2000	1



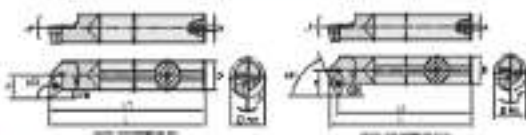
WIDIA 4000000000000000



WIDIA 4000000000000000

CSFM

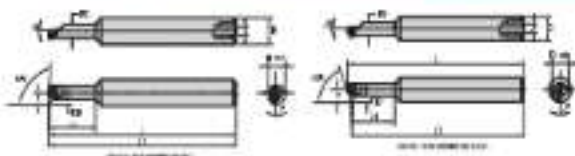
order number	catalogue number	D	d	Dmax	L	d1	d2	L1	L2	L3	A	q ¹	q ²	max. feed	feed rate	try
right hand																
00100	CSFM0000000000000000	6.3	3.0	12.5	60	6.0	5.8	40.0	40.0	25.4	1.0	0.2	0.2	0.00000	CFM	15
01000	CSFM0000000000000000	6.3	3.0	12.5	60	5.8	5.6	40.0	40.0	25.4	1.0	0.2	0.2	0.00000	CFM	15
00101	CSFM0000000000000000	6.3	3.0	9.5	60	5.8	5.6	40.0	40.0	25.4	1.0	0.2	0.2	0.00000	CFM	15
left hand																
00100	CSFM0000000000000000	6.3	3.0	12.5	60	6.0	5.8	40.0	40.0	25.4	1.0	0.2	0.2	0.00000	CFM	15
00101	CSFM0000000000000000	6.3	3.0	9.5	60	5.8	5.6	40.0	40.0	25.4	1.0	0.2	0.2	0.00000	CFM	15
00102	CSFM0000000000000000	6.3	3.0	9.5	60	5.8	5.6	40.0	40.0	25.4	1.0	0.2	0.2	0.00000	CFM	15
00103	CSFM0000000000000000	6.3	3.0	12.5	60	5.8	5.7	40.0	40.0	25.4	1.0	0.2	0.2	0.00000	CFM	15



■CCFM

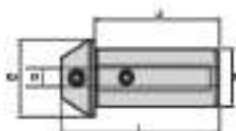
article number	subarticle number	ØD	Ø	2 mm	F	12	L	L1	A	α°	α°	chip feed	insert grade	Tool
right hand														
300001	CCFM000001	Ø1.2	3.00	10.00	0.05	0.20	100.00	100.00	1.00	10°	10°	0.05-0.10	KT10	11
300002	CCFM000002	Ø1.6	3.00	10.00	0.05	0.20	100.00	100.00	1.00	10°	10°	0.05-0.10	KT10	11
left hand														
300003	CCFM000003	Ø1.2	3.00	10.00	0.05	0.20	100.00	100.00	1.00	10°	10°	0.05-0.10	KT10	11
300004	CCFM000004	Ø1.6	3.00	10.00	0.05	0.20	100.00	100.00	1.00	10°	10°	0.05-0.10	KT10	11
300005	CCFM000005	Ø1.2	3.00	10.00	0.05	0.20	100.00	100.00	1.00	10°	10°	0.05-0.10	KT10	11
300006	CCFM000006	Ø1.6	3.00	10.00	0.05	0.20	100.00	100.00	1.00	10°	10°	0.05-0.10	KT10	11

Clamping System S • Steel



■CSFM

article number	subarticle number	ØD	Ø	2 mm	F	12	L	L1	A	α°	α°	chip feed	insert grade	Tool
right hand														
300007	CSFM000007	Ø1.2	10.00	10.00	0.05	0.20	110.00	110.00	1.00	10°	10°	0.05-0.10	KT10	11
left hand														
300008	CSFM000008	Ø1.2	10.00	10.00	0.05	0.20	110.00	110.00	1.00	10°	10°	0.05-0.10	KT10	11
300009	CSFM000009	Ø1.2	10.00	10.00	0.05	0.20	110.00	110.00	1.00	10°	10°	0.05-0.10	KT10	11
300010	CSFM000010	Ø1.6	10.00	10.00	0.05	0.20	110.00	110.00	1.00	10°	10°	0.05-0.10	KT10	11
300011	CSFM000011	Ø1.2	10.00	10.00	0.05	0.20	110.00	110.00	1.00	10°	10°	0.05-0.10	KT10	11



■ CSM

WIDIA NUMBER	CORONA NUMBER	D1	D2	D3	L1	L
200000	CSM00000	1.65	10.00	11.04	30.00	30.00
200001	CSM00001	1.75	10.00	11.04	30.00	30.00
200007	CSM00004	2.00	10.00	11.04	30.00	30.00
200008	CSM00005	2.00	10.00	11.04	30.00	30.00
200011	CSM00011	4.00	10.00	11.04	30.00	30.00
200015	CSM00015	4.00	10.00	11.04	30.00	30.00

How Do Catalogue Numbers Work?

Each character in our catalogue number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.



C	D	H	B	S4																																			
Insert Shape	Insert Orientation	Flank Face Class	Insert Toolholder	Size																																			
1 40° 2 60° 3 80° 4 90°	1 40° 2 60° 3 80° 4 90°	Flank faces apply prior to edge prep and coating 1 2 3 4	Insert Toolholder	Capacity table drilling only (depth 10x D) <table border="1"> <thead> <tr> <th>Drill Size</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>1.0</td> <td>10</td> <td>15</td> <td>20</td> <td>25</td> </tr> <tr> <td>1.5</td> <td>15</td> <td>20</td> <td>25</td> <td>30</td> </tr> <tr> <td>2.0</td> <td>20</td> <td>25</td> <td>30</td> <td>35</td> </tr> <tr> <td>2.5</td> <td>25</td> <td>30</td> <td>35</td> <td>40</td> </tr> <tr> <td>3.0</td> <td>30</td> <td>35</td> <td>40</td> <td>45</td> </tr> <tr> <td>4.0</td> <td>40</td> <td>45</td> <td>50</td> <td>55</td> </tr> </tbody> </table>	Drill Size	1	2	3	4	1.0	10	15	20	25	1.5	15	20	25	30	2.0	20	25	30	35	2.5	25	30	35	40	3.0	30	35	40	45	4.0	40	45	50	55
Drill Size	1	2	3	4																																			
1.0	10	15	20	25																																			
1.5	15	20	25	30																																			
2.0	20	25	30	35																																			
2.5	25	30	35	40																																			
3.0	30	35	40	45																																			
4.0	40	45	50	55																																			
		5. Flank Face Class of the insert mounted on the toolholder 6. Flank Face Class of the toolholder																																					
			Flank Face Class of the insert mounted on the toolholder 7 8	without chipbreaker with chipbreaker																																			
			Flank Face Class of the insert mounted on the toolholder 9 10	without chipbreaker with chipbreaker																																			

2. Select the Cutting Speed

In the table, insert and feed rates, available gear cutting speed, and other tool grade working conditions and range

- Steel
- Cast Iron/Steel
- Light Alloy
- Super Alloy
- High Alloy Alloy
- Cast Iron/Aluminum

TN7-CM1 for Cast Iron

	S				
	100-150	50	40	30	20
Feed Rate mm/min					

- TN7** — High edge strength and wear resistant coated
- ALD** — Capable of high productivity. Flange coating enables higher cutting speeds
- CM1** — High speed, general purpose grade for demands of standard cast iron
- CM2** — High edge strength and wear resistance. Yellow, particles with high edge. Superior thermal deformation resistance and high thermal conductivity
- CM and CM2** — Good wear resistance with some toughness
- CM** — Excellent abrasion resistance for machining cast iron, stainless steels, Ti alloys, and various alloys, and various high compression alloys
- CM2** — Good at low speeds. All kinds of applications and high wear wear
- CM1** — For heavy cutting and heavy interrupted cut

Toughness is better

CM-CM1 for High-Temperature Alloys

	S				
	100-150	50	40	30	20
Feed Rate mm/min					

- CM and CM2** — Good wear resistance with some toughness
- CM** — Excellent abrasion resistance for machining cast iron, stainless steels, Ti alloys, and various alloys, and various high compression alloys
- CM2** — Good at low speeds. All kinds of applications and high wear wear
- CM1** — For heavy turning and heavy interrupted cut

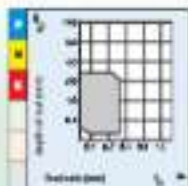
Toughness is better

Single-Flute, Positive Insert

.H5



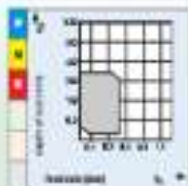
Old inserts. Deepening ground in both sections equally and without outbursts. Very smooth cutting edge offers maximum rigidity.



.H2



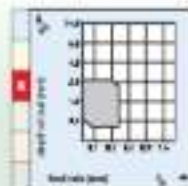
Deepened ground insert hydroplanes. Good chip control. Designed for general purpose applications.



.H5-M



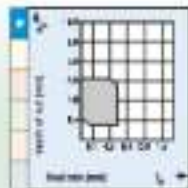
Close Ground Finish (CGF) or Independent Ground (ITD) for high rigidity when used with known technology. Very smooth cutting edge offers maximum rigidity.



.JF



Designed for general purpose applications. Very good chip control. Recommended for general hole finishing.



Geometry Selection Criteria

Flat Top-Type Inserts

Chipbreaker Geometry: JH, JH-M, JH

- Suitable for interrupted cuts.
- Use when chip control is not critical.

Pre-set Chipbreaker-Type Inserts

Chipbreaker Geometry: J2

- Suitable for moderate interruption of cuts.
- Use when chip control is a concern.

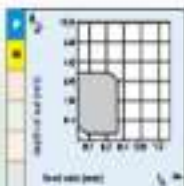


Single-Fluted, Positive Inserts

J44



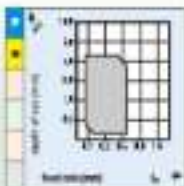
Designed for best surface quality and reduced cutting pressure. Suitable for medium speeds.



H9



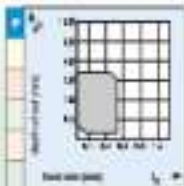
High positive rake (30°). Designed for best surface quality and reduced cutting pressure. Recommended for high-speed drilling and low-feed-rate working.



J44 DL



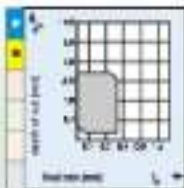
Designed to penetrate. Designed for best surface quality and reduced cutting pressure. High feed inserts used in full-feed rates (0.1) with conventional cutting speeds (0.1).



J38



For best finishing. Low stable cutting edge offers maximum rigidity.



Geometry Selection Criteria

Pressed Chipbreaker Type Inserts with Ground Flankberg

Chipbreaker Geometry: JPS, JPS, JPS

- Suitable for light to moderate chiploads of cuts.
- Use when chip control is a concern.
- Superior surface finish and close tolerance on workpiece.

Ground-In Chipbreaker Type Inserts

Chipbreaker Geometry: JPS, JPS

- Suitable for smooth cuts.
- Use when chip control is a concern.
- Superior surface finish and close tolerance on workpiece.

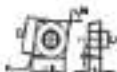


		Cutting Speed - m/min																							
Material Group		C12			C18			C20			C25			C30			C35			C40			C45		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
Aluminum	Al (mm)	1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200		
	Feed (mm/min)	1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200		
	1	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	4	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	5	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Steel	St (mm)	1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200		
	Feed (mm/min)	1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200		
	1	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	4	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	5	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Cast Iron	CI (mm)	1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200		
	Feed (mm/min)	1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200		
	1	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	4	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	5	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Titanium	Ti (mm)	1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200		
	Feed (mm/min)	1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200		
	1	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	4	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	5	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Inconel	IN (mm)	1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200		
	Feed (mm/min)	1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200			1200 - 1200		
	1	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	4	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	5	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

NOTE: Speed and feed values and depth of cut may vary depending on materials and machining conditions including, but not limited to, tool coating, tool life, and fixture setup requirements.

Material Group	Cutting Speed – m/min											
	C45			AISI			707			2024		
	60°	75°	90°	60°	75°	90°	60°	75°	90°	60°	75°	90°
1	4000			4000			4000			4000		
	1000			1000			1000			1000		
	1	35	50	35	45	60	150	200	150	—	—	—
	2	35	40	35	40	50	150	180	150	—	—	—
	3	35	40	35	40	50	150	180	150	—	—	—
	4	35	35	40	40	50	150	150	150	—	—	—
	5	35	40	35	40	50	150	180	150	—	—	—
	6	35	35	35	35	40	150	150	150	—	—	—
2	4000			4000			4000			4000		
	1000			1000			1000			1000		
	1	35	50	35	45	60	150	200	150	—	—	—
	2	35	40	35	40	50	150	180	150	—	—	—
	3	35	40	35	40	50	150	180	150	—	—	—
	4	35	35	40	40	50	150	150	150	—	—	—
	5	35	40	35	40	50	150	180	150	—	—	—
3	4000			4000			4000			4000		
	1000			1000			1000			1000		
	1	45	60	35	45	60	40	150	150	—	—	—
	2	40	50	40	40	50	30	150	150	—	—	—
	3	45	50	35	40	50	40	150	150	—	—	—
	4	45	45	40	40	50	40	150	150	—	—	—
	5	45	50	35	40	50	40	150	150	—	—	—
4	4000			4000			4000			4000		
	1000			1000			1000			1000		
	1	40	50	40	—	—	40	200	400	—	—	—
	2	40	30	40	—	—	40	200	400	—	—	—
	3	35	30	40	—	—	40	180	400	—	—	—
	4	40	30	40	—	—	40	180	400	—	—	—
	5	40	30	40	—	—	40	180	400	—	—	—
5	4000			4000			4000			4000		
	1000			1000			1000			1000		
	1	45	60	40	—	—	40	200	400	—	—	—
	2	45	50	40	—	—	40	180	400	—	—	—
	3	45	50	40	—	—	40	180	400	—	—	—
	4	45	50	40	—	—	40	180	400	—	—	—
	5	45	50	40	—	—	40	180	400	—	—	—
6	4000			4000			4000			4000		
	1000			1000			1000			1000		
	1	35	50	40	—	—	40	180	400	—	—	—
	2	35	40	40	—	—	40	180	400	—	—	—
	3	35	40	40	—	—	40	180	400	—	—	—
	4	35	40	40	—	—	40	180	400	—	—	—
	5	35	40	40	—	—	40	180	400	—	—	—
7	4000			4000			4000			4000		
	1000			1000			1000			1000		
	1	35	50	40	—	—	40	180	400	—	—	—
	2	35	40	40	—	—	40	180	400	—	—	—
	3	35	40	40	—	—	40	180	400	—	—	—
	4	35	40	40	—	—	40	180	400	—	—	—
	5	35	40	40	—	—	40	180	400	—	—	—
8	4000			4000			4000			4000		
	1000			1000			1000			1000		
	1	35	50	40	—	—	40	180	400	—	—	—
	2	35	40	40	—	—	40	180	400	—	—	—
	3	35	40	40	—	—	40	180	400	—	—	—
	4	35	40	40	—	—	40	180	400	—	—	—
	5	35	40	40	—	—	40	180	400	—	—	—
9	4000			4000			4000			4000		
	1000			1000			1000			1000		
	1	35	50	40	—	—	40	180	400	—	—	—
	2	35	40	40	—	—	40	180	400	—	—	—
	3	35	40	40	—	—	40	180	400	—	—	—
	4	35	40	40	—	—	40	180	400	—	—	—
	5	35	40	40	—	—	40	180	400	—	—	—

MTD: General feed values and depth of cut may vary depending on materials and machining conditions including tool set.
 limited by tool strength, tool use, unaffiliated surface degradation.



- **the class:**
different class

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31					

■ **CPI-5.1**

BO candidate number	C	LH	S	A	DH	W	M	F	T	U
07968010	1,2	4,5	1,3	5,6	2,3	-	-	-	-	-
07968016	1,2	4,5	1,3	5,6	2,3	-	-	-	-	-



●CDM41

ISO country number	0	10	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
CONTEST01	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9
CONTEST02	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9
CONTEST03	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9

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• **Not a disease**
• **Not a disorder**



■ **Trans-Act**

[illegible]

NOTE: To get the most out of this book, read the introduction first.

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- **the class:**
different class



■ **TEST 40**

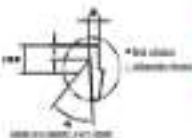
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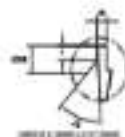
● 1998年4月

CO- ORDINATE SYSTEM	0	1.0	5	9	21	30	39	48	57	66	75	84	93	102	111	120	129	138	147	156	165	174	183	192	201	210	219	228	237	246	255	264	273	282	291	300	309	318	327	336	345	354	363	372	381	390	399	408	417	426	435	444	453	462	471	480	489	498	507	516	525	534	543	552	561	570	579	588	597	606	615	624	633	642	651	660	669	678	687	696	705	714	723	732	741	750	759	768	777	786	795	804	813	822	831	840	849	858	867	876	885	894	903	912	921	930	939	948	957	966	975	984	993	1002	1011	1020	1029	1038	1047	1056	1065	1074	1083	1092	1101	1110	1119	1128	1137	1146	1155	1164	1173	1182	1191	1200	1209	1218	1227	1236	1245	1254	1263	1272	1281	1290	1299	1308	1317	1326	1335	1344	1353	1362	1371	1380	1389	1398	1407	1416	1425	1434	1443	1452	1461	1470	1479	1488	1497	1506	1515	1524	1533	1542	1551	1560	1569	1578	1587	1596	1605	1614	1623	1632	1641	1650	1659	1668	1677	1686	1695	1704	1713	1722	1731	1740	1749	1758	1767	1776	1785	1794	1803	1812	1821	1830	1839	1848	1857	1866	1875	1884	1893	1902	1911	1920	1929	1938	1947	1956	1965	1974	1983	1992	2001	2010	2019	2028	2037	2046	2055	2064	2073	2082	2091	2100	2109	2118	2127	2136	2145	2154	2163	2172	2181	2190	2199	2208	2217	2226	2235	2244	2253	2262	2271	2280	2289	2298	2307	2316	2325	2334	2343	2352	2361	2370	2379	2388	2397	2406	2415	2424	2433	2442	2451	2460	2469	2478	2487	2496	2505	2514	2523	2532	2541	2550	2559	2568	2577	2586	2595	2604	2613	2622	2631	2640	2649	2658	2667	2676	2685	2694	2703	2712	2721	2730	2739	2748	2757	2766	2775	2784	2793	2802	2811	2820	2829	2838	2847	2856	2865	2874	2883	2892	2901	2910	2919	2928	2937	2946	2955	2964	2973	2982	2991	3000
START ADDRESS	0.0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.55	3.60	3.65	3.70	3.75	3.80	3.85	3.90	3.95	4.00	4.05	4.10	4.15	4.20	4.25	4.30	4.35	4.40	4.45	4.50	4.55	4.60	4.65	4.70	4.75	4.80	4.85	4.90	4.95	5.00	5.05	5.10	5.15	5.20	5.25	5.30	5.35	5.40	5.45	5.50	5.55	5.60	5.65	5.70	5.75	5.80	5.85	5.90	5.95	6.00	6.05	6.10	6.15	6.20	6.25	6.30	6.35	6																																																																																																																																																																																																															

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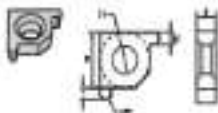


● csc.ual

[illegible]

● **CGI-AM**

[illegible]



• **West Virginia**
• **Illinois**

1	2	3	4	5	6
2	3	4	5	6	1
3	4	5	6	1	2
4	5	6	1	2	3
5	6	1	2	3	4
6	1	2	3	4	5

■ **ENVIRONMENTAL**

[illegible]

● **2011-10-14**

[illegible]

■ CPT-FWI

EU catalogue number	C	S	I	R	RI	T1max	T7max	T9max	T10max	W1max	W7max	W9max	W10max
right hand													
CPD6800R	4.20	1.90	1.80	0.10	0.04	40	38	1.8	0.1	4.0	3.8	1.8	0.1

WIDIA COHLE™ catalogue number	Widia C3 catalogue number
0000	0000
0002	0002
0005	0005
0008	0008
0010	0010
0015	0015
0020	0020
0025	0025
0030	0030
0035	0035
0040	0040
0045	0045
0050	0050
0055	0055
0060	0060
0065	0065
0070	0070
0075	0075
0080	0080
0085	0085
0090	0090
0095	0095
0100	0100
0105	0105
0110	0110
0115	0115
0120	0120
0125	0125
0130	0130
0135	0135
0140	0140
0145	0145



Insert Screens

order number	ISO catalogue number	Toolbars	Internal Thread
300300	67540	1 mm	M30 x 1
300300	67550 (ISO 20)	10 mm	M30 x 1
300310	67550	10 mm	—
300320	17540	11	M30 x 1
300340	67511	14	M30 x 1
300350	67511	14	M30 x 1
300410	67511	17	—
300510	67511	17	M30 x 1
300540	67500	17	M30 x 1.5
300540	67500	17	M30 x 1.5
300550	67511	18	M30 x 1
300560	67511	18	M30 x 1
300570	67511	18	M30 x 1
300580	67500	18	M30 x 1.5
300590	67511	18	M30 x 1

Wrenches

order number	ISO catalogue number	Toolbars
300500	68011	10 mm
300510	68011	10 mm
300520	67507	11
300530	68011	11
300540	68011	11
300550	68007	11
300560	68011	11
300570	68011	11 mm

Drill Bits

order number	ISO catalogue number	Toolbars
300580	68011	11 mm
300590	68011	11
300600	68011	17
300610	67507	17
300620	68007	18
300630	68011	18
300640	68011	18
300650	68011	18
300660	68011	18

Wedges

order number	ISO catalogue number
300500	68000 (ISO)
300500	68011

A/B Series Small Hole Tooling

Available in steel and carbide shanks, the WIDIA® line of micro boring bars is an excellent, economical choice for a wide range of applications — from creating small holes in small parts to precision micro boring typically found in large workpieces — manufactured in the aerospace, heavy equipment, and automotive industries.

A/B Series



A/B Series Micro Boring Bar

Features

- 1/16–22kines diameter boring range.
- Design locking option enables quick, accurate tool changes.
- Bore repeatability guaranteed within ± 0.012 mm.

Benefits

- Quick, accurate tool setups.
- Available in multiple styles for machining a wide range of materials.
- High-strength, ground tool shanks for maximum strength and rigidity.

ABD Type

Replaceable boring insert with coolant slot.



ABD Type

Replaceable boring insert available in coolant port and uncooled variants, CBN, and PCD tip. A series has a coolant slot.



BB Type

Replaceable boring insert.

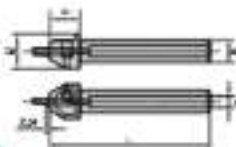


A/B Series Boring Bar Identification System

Each character in our catalog number signifies a specific tool or that product. Use the following key columns and corresponding images to easily identify which attributes apply.



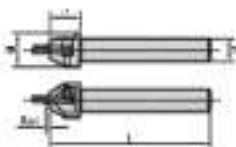
A	B	M	S	38
Series Designated for Type Conductor Features of the Boring Bar	Boring Bar	Type	Shank Diameter shown in "I"	Length shown in "I"
A - Through Center B - Not Center		M - Metric	Metric 8 - 1/2" max 16 - 1/2" max 25 - 1/2" max 32 - 1/2" max 40 - 1/2" max	Metric 30 - 600mm 100 - 600mm 150 - 600mm 180 - 600mm
				



■ ATOM

order number	catalogue number	D	D1	L	H			hex
						wedge	wedge screw	
200101	AS 5006-01	11.00	14.00	50	4.00	AS 5006-W-01	AS 5006-S-4-02	10H
200102	AS 5006-02	12.00	14.00	50	4.00	AS 5006-W-02	AS 5006-S-4-02	10H
200103	AS 5006-03	16.00	14.00	50	4.00	AS 5006-W-03	AS 5006-S-4-02	10H
200104	AS 5006-04	20.00	14.00	50	4.00	AS 5006-W-04	AS 5006-S-4-02	10H
200105	AS 5006-05	25.00	14.00	100	6.00	AS 5006-W-05	AS 5006-S-6-02	10H

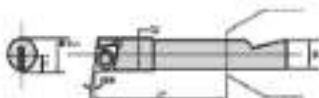
NOTE: These tools will accept any 1/2-inch size/condition tool (R2, R3, R4, R5, R6, R7, and R8).



■ 050M

order number	catalogue number	D	D1	L	H			hex
						wedge	wedge screw	
200106	AS 5006-06	11.00	14.00	50	4.00	AS 5006-W-06	AS 5006-S-4-02	10H

NOTE: These tools will accept any 1/2-inch size/condition tool (R2, and R3).



AGC

order number	catalogue number	Q10	Q	Q mm	Q2	Q1	Q4	Q10	Q10	Q10
right hand										
AGC 5010	AGC 5010	1	1.00	4.00	4.00	1.00	1.00	1.00	1.00	1.00
AGC 5011	AGC 5011	1	1.00	4.00	4.00	1.00	1.00	1.00	1.00	1.00
AGC 5012	AGC 5012	1	1.00	4.00	4.00	1.00	1.00	1.00	1.00	1.00
AGC 5013	AGC 5013	1	1.00	4.00	4.00	1.00	1.00	1.00	1.00	1.00
AGC 5014	AGC 5014	1	1.00	4.00	4.00	1.00	1.00	1.00	1.00	1.00

Small Hole Drilling Run



Coatings provide high-speed capability and are resistant to sticking to light roughing.

	Free
	Substrate Steel
	Cast Iron
	Non-ferrous
	High temp. alloys
	Coated (Aluminum)

Grade	Coating	Grade Description	Work materials											
			01	02	11	12	21	22	31	32	41	42	51	52
1000		Coated tooling. A new family of high-speed tooling materials. For general purpose machining of most steels, stainless steels, high temperature alloys, cast irons, and non-ferrous materials. The tooling has a low speed and all family materials and high feed rates, the effect of 11, 12, 21, 22, 31, 32, 41, 42, 51, 52.												
		Coated tooling. A new family of high-speed tooling materials. For general purpose machining of most steels, stainless steels, high temperature alloys, cast irons, and non-ferrous materials. The tooling has a low speed and all family materials and high feed rates, the effect of 11, 12, 21, 22, 31, 32, 41, 42, 51, 52.												
1000		Coated tooling. A new family of high-speed tooling materials. For general purpose machining of most steels, stainless steels, high temperature alloys, cast irons, and non-ferrous materials. The tooling has a low speed and all family materials and high feed rates, the effect of 11, 12, 21, 22, 31, 32, 41, 42, 51, 52.												
		Coated tooling. A new family of high-speed tooling materials. For general purpose machining of most steels, stainless steels, high temperature alloys, cast irons, and non-ferrous materials. The tooling has a low speed and all family materials and high feed rates, the effect of 11, 12, 21, 22, 31, 32, 41, 42, 51, 52.												
1000		Coated tooling. A new family of high-speed tooling materials. For general purpose machining of most steels, stainless steels, high temperature alloys, cast irons, and non-ferrous materials. The tooling has a low speed and all family materials and high feed rates, the effect of 11, 12, 21, 22, 31, 32, 41, 42, 51, 52.												
		Coated tooling. A new family of high-speed tooling materials. For general purpose machining of most steels, stainless steels, high temperature alloys, cast irons, and non-ferrous materials. The tooling has a low speed and all family materials and high feed rates, the effect of 11, 12, 21, 22, 31, 32, 41, 42, 51, 52.												



Cutting Speed - m min										
Material Group		C100			C20			C200		
		min	Start	max	min	Start	max	min	Start	max
A Aluminum	Al 6061 T 6 temp	0,250	—	0,250	0,250	—	0,250	—	—	—
	Al 6061	0,250	—	0,250	0,250	—	0,250	—	—	—
	1	10	100	40	10	70	30	—	—	—
	2	10	80	30	10	60	20	—	—	—
	3	10	60	20	10	40	10	—	—	—
	4	10	50	15	10	30	10	—	—	—
	5	10	40	10	10	20	10	—	—	—
B Steel	Al 304 T 6 temp	0,250	—	0,250	0,250	—	0,250	—	—	—
	Al 304	0,250	—	0,250	0,250	—	0,250	—	—	—
	1	10	80	100	10	70	80	—	—	—
	2	10	60	100	10	50	70	—	—	—
	3	10	40	60	10	30	50	—	—	—
	4	10	30	40	10	20	30	—	—	—
	5	10	20	30	10	10	20	—	—	—
C Cast Iron	Al 6061 T 6 temp	0,250	—	0,250	0,250	—	0,250	—	—	—
	Al 6061	0,250	—	0,250	0,250	—	0,250	—	—	—
	1	10	80	60	10	60	70	—	—	—
	2	10	60	70	10	50	60	—	—	—
	3	10	50	60	10	40	50	—	—	—
	4	10	40	50	10	30	40	—	—	—
	5	10	30	40	10	20	30	—	—	—
D Titanium	Al 6061 T 6 temp	0,250	—	0,250	0,250	—	0,250	—	—	—
	Al 6061	0,250	—	0,250	0,250	—	0,250	—	—	—
	1	100	200	100	100	200	100	—	—	—
	2	100	200	100	100	200	100	—	—	—
	3	10	80	100	10	60	100	—	—	—
	4	100	100	100	100	100	100	—	—	—
	5	100	100	100	100	100	100	—	—	—
E Inconel	Al 6061 T 6 temp	0,250	—	0,250	0,250	—	0,250	—	—	—
	Al 6061	0,250	—	0,250	0,250	—	0,250	—	—	—
	1	10	10	10	10	10	10	—	—	—
	2	10	10	10	10	10	10	—	—	—
	3	10	10	10	10	10	10	—	—	—
	4	10	10	10	10	10	10	—	—	—
	5	10	10	10	10	10	10	—	—	—
F Copper	Al 6061 T 6 temp	0,250	—	0,250	0,250	—	0,250	—	—	—
	Al 6061	0,250	—	0,250	0,250	—	0,250	—	—	—
	1	10	10	10	10	10	10	—	—	—
	2	10	10	10	10	10	10	—	—	—
	3	10	10	10	10	10	10	—	—	—
	4	10	10	10	10	10	10	—	—	—
	5	10	10	10	10	10	10	—	—	—
G Brass	Al 6061 T 6 temp	0,250	—	0,250	0,250	—	0,250	—	—	—
	Al 6061	0,250	—	0,250	0,250	—	0,250	—	—	—
	1	—	—	—	—	—	—	100	100	100
	2	—	—	—	—	—	—	100	100	100
	3	—	—	—	—	—	—	100	100	100
	4	—	—	—	—	—	—	100	100	100
	5	—	—	—	—	—	—	100	100	100

Notes: Speeds are theoretical and actuals will vary due to dependency on materials and toolholding conditions including, but not limited to, tool wear, tool life and broken surface measurements.



AS Series
Solid Carbide Inserts



AS Series

AS Series number	D mm	L mm	R mm	W mm
AS01000001	1.25	1.25	0.125	0.25
AS01000002	1.25	1.25	0.125	0.25
AS01000003	1.25	1.25	0.125	0.25
AS01000004	1.25	1.25	0.125	0.25
AS01000005	1.25	1.25	0.125	0.25
AS01000006	1.25	1.25	0.125	0.25
AS01000007	1.25	1.25	0.125	0.25
AS01000008	1.25	1.25	0.125	0.25



AS Series

AS Series number	D mm	L mm	R mm	W mm
AS01000009	1.25	1.25	0.125	0.25

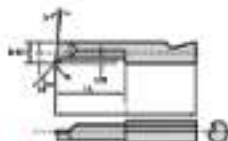


• See chart for
recommended values



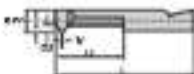
AW2500

AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500
AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500
AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500
AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500
AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500
AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500
AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500
AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500
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AW2500

AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500
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AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500
AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500
AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500
AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500
AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500
AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500
AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500
AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500	AW2500



• Groove insert
... alternate insert



ATD

ISO catalogue number	D min	L4	L	T	CS	W	20° min	15° max	10° min	10° max	10° min	10° max
WCT100001	3,18	3,18	25,0	1,0	0,30	0,30	1,0	0,20	10	10		
WCT100002	6,35	6,35	25,0	1,0	0,4	0,4	1,0	0,20	10	10		



ED

ISO catalogue number	D min	L4	L	T	CS	W	20° min	15° max	10° min	10° max	10° min	10° max
WED100001	4,0		10,0		0,20	0,20						
WED100002	4,0		12,0		0,40	0,40						
WED100003	6,0		12,0		0,20	0,20						
WED100004	6,0		12,0		0,40	0,40						

Insert Screens

order number	ISO catalogue number	Toolbox	Internal Thread
300008	67040	1 mm	M2.5 x 1
300010	67040-0.25	0.25	M2.5
300011	67040	0.5	—
300012	67040	1	M2.5 x 1
300047	6711	16	Ø 1.5
300052	6711	16	Ø 1.5
300417	6711	17	—
300521	6711	17	Ø 1.5
300541	67040	17	M2.5 x 1.5
300546	67040	17	M2.5 x 1.5
300550	6711	18	Ø 1.5
300558	6711	18	Ø 1.5
300561	6711	19	Ø 1.5
300563	67040	19	M2.5 x 1.5
300591	6711	1.6	Ø 1.5

Small Hole Drilling Solutions

Wonders

order number	ISO catalogue number	Toolbox
300004	6601	15 mm
300014	6601	1.5
300016	67017	16
300018	6601	16
300060	6601	17
300061	66017	16
300062	6601	16
300063	6601	1.5

Drive Bits

order number	ISO catalogue number	Toolbox
300006	6601	1.5 mm
300007	6601	1.6
300009	6701	17
300011	67017	17
300014	6601	1.5
300016	6601	1.6
300018	6601	1.5
300019	6601	1.5

Wedges

order number	ISO catalogue number
300010	66010-0.25
300014	66011

Quadralock™ •

High-Precision Products for I.D. Applications

Easy access, quick-change toolholders and inserts perform multiple I.D. applications for maximum productivity with one toolholder.

The unique cutting tip of the Quadralock™ I.D. Quick-Change Tooling System can be locked in four different positions, enabling operation in both Swiss-style and conventional machines. Four quick, easy setup steps and guaranteed insert repeatability within ± 0.002 mm ensures superior performance.

Quadralock



Quadralock Ultra-Precision Tooling

Features

- Four lock steps for precise and repeatable cutting edge positioning.
- Tight insert and pocket ensure secure hold.
- 8 slots and lock-step tools for increased rigidity.

Benefits

- Internal coolant supply directly lubricates cutting edge.
- Ability to rotate tool at 30° increments.
- For finishing, grooving, profiling, and threading applications.

Boring

Bore finish as small as 0.7µm.



Grooving

Groove in a 3.2mm diameter hole.



Profiling

Profile in diameter as small as 1.3mm.



Threading

Thread down to a M6 x 0.5mm.



QuadraLock Boring Bar Identification System



MTM

QuadraLock
Boring System

M

Type

8

Shank Diameter
down to "1"

40

Length
down to "1"

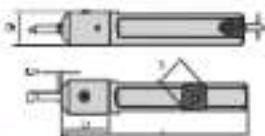
g - Metric

Series

- 8 - 8.0mm
- 10 - 10.0mm
- 12 - 12.0mm
- 14 - 14.0mm
- 16 - 16.0mm
- 20 - 20.0mm

Series

- 40 - 40.0mm
- 45 - 45.0mm
- 50 - 50.0mm
- 55 - 55.0mm



■ MTMM

order number	catalogue number						 insert width	hole
		Ø	Ø1	l	l1	A		
200020	MTMM0040	4.0	10.0	30	10	2.30	MTMM00	2.000
200030	MTMM0045	5.0	10.0	30	10	2.30	MTMM00	2.000
200020	MTMM0040	4.0	10.0	30	10	2.30	MTMM00	2.000
200030	MTMM0045	5.0	10.0	30	10	2.30	MTMM00	2.000
200020	MTMM0040	4.0	10.0	100	10	2.30	MTMM00	2.000
200030	MTMM0045	5.0	10.0	100	10	2.30	MTMM00	2.000

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Customer Application Support (CAS)

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EXTREME RESULTS.

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France	Widia	+33 49 950773	+33 49 950667	g.widia@widia.com
Germany	Widia	+49 89 3030	31 75 33333	g.widia@widia.com
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India	Widia	+91 11 3333	31 333333	g.widia@widia.com
South Korea	Widia	+82 2 3333	31 333333	g.widia@widia.com
Malaysia	Widia	+60 3 3333	31 333333	g.widia@widia.com
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Romania	Widia	+40 21 3333	31 333333	g.widia@widia.com
Bulgaria	Widia	+359 2 3333	31 333333	g.widia@widia.com
Greece	Widia	+30 21 3333	31 333333	g.widia@widia.com
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WIDIA 

Quadrach Boring Bar Inset Identification System



MB	125	625	R
Insert Type	Minimum Flute Depth as "125"	Base Depth, Groove Width, Flute on Thread as "625"	Type of Tool
MB - Insert 	MB - Flute 000 - 0.10mm 001 - 0.15mm 002 - 0.20mm 004 - 0.25mm 005 - 0.30mm 006 - 0.35mm For MB and MB - Flute only 000 - 0.10mm 001 - 0.15mm 002 - 0.20mm	MB - Base Depth 000 - 0.10mm 001 - 0.15mm 002 - 0.20mm 004 - 0.25mm 005 - 0.30mm 006 - 0.35mm 007 - 0.40mm 008 - 0.45mm 009 - 0.50mm Groove Width For MB - Flute only 000 - 0.10mm 001 - 0.15mm 002 - 0.20mm Thread For MB - Flute only 000 - 0.10mm 001 - 0.15mm	R - Type of Tool 000 - 0.10mm



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

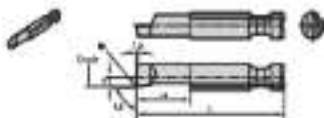
	Steel
	Stainless Steel
	Cast Iron
	Non-ferrous
	High Temp Alloys
	Uncoated (Blanks)

Grain	Coating	Grade Description	WIP Roughness											
			10	15	20	30	40	50	60	70	80	90	100	120
100		Uncoated grades. A very rough, ultra-fine grain uncoated substrate. For general purpose machining of most steels, stainless steels, high temperature alloys, cast irons, and non-ferrous materials. Preferred cut at low speeds and will handle interrupted and high feed rates. See also 100, 110, and 120. Not used in chiping or breaking.												
	100-100													
200		AT501 100 coated grade. Rough 100-100 Co substrate. Substrate grade. For general purpose machining of most steels, stainless steels, high temperature alloys, cast irons, and non-ferrous materials. Preferred cut at low speeds and will handle interrupted and high feed rates.												
	200-100													



Cutting Speed – m/min							
Material Group	C15			C30			mm/min
	min	Start	max	min	Start	max	
A Aluminum	Al 6061 T6	200	—	200	—	200	200
	Al 6063 T6	200	—	200	—	200	200
	Al 7075 T6	150	100	100	80	100	100
	Al 2024 T3	15	30	30	15	30	30
	Al 2024 T3	15	30	30	15	30	30
	Al 2024 T3	15	30	30	15	30	30
	Al 2024 T3	15	30	30	15	30	30
B Steel	SAE 1045 Annealed	200	—	200	—	200	200
	SAE 1045 Tempered	200	—	200	—	200	200
	SAE 1045 Tempered	15	30	30	15	30	30
	SAE 1045 Tempered	15	30	30	15	30	30
	SAE 1045 Tempered	15	30	30	15	30	30
	SAE 1045 Tempered	15	30	30	15	30	30
	SAE 1045 Tempered	15	30	30	15	30	30
C Cast Iron	SAE 1135 As Cast	200	—	200	—	200	200
	SAE 1135 As Cast	200	—	200	—	200	200
	SAE 1135 As Cast	15	30	30	15	30	30
	SAE 1135 As Cast	15	30	30	15	30	30
	SAE 1135 As Cast	15	30	30	15	30	30
	SAE 1135 As Cast	15	30	30	15	30	30
	SAE 1135 As Cast	15	30	30	15	30	30
D Titanium	SAE 304 Annealed	200	—	200	—	200	200
	SAE 304 Annealed	200	—	200	—	200	200
	SAE 304 Annealed	15	30	30	15	30	30
	SAE 304 Annealed	15	30	30	15	30	30
	SAE 304 Annealed	15	30	30	15	30	30
	SAE 304 Annealed	15	30	30	15	30	30
	SAE 304 Annealed	15	30	30	15	30	30
E Inconel	SAE 625 Annealed	200	—	200	—	200	200
	SAE 625 Annealed	200	—	200	—	200	200
	SAE 625 Annealed	15	30	30	15	30	30
	SAE 625 Annealed	15	30	30	15	30	30
	SAE 625 Annealed	15	30	30	15	30	30
	SAE 625 Annealed	15	30	30	15	30	30
	SAE 625 Annealed	15	30	30	15	30	30
F Copper	SAE 110 Annealed	200	—	200	—	200	200
	SAE 110 Annealed	200	—	200	—	200	200
	SAE 110 Annealed	15	30	30	15	30	30
	SAE 110 Annealed	15	30	30	15	30	30
	SAE 110 Annealed	15	30	30	15	30	30
	SAE 110 Annealed	15	30	30	15	30	30
	SAE 110 Annealed	15	30	30	15	30	30
G Brass	SAE 360 Annealed	200	—	200	—	200	200
	SAE 360 Annealed	200	—	200	—	200	200
	SAE 360 Annealed	15	30	30	15	30	30
	SAE 360 Annealed	15	30	30	15	30	30
	SAE 360 Annealed	15	30	30	15	30	30
	SAE 360 Annealed	15	30	30	15	30	30
	SAE 360 Annealed	15	30	30	15	30	30

Notes: Speeds are theoretical and should be cut 10% deep depending on materials and tool holding conditions including, but not limited to, tool wear, tool size and holder, surface treatments.


 Wide choice
 of inserts choice


162

ISO code designation	D mm	L mm	L mm	R mm	Tip
Right hand					
WID1000000	10.0	1.0	10.0	0.0	0.0
WID1000001	10.0	1.1	11.0	0.0	0.0
WID1000002	10.0	1.0	10.0	0.0	0.0
WID1000003	10.0	1.1	11.0	0.0	0.0
WID1000004	10.0	1.1	11.0	0.0	0.0
WID1000005	10.0	1.1	11.0	0.0	0.0
WID1000006	10.0	1.1	11.0	0.0	0.0
WID1000007	10.0	1.1	11.0	0.0	0.0
WID1000008	10.0	1.1	11.0	0.0	0.0
WID1000009	10.0	1.1	11.0	0.0	0.0
WID1000010	10.0	1.1	11.0	0.0	0.0
WID1000011	10.0	1.1	11.0	0.0	0.0
WID1000012	10.0	1.1	11.0	0.0	0.0
WID1000013	10.0	1.1	11.0	0.0	0.0
WID1000014	10.0	1.1	11.0	0.0	0.0
WID1000015	10.0	1.1	11.0	0.0	0.0
WID1000016	10.0	1.1	11.0	0.0	0.0
WID1000017	10.0	1.1	11.0	0.0	0.0
WID1000018	10.0	1.1	11.0	0.0	0.0
WID1000019	10.0	1.1	11.0	0.0	0.0
WID1000020	10.0	1.1	11.0	0.0	0.0
WID1000021	10.0	1.1	11.0	0.0	0.0
WID1000022	10.0	1.1	11.0	0.0	0.0
WID1000023	10.0	1.1	11.0	0.0	0.0
WID1000024	10.0	1.1	11.0	0.0	0.0
WID1000025	10.0	1.1	11.0	0.0	0.0
WID1000026	10.0	1.1	11.0	0.0	0.0
WID1000027	10.0	1.1	11.0	0.0	0.0
WID1000028	10.0	1.1	11.0	0.0	0.0
WID1000029	10.0	1.1	11.0	0.0	0.0
WID1000030	10.0	1.1	11.0	0.0	0.0
WID1000031	10.0	1.1	11.0	0.0	0.0
WID1000032	10.0	1.1	11.0	0.0	0.0
WID1000033	10.0	1.1	11.0	0.0	0.0
WID1000034	10.0	1.1	11.0	0.0	0.0
WID1000035	10.0	1.1	11.0	0.0	0.0
WID1000036	10.0	1.1	11.0	0.0	0.0
WID1000037	10.0	1.1	11.0	0.0	0.0
WID1000038	10.0	1.1	11.0	0.0	0.0
WID1000039	10.0	1.1	11.0	0.0	0.0
WID1000040	10.0	1.1	11.0	0.0	0.0
WID1000041	10.0	1.1	11.0	0.0	0.0
WID1000042	10.0	1.1	11.0	0.0	0.0
WID1000043	10.0	1.1	11.0	0.0	0.0
WID1000044	10.0	1.1	11.0	0.0	0.0
WID1000045	10.0	1.1	11.0	0.0	0.0
WID1000046	10.0	1.1	11.0	0.0	0.0
WID1000047	10.0	1.1	11.0	0.0	0.0
WID1000048	10.0	1.1	11.0	0.0	0.0
WID1000049	10.0	1.1	11.0	0.0	0.0
WID1000050	10.0	1.1	11.0	0.0	0.0
WID1000051	10.0	1.1	11.0	0.0	0.0
WID1000052	10.0	1.1	11.0	0.0	0.0
WID1000053	10.0	1.1	11.0	0.0	0.0
WID1000054	10.0	1.1	11.0	0.0	0.0
WID1000055	10.0	1.1	11.0	0.0	0.0
WID1000056	10.0	1.1	11.0	0.0	0.0
WID1000057	10.0	1.1	11.0	0.0	0.0
WID1000058	10.0	1.1	11.0	0.0	0.0
WID1000059	10.0	1.1	11.0	0.0	0.0
WID1000060	10.0	1.1	11.0	0.0	0.0
WID1000061	10.0	1.1	11.0	0.0	0.0
WID1000062	10.0	1.1	11.0	0.0	0.0
WID1000063	10.0	1.1	11.0	0.0	0.0
WID1000064	10.0	1.1	11.0	0.0	0.0
WID1000065	10.0	1.1	11.0	0.0	0.0
WID1000066	10.0	1.1	11.0	0.0	0.0
WID1000067	10.0	1.1	11.0	0.0	0.0
WID1000068	10.0	1.1	11.0	0.0	0.0
WID1000069	10.0	1.1	11.0	0.0	0.0
WID1000070	10.0	1.1	11.0	0.0	0.0

(continued)

Supply in 1000 pcs per box

WIDIA – Quasitreck

■ Real values
□ Nominal values

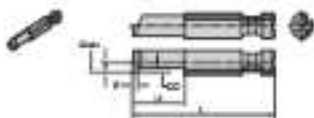


Check the sheet temperature

WIDIA Catalogue Number	Width	Height	Length	Weight	Volume
WIDIA0001	0.25	0.25	0.25	0.00	0.00
WIDIA0002	0.25	0.25	0.25	0.00	0.00
WIDIA0003	0.25	0.25	0.25	0.00	0.00
WIDIA0004	0.25	0.25	0.25	0.00	0.00
WIDIA0005	0.25	0.25	0.25	0.00	0.00
WIDIA0006	0.25	0.25	0.25	0.00	0.00
WIDIA0007	0.25	0.25	0.25	0.00	0.00
WIDIA0008	0.25	0.25	0.25	0.00	0.00
WIDIA0009	0.25	0.25	0.25	0.00	0.00
WIDIA0010	0.25	0.25	0.25	0.00	0.00

WIDIA: Actual base depth for WIDIA0001 and WIDIA0002 approx. 0.00m

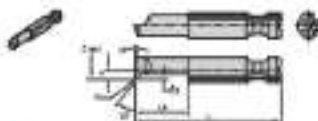
WIDIA Catalogue Number WIDIA0001 and WIDIA Catalogue Number WIDIA0002 have an actual base depth of 0.00m


 * Not shown
in standard drawing


■ MC1

MC1 cutting direction	20-400	1-4	1	0	100	W
right hand						
MC1-020400	0.15	0.05	0.04	0.02	0.15	0.15
MC1-020401	0.15	0.05	0.04	0.02	0.15	0.15
MC1-020402	0.15	0.05	0.04	0.02	0.15	0.15
left hand						
MC1-020403	0.15	0.05	0.04	0.02	0.15	0.15
MC1-020404	0.15	0.05	0.04	0.02	0.15	0.15
MC1-020405	0.15	0.05	0.04	0.02	0.15	0.15

* See the Quadrant Insert Drawing

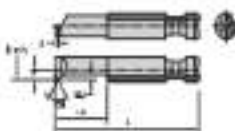


W: flat width
L: alternate width



Check the thread form during

ISO cutting conditions	D (mm)	L (mm)	L _{alt} (mm)	F (mm/min)	V _c (m/min)	W _{max} (mm)
right hand						
WPCD1001	1.0	6.75	11.25	1000	6.00	0.10
WPCD1002	1.0	7.00	11.40	1100	6.15	0.10
WPCD1003	1.0	6.00	10.00	1.40	1.00	0.10
WPCD1004	1.0	10.75	16.25	1400	12.0	0.10
left hand						
WPLD1001	1.0	6.75	11.25	1000	6.00	0.10
WPLD1002	1.0	7.00	11.40	1100	6.15	0.10
WPLD1003	1.0	6.00	10.00	1.40	1.00	0.10
WPLD1004	1.0	10.75	16.25	1400	12.0	0.10



• Non-coated
• Coated inserts



MT

ISO category number	R mm	L mm	W mm	W mm	W mm	W mm
right hand						
MT12000120	1.25	1.25	25.40	1.25	1.25	1.25
MT12000125	1.25	1.25	25.40	1.25	1.25	1.25
MT12000130	1.25	1.25	25.40	1.25	1.25	1.25
left hand						
MT12000121	1.25	1.25	25.40	1.25	1.25	1.25
MT12000125	1.25	1.25	25.40	1.25	1.25	1.25
MT12000131	1.25	1.25	25.40	1.25	1.25	1.25

Quadrant is a brand name of Widia

Insert Screws

order number	ISO catalogue number	Twoflow	external thread
200000	80500	2 mm	M3.5x1
200000	4000000 2.0	2.0	M3.5
200000	00000	0.8	-
200000	17000	1.5	M3.5x1
200000	00100	0.5	M3.5
200000	01100	0.5	M3.5
200000	00100	0.5	-
200000	00000	0.5	M3.5
200000	01000	0.5	M3.5x1.5
200000	01000	0.5	M3.5x1.5
200000	00100	0.5	M3.5
200000	00100	0.5	M3.5
200000	00100	1.0	M3.5
200000	01000	1.0	M3.5x1.5
200000	01100	1.0	M3.5

Washers

order number	ISO catalogue number	Twoflow
200000	80100	1.5 mm
200000	80100	1.0
200000	01000	0.5
200000	00100	0.5
200000	00100	0.5
200000	00100	0.5
200000	00100	0.5
200000	00100	1.0

Drive Bits

order number	ISO catalogue number	Twoflow
200000	80000	1.5 mm
200000	00000	0.5
200000	00000	0.5
200000	00000	0.5
200000	00000	0.5
200000	00000	0.5
200000	00000	1.0
200000	00000	1.0

Wedges

order number	ISO catalogue number
200000	4000000 2.0
200000	80100

WMT™ System



**EXTREME CHALLENGES.
EXTREME RESULTS.**

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.

Versatile and Well-Constructed

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

WMT Toolholders

- Outstanding rigidity and clamping capabilities
- Guarantees fast cycle times and limited tool deflection
- Precise insert positioning for accurate machining
- Compact design makes operator-friendly insert indexing and optimum insert positioning
- Choice of integral or modular toolholders

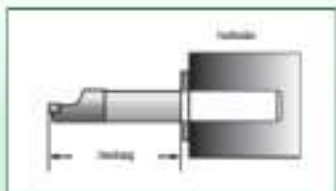
To learn more, contact your local Authorized Distributor or visit widia.com

WIDIA

Setup Recommendations for Bar Overhang

WIDIA L3000™ cutting tools are the best quality turning, grooving, profiling and finishing tools available. For more than 30 years, WIDIA L3000™ has been successfully capable in cutting steel and other non-cutting problems in high-volume turning plants worldwide.

A suitable position is essential with any cutting tool to achieve the best finished or support work. The position of the workpiece, cutting tool, tool holder, work rest, or machine tool must be.



As an example, a 4:1 ratio is given for standard overhang and setup time. This ratio is for a 4:1 ratio of workpiece diameter to tool diameter. The overhang ratio is affected by many factors:

- Type of material being machined
- Depth of cut
- Feed rate

As an example, a 4:1 ratio is given for standard overhang and setup time. This ratio is for a 4:1 ratio of workpiece diameter to tool diameter. The overhang ratio is affected by many factors:

Work diameter (mm)	Tool work ratio (mm)	Setup work ratio (mm)
4.0mm	16.0mm	16.0mm
6.0mm	24.0mm	24.0mm
8.0mm	32.0mm	32.0mm
10.0mm	40.0mm	40.0mm
12.0mm	48.0mm	48.0mm
14.0mm	56.0mm	56.0mm
16.0mm	64.0mm	64.0mm
18.0mm	72.0mm	72.0mm
20.0mm	80.0mm	80.0mm
22.0mm	88.0mm	88.0mm
24.0mm	96.0mm	96.0mm
26.0mm	104.0mm	104.0mm
28.0mm	112.0mm	112.0mm
30.0mm	120.0mm	120.0mm

Setup Information and Recommendations

Tool/PC system selection

For 2D applications, position "10" is always the best by defaulting to a smaller than, 0.01. For "PC" control, 0.01 or 0.005 between the tool and workpiece is the best by default.

Tool/PC system selection or tooling

For 2D "Single" and multi-axis systems, position "10" and "10.1" is the best by default. For 3D, the best by default is "10.1".

Tip of the tool

This position the tool tip to the tool holder, position a holder, and, position a holder.

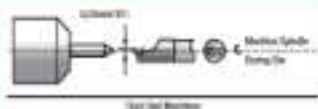


Before operation of the 2D/3D/4D/5D machine, the tool tip must be aligned with the center of the workpiece. The tool tip must be aligned with the center of the workpiece. The tool tip must be aligned with the center of the workpiece. The tool tip must be aligned with the center of the workpiece.

Use the 2D/3D/4D/5D machine setup level

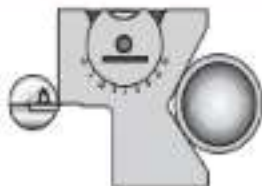
1. Use the center height gauge and position level as shown in the diagram.
2. Position the tool tip, with the center of the tool tip, with the center of the workpiece. The tool tip must be aligned with the center of the workpiece.
3. Use a straight edge to check the tool tip position. The tool tip must be aligned with the center of the workpiece.

Widia is a leader in the tooling industry. We have a wide range of products to meet your needs. We have a wide range of products to meet your needs. We have a wide range of products to meet your needs.





One Level Precision Setup Level



For most machines:
Set the dial to 90° of work.



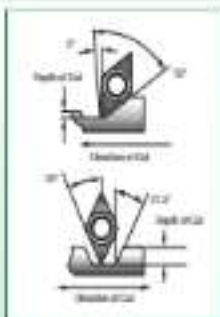
For about level hyper machines:
Set the dial to 50° degree of the tool.



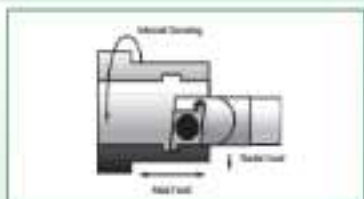
Rotate (C): Swivel (pointing to red line). This sets the leveling at 17° from above horizontal.

Rotate (C): Swivel (pointing to red line). This sets the leveling at 17° from above horizontal.

Setup Information and Recommendations for Boring and Drilling



Setup Information and Recommendations for Grooving

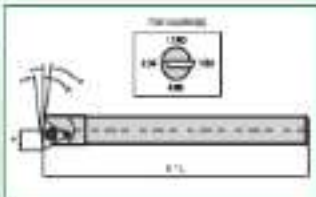


■ CDD Indexable Type Grooving Inserts

Setup conditions	Feed rate (mm/min)	Cutting speed (m/min)
Setup conditions	See page 145-146	
Feed rate	1.5 mm/min - 2.0 mm/min	
Cutting speed	1.5 m/min - 2.0 m/min	

For best results, use WIDIA UNICUT™ tool against the work material. Optimal results cannot be achieved with carbide.

Although our estimates provide the correct steel marking application, we understand that a custom solution may be required.



Straight Shank Type Tooling Bars

Steel or Carbide

Size:

Customer-Specified Dimensions

	A-A Overall Length	From center of shank to cutting edge
	B-B Diameter	A-A diameter hole diameter shown in cutting length must be 0.015
	C-C Diameter	+0.000 -0.005 Maximum hole size
	D-D Length	1.00 - 1.50 Maximum hole size

Special Instructions
Please specify material type

Current Catalog Number

Customer

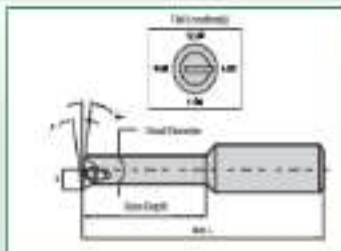
Order Date

Shipping Requirements

Attention: Distribution - For the worksheet
to collect information for your customer

1st Count 1st Tool Tip 2nd Tool Tip 3rd Tool Tip

Use this worksheet to modify one of our existing products to meet your own specifications. If your product requirements are 100% within tolerance, contact us directly.



Step-Down Shank Type During Drill Run or Retract

Date:

Customer-Specified Dimensions

	Shank Depth	1/2" (100mm) to 1 1/2" (38mm) (max); 1/2" (100mm) to 1 1/2" (38mm) (min)
	O.D. (Shank Length)	Shank length 1/2" (100mm) to 1 1/2" (38mm) (max); 1/2" (100mm) to 1 1/2" (38mm) (min)
	1" Diameter	1/2" (100mm) to 1 1/2" (38mm) (max); 1/2" (100mm) to 1 1/2" (38mm) (min)
	1 1/2" Diameter	1/2" (100mm) to 1 1/2" (38mm) (max); 1/2" (100mm) to 1 1/2" (38mm) (min)
	1 1/2" Length	1/2" (100mm) to 1 1/2" (38mm) (max); 1/2" (100mm) to 1 1/2" (38mm) (min)

Special Instructions
Please specify material & size

Current Catalogue Standard

Customer

Distributor

Shipping Requirements

Please indicate the size of the product
to which the material is to be applied.

1/2" (100mm)

1 1/2" (38mm) to 1 1/2" (38mm)

1 1/2" (38mm) to 1 1/2" (38mm)

1 1/2" (38mm) to 1 1/2" (38mm)

NOVO KNOWS ART TO PART TO PROFIT



Living as productive and profitable as possible is your fundamental goal. With the addition of NOVO™ to your team, your goal can be achieved. NOVO possesses powerful digital tools that tie together process planning, inventory availability and purchase, cost-per-part management, and productivity improvements.

NOVO can ensure you have the right tools on your machines, in the right sequence. Resulting in flawless execution that accelerates every job, and maximizes every cut.

www.widia.com/novo



01

THE DIGITAL SOURCE FOR DELIVERING
SMART MACHINING SOLUTIONS

www.cim.mach

NOVO



Turning • Grooving and Cut-Off

Grooving and Cut-Off Flatturner	CG-23
WMT Grooving, Face Grooving, Cut-Off, and Profiling	FA-636
TopGroover Shallow Grooving and Face Grooving	CG-23H
ProGroover Grooving and Cut-Off	CG-210T
Separator for Cut-Off	D186-D132

Grooving



WMT™

- Grooving widths 0-4mm
- CD cutting depths 0.1-0.3mm
- CD cutting for maximum heat dissipation 0.15mm
- Groove cleaning integral shock handling toolholders available
- Suitable for deep grooving

Range
D4-L38



TopGroove™

- Grooving widths 0.1-0.3mm
- Grooving depths 0.05-0.1mm
- CD cutting for maximum heat dissipation 0.1mm
- Integral shock handling systems

Range
D4-L38



ProGroove™

- Grooving depths 0-10mm
- Groove widths 0.05mm to 0.3mm
- Excellent chip removal
- Groove cleaning integral shock handling toolholders available
- Grooving and CD cutting

Range
D4-L38



L3

- Grooving widths 0-4mm
- CD cutting depths 0.1-0.3mm
- Groove cleaning integral shock handling toolholders available

Range
D4-L38



Cut-Off



WMT™

- Cut-off widths 1-3mm
- Maximum cutting depths 0.1mm
- Groove cleaning integral shock handling toolholders available
- Integral shock-handling system for square and rectangular sections
- Right-hand toolholders 2° and 4° tool angles

Range
D4-L38



Separator™

- Cut-off widths 3-4mm
- Positive mechanical and clamping forces
- Right-hand toolholders available
- Right-hand toolholders for maximum depth capacity

Range
D4-L38



ProGroove

- Cut-off widths 1-4mm
- Single support point for maximum depth capacity
- Right-hand toolholders with 0° tool angles
- Left-hand toolholders with 0° tool angles
- Groove cleaning integral shock handling toolholders available

Range
D4-L38



Pumps and Turn



WMT™

Heavy-Duty Reinforced Turning Applications

- Grooving widths 0-4mm
- CD cutting depths 0.1-0.3mm
- CD cutting for maximum heat dissipation 0.15mm
- Groove cleaning integral shock handling toolholders available

Range
D4-L38



ProGroove

For Light-Cutting Turns

- Grooving widths 0-4mm
- CD cutting depths 0-0.3mm
- Single edge design for maximum depth capacity
- Groove cleaning integral shock handling toolholders available

Range
D4-L38



**Face
Grooving**

WMT™

- Cutting width: 1-4.0 mm
- Cutting depth: 0.5-10.0 mm
- Minimum feed per revolution: 0.05 mm/rev

 Pairs:
14-120

TopGroove™

- VSD M11 turn grooves max. depth: 14.0 mm
- Cutting width range for standard inserts: 1.0-4.0 mm
- Cutting depth range for standard inserts: 1.0-10.0 mm
- Cutting width range for M11 turn grooving inserts: 1-4.0 mm
- Cutting depth range for M11 turn grooving inserts: 1.0-10.0 mm
- Cutting depth range for M11 turn grooving inserts: 1.0-10.0 mm
- Cutting depth range for M11 turn grooving inserts: 1.0-10.0 mm

 Pairs:
140-120

Profiling

WMT™

For Heavy Stock Removal

- Full radius turn cutting width: 1.0 mm
- VSD cutting depth: 0.5-10.0 mm
- Fine-chipping integral insert settings available on both

 Pairs:
14-120

TopGroove™

 Medium to Heavy Stock Removal
at Groove Profile Depths

- Full radius turn cutting width: 1.0-4.0 mm
- Full cutting depth: 1.0-10.0 mm
- Integral built-in coolant and ISO 50/CM™ built-in coolant

 Pairs:
140-120

ProGroove™

For Light Setup

- Full radius turn cutting width: 1.0 mm
- VSD cutting depth: 1-10 mm
- Fine-chipping integral insert settings available on both

 Pairs:
120-120

Undercutting

TopGroove™

- Undercutting feed width: 1.0 mm
- Undercutting depth: 0.5-10.0 mm

 Pairs:
140-120


WMT™ System •

One Platform for Grooving, Face Grooving,
Cut-Off, and Profiling

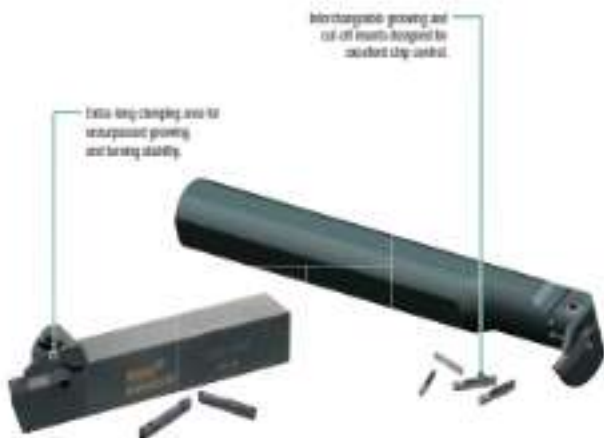
WMT



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 you the most accurate machining with exceptionally fast cycle times and superior performance.

Versatile and Well-Constructed

- Specifically designed to increase speeds and feeds.
- Idealized geometry for near zero tool deflection during grooving applications.
- The WMT system enables facing chuck removal in turning applications.
- Ensures clean surface finishes and a long, reliable tool life.



WMT® Toolholders

- Outstanding rigidity and clamping capabilities.
- Guarantees short cycle times and limited tool wear.
- Precise insert positioning for accurate machining.
- Groove & drop inserts: superior finish, insert retaining and optimum insert positioning.
- Choice of rough or finish turning.



The Most Advanced Turning Solutions in the Industry

For exceptional quality, value, and performance, look no further than the WMT™ comprehensive line of specially engineered and optimized grooving and cut-off solutions. All the tools you need here for almost every application.

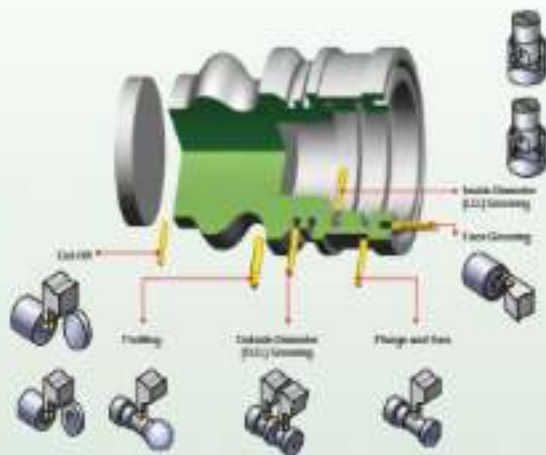
The WMT system, with its ultra-high-speed and precision performance, provides significantly faster and more consistent, all-in-one tool for your most demanding grooving, cut-off, turning, and profiling applications.

It's perfect for all general precision operations, including both machine and hand grooving.

Access the handy, easy-to-use guide to design and select the appropriate grooving and cut-off tool for your specific needs.

1. Choose the application to be performed

Consider depth, width, and profile.

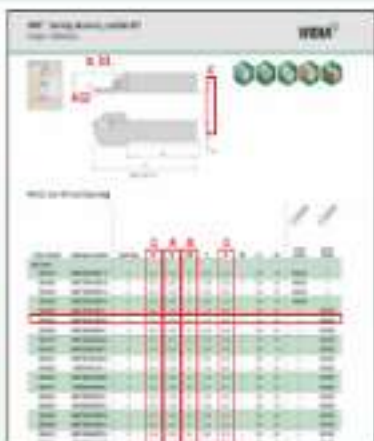


2. Identify the material to be machined

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

- Steel
- Stainless Steel
- Cast Iron
- Non-Ferrous
- High Temp. Alloys
- Hardened Steels

2. Select your toolholder based on the application
3. Choose the appropriate width "W" applied for the application
4. Choose the desired cutting depth "D" determine the diameter tool rigidity
5. Select the largest toolholder width "W" and "D" dimensions for maximum rigidity



	application	recommended toolholders	available widths
	Turning and Grooving	pages 134-137	page 138
	Face Turning	pages 134-136	page 138
	Cut Off	page 138	
	Profile and Turn	pages 134-137	page 138

• Select adaptation style for the application

- CB Cut-Off Module
- CB-B Cut-Off Module with Edge
- PT Groove, Flange and Turn
- PC Flanged Groove
- PS Groove, Flange and Turn

NOTE: Cut-Offs are recommended using bar stock.

WMT™ Turning, Grooving, Cut-Off and Profiling
Tool Selection Chart

WIDIA

CB Cut-Off Module

• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock

CB-B Cut-Off Module with Edge

• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock

PT Groove, Flange and Turn

• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock

PC Flanged Groove

• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock

PS Groove, Flange and Turn

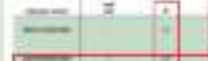
• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock
• Grooving, turning, and cut-off on bar stock



- A. Choose the appropriate insert with "90°" for your specific application.
- B. Select the required corner radius value "R0.2".

WMT™ Turning, Grooving, and Profiling
Tool Selection Chart

WIDIA



2. Default guide

		Recommended to pass					
Turning cutting condition		Steel	Aluminum alloy	Cast iron	Non-ferrous alloys	High temp. alloys	Hardened materials
Steady interrupted cut		W1010T	W1010T	W1010T	W1010T	W1010T	-
Light interrupted cut		W1010T / W1010T	W1010T	W1010T / W1010T	W1010T	W1010T	-
Feeding depth of cut, cutting on turning table		W1010T	W1010T	W1010T / W1010T	W1010T	W1010T / W1010T	W1010T
Smooth cut, per round surface		W1010T / W1010T	W1010T	W1010T / W1010T	W1010T	W1010T / W1010T	W1010T

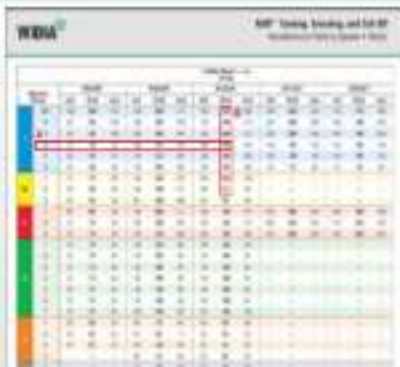
		Recommended to enter					
Cut-Off cutting condition		Steel	Aluminum alloy	Cast iron	Non-ferrous alloys	High temp. alloys	Hardened materials
Steady interrupted cut		W1010T	W1010T	W1010T	W1010T	W1010T	-
Light interrupted cut		W1010T	W1010T	W1010T	W1010T	W1010T	-
Feeding depth of cut, cutting on turning table		W1010T	W1010T	W1010T	W1010T	W1010T	W1010T
Smooth cut, per round surface		W1010T	W1010T	W1010T	W1010T	W1010T	W1010T

NOTE: See page 141 for details on tool length recommendations.

3. Determine cutting data

- Based on material group and grade, identify starting point (a).
- Then rotate starting speed to 0.0020.

NOTE: See page 141 for cutting data.



WMT Identification System

Each character in our catalogue number denotes a specific trait of that product. Use the following key columns and corresponding legend to easily identify which attributes apply.



Cat-01							
WMT	C	015	N	00	CM	08	
Turning System	Cat-01	Wt. mm 1/8"	Material	Material Chip Load Angle	Chipload Geometry CM = Cat-01 Wt. mm CM 45 = Cat-01 Wt. mm with Nose	Corner Radius mm 1/8"	



Turns, Flange, Turn, and Groove Insert							
WMT	S	205	M	2	U	02	PT
Turning System	Insert	Wt. mm Wt. 1/8"	Cat. of Microinsert for WMT Wt. mm 1/8"	Tool Size	Insert Material	Corner Radius mm 1/8"	Chipload Geometry PT = Groove, Flange, and Turn PU = Groove, Flange, and Turn PS = Flange and Groove

F = Groove, grooved turning with system, e.g. 1000-10-02 G = Groove, grooved turning with system, e.g. 1000-10-02 U = Groove, grooved turning with system, e.g. 1000-10-02 PT = Groove, Flange, and Turn, e.g. 1000-10-02							
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Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

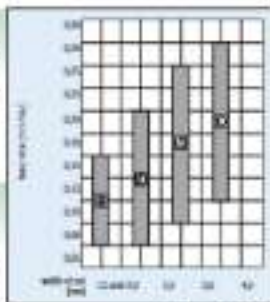


Feed
Depth of Cut

Coating	Grade Description	Feed	Depth of Cut
WMT 100	An advanced TiN/TiAlN coating with a very effective coolant and liquid soluble additives. The WMT 100™ grade is used for general turning, grooving, and cut-off for 2+ years. The WMT 100™ grade is also used for turning, grooving, and cut-off for 2+ years. The WMT 100™ grade is also used for turning, grooving, and cut-off for 2+ years.	0.015	0.015
WMT 100	An advanced TiN/TiAlN coating with a high alloy steel grade and liquid soluble additives. The WMT 100™ grade is used for general turning, grooving, and cut-off for 2+ years. The WMT 100™ grade is also used for turning, grooving, and cut-off for 2+ years.	0.015	0.015
WMT 100	A hard tool grade coated with a high alloy steel grade and liquid soluble additives. The WMT 100™ grade is used for general turning, grooving, and cut-off for 2+ years. The WMT 100™ grade is also used for turning, grooving, and cut-off for 2+ years.	0.015	0.015
WMT 100	A hard tool grade coated with a high alloy steel grade and liquid soluble additives. The WMT 100™ grade is used for general turning, grooving, and cut-off for 2+ years. The WMT 100™ grade is also used for turning, grooving, and cut-off for 2+ years.	0.015	0.015
WMT 100	A hard tool grade coated with a high alloy steel grade and liquid soluble additives. The WMT 100™ grade is used for general turning, grooving, and cut-off for 2+ years. The WMT 100™ grade is also used for turning, grooving, and cut-off for 2+ years.	0.015	0.015
WMT 100	A hard tool grade coated with a high alloy steel grade and liquid soluble additives. The WMT 100™ grade is used for general turning, grooving, and cut-off for 2+ years. The WMT 100™ grade is also used for turning, grooving, and cut-off for 2+ years.	0.015	0.015
WMT 100	A hard tool grade coated with a high alloy steel grade and liquid soluble additives. The WMT 100™ grade is used for general turning, grooving, and cut-off for 2+ years. The WMT 100™ grade is also used for turning, grooving, and cut-off for 2+ years.	0.015	0.015
WMT 100	A hard tool grade coated with a high alloy steel grade and liquid soluble additives. The WMT 100™ grade is used for general turning, grooving, and cut-off for 2+ years. The WMT 100™ grade is also used for turning, grooving, and cut-off for 2+ years.	0.015	0.015
WMT 100	A hard tool grade coated with a high alloy steel grade and liquid soluble additives. The WMT 100™ grade is used for general turning, grooving, and cut-off for 2+ years. The WMT 100™ grade is also used for turning, grooving, and cut-off for 2+ years.	0.015	0.015
WMT 100	A hard tool grade coated with a high alloy steel grade and liquid soluble additives. The WMT 100™ grade is used for general turning, grooving, and cut-off for 2+ years. The WMT 100™ grade is also used for turning, grooving, and cut-off for 2+ years.	0.015	0.015

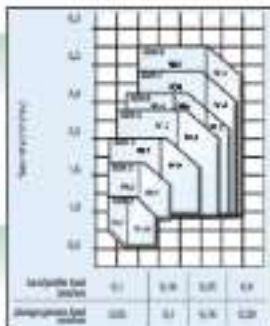
CM Cut-Off Medium

- Double-sided, 9° bottom and two mechanically relieved.
- Maximal right- and left-hand feed angles up to 45°.
- Designed for maximum speed and feed.
- Chip geometry designed for excellent chip control and maximum cutting pressure on various materials.



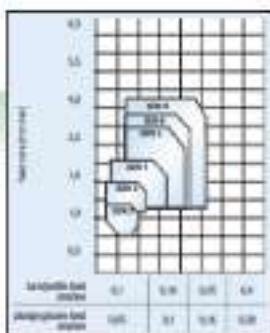
CM-W Cut-Off Medium with Wiper

- Wiper flats achieve surface finish in cut-off.
- Double-sided, 9° bottom and two mechanically relieved.
- Maximal right- and left-hand feed angles up to 45°.
- Designed for maximum speed and feed.
- Chip geometry designed for excellent chip control and maximum cutting pressure on various materials.
- Ideal for AISI 304 stainless steel, tool steel, titanium, Inconel®, and other nickel-based alloys at maximum speeds and feeds.



PI Flange, Groove, and Turn Inserts

- High precision, high geometry for deep cutting inserts, especially on soft materials.
- Deep grooving and full chipgroove tool (DCL) and face grooving capabilities.
- Excellent chip control over full range of DCL when turning.
- Capable both axial and radial directions.



PC Grooving and Profiling Inserts

- Superior chip control.
- Full face-width geometry for flange and coolant operations.
- Effective cutting edge geometry accounts for the increased versatility.



PN Flange, Groove, and Turn Inserts

- Excellent performance in grooves (max. 30 DCL).
- Deep grooving and full chipgroove tool (DCL) and face grooving capabilities.
- Excellent chip control over full range of DCL when turning.
- Excellent superior chip control in interrupted cuts.



Cutting Speed - m/min																
Material Group		WMT-HS1			WMT-HS2			WMT-HS3			WMT-HS4			WMT-HS7		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
Blue	10	120	180	140	140	200	160	140	170	160	140	200	160	140	170	160
	1	80	80	140	140	160	160	120	160	140	140	200	160	80	160	160
	2	80	80	140	140	160	160	120	160	140	140	200	160	80	160	160
	4	10	10	20	140	160	160	120	160	140	140	200	160	10	100	120
	5	80	80	80	170	170	160	140	120	150	140	160	80	100	100	170
Yellow	1	80	80	80	140	160	160	120	160	140	140	200	160	80	80	80
	2	80	80	80	140	160	160	120	160	140	140	200	160	80	80	80
	3	80	80	80	140	160	160	120	160	140	140	200	160	80	80	80
Red	1	80	80	80	140	160	160	120	160	140	140	200	160	80	160	160
	2	80	80	80	140	160	160	120	160	140	140	200	160	80	160	160
	3	80	80	80	140	160	160	120	160	140	140	200	160	80	160	160
Green	1	10	20	40	140	160	160	120	160	140	140	200	160	10	10	10
	2	10	20	40	140	160	160	120	160	140	140	200	160	10	10	10
	3	10	20	40	140	160	160	120	160	140	140	200	160	10	10	10
	4	10	20	40	140	160	160	120	160	140	140	200	160	10	10	10
	5	10	20	40	140	160	160	120	160	140	140	200	160	10	10	10
	6	10	20	40	140	160	160	120	160	140	140	200	160	10	10	10
	7	10	20	40	140	160	160	120	160	140	140	200	160	10	10	10
Orange	1	80	80	80	140	160	160	120	160	140	140	200	160	10	10	10
	2	80	80	80	140	160	160	120	160	140	140	200	160	10	10	10
	3	80	80	80	140	160	160	120	160	140	140	200	160	10	10	10
	4	10	10	10	140	160	160	120	160	140	140	200	160	10	10	10
Grey	1	10	10	10	140	160	160	120	160	140	140	200	160	10	10	10
	2	10	10	10	140	160	160	120	160	140	140	200	160	10	10	10
	3	10	10	10	140	160	160	120	160	140	140	200	160	10	10	10
	4	10	10	10	140	160	160	120	160	140	140	200	160	10	10	10

WMT
turning, grooving, and cut-off

WMT

WMT series
cut-off inserts



WMT-DM

catalog number	tool size	W	D	L	h	feed	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM
WMT010DMCMB	1	1.00	0.40	10.00	0.20	0.10	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM
WMT010DMCMB	2	1.00	0.40	10.00	0.20	0.10	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM
WMT010DMCMB	40	1.00	0.40	10.00	0.20	0.10	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM
WMT010DMCMB	5	1.00	0.40	10.00	0.20	0.10	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM
WMT010DMCMB	6	1.00	0.40	10.00	0.20	0.10	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM
WMT010DMCMB	8	1.00	0.40	10.00	0.20	0.10	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM

catalog number	tool size	W	D	L	h	feed	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM
WMT010DMCMB	1	1.00	0.40	10.00	0.20	0.10	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM
WMT010DMCMB	2	1.00	0.40	10.00	0.20	0.10	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM
WMT010DMCMB	40	1.00	0.40	10.00	0.20	0.10	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM
WMT010DMCMB	5	1.00	0.40	10.00	0.20	0.10	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM
WMT010DMCMB	6	1.00	0.40	10.00	0.20	0.10	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM
WMT010DMCMB	8	1.00	0.40	10.00	0.20	0.10	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM	WMT-DM

(continued)

1997-1998—continued

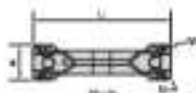


• **Substrate:**
• **Enzyme:**

25	Blue	4	4	10	10
10	Yellow			10	10
10	Red	4	4	10	10
10	Green			10	10
10	Orange			10	10
10	Grey				

[illegible]

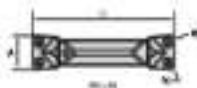
Abstract


 First corner
 Lubrication device

WMT P-PT • Precision

Lathe type / number	Feed rate	W	DB	LT	WMT P-PT • Precision
WMT1000P001	0	0.25	0.0	16.0	1000
WMT1000P002	0.5	0.25	0.0	16.0	1000
WMT1000P003	0.5	0.25	0.0	16.0	1000
WMT1000P004	0	0.25	0.0	16.0	1000
WMT1000P005	0	0.25	0.0	16.0	1000
WMT1000P006	0	0.25	0.0	16.0	1000
WMT1000P007	0	0.25	0.0	16.0	1000
WMT1000P008	0	0.25	0.0	16.0	1000
WMT1000P009	0	0.25	0.0	16.0	1000
WMT1000P010	0	0.25	0.0	16.0	1000
WMT1000P011	0	0.25	0.0	16.0	1000
WMT1000P012	0	0.25	0.0	16.0	1000
WMT1000P013	0	0.25	0.0	16.0	1000
WMT1000P014	0	0.25	0.0	16.0	1000
WMT1000P015	0	0.25	0.0	16.0	1000
WMT1000P016	0	0.25	0.0	16.0	1000
WMT1000P017	0	0.25	0.0	16.0	1000
WMT1000P018	0	0.25	0.0	16.0	1000

Drawing code: 20-01

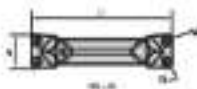


Pin shown
is alternate choice



WMF-12-12 • Molded

width/height	width	length	height	weight	material	operation	insert code
WMF1206060010	6	12	6	0.10	P	Turning	WMF1206060010
WMF1206060010	6	12	6	0.10	M	Grooving	WMF1206060010
WMF1206060010	6	12	6	0.10	K	Cut-Off	WMF1206060010
WMF1206060010	6	12	6	0.10	N	Turning	WMF1206060010
WMF1206060010	6	12	6	0.10	S	Grooving	WMF1206060010
WMF1206060010	6	12	6	0.10	H	Cut-Off	WMF1206060010
WMF1206060010	6	12	6	0.10	L	Turning	WMF1206060010
WMF1206060010	6	12	6	0.10	T	Grooving	WMF1206060010
WMF1206060010	6	12	6	0.10	V	Cut-Off	WMF1206060010
WMF1206060010	6	12	6	0.10	W	Turning	WMF1206060010
WMF1206060010	6	12	6	0.10	X	Grooving	WMF1206060010


 * Substrate
 † Groove width

WMT P-PH • Feedstock

WMT grade number	Substrate	W	PH	L	Grade	Substrate	W	PH	L	Grade
WMT1000P01PH	1	3.0	0.0	0.00	1	WMT1000P01PH	1	3.0	0.0	0.00
WMT1000P02PH	1	3.0	0.0	0.00	2	WMT1000P02PH	2	3.0	0.0	0.00
WMT1000P03PH	2	3.0	0.0	0.00	3	WMT1000P03PH	3	3.0	0.0	0.00
WMT1000P04PH	3	3.0	0.0	0.00	4	WMT1000P04PH	4	3.0	0.0	0.00
WMT1000P05PH	4	3.0	0.0	0.00	5	WMT1000P05PH	5	3.0	0.0	0.00
WMT1000P06PH	5	3.0	0.0	0.00	6	WMT1000P06PH	6	3.0	0.0	0.00
WMT1000P07PH	6	3.0	0.0	0.00	7	WMT1000P07PH	7	3.0	0.0	0.00
WMT1000P08PH	7	3.0	0.0	0.00	8	WMT1000P08PH	8	3.0	0.0	0.00
WMT1000P09PH	8	3.0	0.0	0.00	9	WMT1000P09PH	9	3.0	0.0	0.00
WMT1000P10PH	9	3.0	0.0	0.00	10	WMT1000P10PH	10	3.0	0.0	0.00

(continued)

Drawing sheet 20-01

NOVO KNOWS SEARCH

Searching for a tool by using the outdated method of a catalogue has been replaced with the Advise and Select functions from NOVO™ — saving you time and money.

ADVISE

Widia is taking a new approach to providing cutting tool recommendations:

- Define Machining Features (face milling, drilling, turned hole, etc.)
- Apply Constraints/Requirements (geometric, material, tolerance, etc.)
- Get Machining Sequence (single or multi-step operations, rough then finish, etc.)
- Receive Toolset Results

SELECT

A method of selecting cutting tools from a large structure via a hierarchy or parametric search.

- If you know which product you are looking for, a quick search can be performed by just the catalogue number or product description.
- Select Wides significantly reduce the amount of potential tooling solutions.
- After the tool is selected, NOVO also provides cutting and adaptive flow options that fit with your solution.

NOVO can ensure you have the right tools on your machines, in the right sequence. Resulting in flawless execution that accelerates every job, and maximizes every shift. widia.com/novo

WMT System

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



Integral Toolholders							
WMT	B	R	2525	M	3	13	— 038-052
Tooling System	Tool Shape	Insert	Shank Size	Tool Length	Coat Size	Max. Grooving Depth	Face Grooving Identifier
WMT - Groove and Turn (WMT) (WMT)	- B - Straight - R - Straight with round insert - C - Grooved - A - Straight, face grooving, external - R - Straight, face grooving, internal	- R - Right hand - L - Left hand	Inserts in Mill (mm)	10 - 100 2 - 110 6 - 115 1 - 160 10 - 220 12 - 220	1 2 20 3 4 5 6 8	- Coarse to fine 0.1 mm - 0.1 mm - or less 0.1 - 0.1 mm 0.1 - 0.1 mm 0.1 - 0.1 mm 0.1 - 0.1 mm 0.1 - 0.1 mm	- Coarse to fine 0.1 mm - 0.1 mm - or less 0.1 - 0.1 mm 0.1 - 0.1 mm 0.1 - 0.1 mm 0.1 - 0.1 mm 0.1 - 0.1 mm



Modular Shanks						
WMT	WGM	R	3	16	B	070-100
Tooling System	Tooling System	Insert	Shank Size	Max. Grooving Depth	Tool Shape	Face Grooving Identifier
		- R - Right hand - L - Left hand			- B - Double fl - B - Double fl	



WIDIA
VICTORY



Module Toolholders

WCM

Tooling
System

WCM → Module
Deep Drilling

WCM → Module Standard
Drilling System

S

Tool Holder

S → Straight
S → Tool holder

R

Tool

R → Right-hand
L → Left-hand

2525

Shank Size

Integral Boring Bars

A

Tool
Bar with
Coolant



25

Shank Diameter

R

Tool Length

WMT

WMT[®]
Coated Tool
Bar System



Coated Bar → Tool Holder
W → 100mm
S → 150mm
T → 200mm

E

Tool Holder



E → Increased
SPM

R

Tool

R → Right-hand
L → Left-hand

03

Tool Size

16

Max
Drilling
Depth

M

Tool Holder

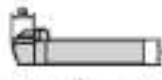
M → Tool
M → Holder

Shank and Size	Tooling with WMT
10	100-150
12	150-200
14	200-250
16	250-300
18	300-350
20	350-400
22	400-450
24	450-500

Shank	Tool
10	100
12	150
14	200
16	250
18	300
20	350
22	400
24	450

(1) Grooving section (2) – (continued)

													
Order number	Catalogue number	Lead mm	W	R	R	D	F	K1	L1	L2	Change to W	Change to W	
SD 1400													
300001	WMTL 300001-0	1	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300002	WMTL 300002-0	2	1.00	0.0	0.0	0	0.0	0	100	100	300000	—	
300003	WMTL 300003-0	3	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300004	WMTL 300004-0	4	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300005	WMTL 300005-0	5	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300006	WMTL 300006-0	6	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300007	WMTL 300007-0	7	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300008	WMTL 300008-0	8	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300009	WMTL 300009-0	9	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300010	WMTL 300010-0	10	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300011	WMTL 300011-0	11	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300012	WMTL 300012-0	12	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300013	WMTL 300013-0	13	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300014	WMTL 300014-0	14	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300015	WMTL 300015-0	15	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300016	WMTL 300016-0	16	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300017	WMTL 300017-0	17	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300018	WMTL 300018-0	18	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300019	WMTL 300019-0	19	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300020	WMTL 300020-0	20	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300021	WMTL 300021-0	21	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300022	WMTL 300022-0	22	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300023	WMTL 300023-0	23	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300024	WMTL 300024-0	24	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300025	WMTL 300025-0	25	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300026	WMTL 300026-0	26	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300027	WMTL 300027-0	27	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300028	WMTL 300028-0	28	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300029	WMTL 300029-0	29	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300030	WMTL 300030-0	30	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300031	WMTL 300031-0	31	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300032	WMTL 300032-0	32	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300033	WMTL 300033-0	33	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300034	WMTL 300034-0	34	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300035	WMTL 300035-0	35	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300036	WMTL 300036-0	36	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300037	WMTL 300037-0	37	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300038	WMTL 300038-0	38	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300039	WMTL 300039-0	39	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	
300040	WMTL 300040-0	40	1.00	0.0	0.0	0	0.0	—	100	100	300000	—	



■ **Carved Out**

order number	catalogue number	total size	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	112	114	116	118	120	122	124	126	128	130	132	134	136	138	140	142	144	146	148	150	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	186	188	190	192	194	196	198	200	202	204	206	208	210	212	214	216	218	220	222	224	226	228	230	232	234	236	238	240	242	244	246	248	250	252	254	256	258	260	262	264	266	268	270	272	274	276	278	280	282	284	286	288	290	292	294	296	298	300	302	304	306	308	310	312	314	316	318	320	322	324	326	328	330	332	334	336	338	340	342	344	346	348	350	352	354	356	358	360	362	364	366	368	370	372	374	376	378	380	382	384	386	388	390	392	394	396	398	400	402	404	406	408	410	412	414	416	418	420	422	424	426	428	430	432	434	436	438	440	442	444	446	448	450	452	454	456	458	460	462	464	466	468	470	472	474	476	478	480	482	484	486	488	490	492	494	496	498	500	502	504	506	508	510	512	514	516	518	520	522	524	526	528	530	532	534	536	538	540	542	544	546	548	550	552	554	556	558	560	562	564	566	568	570	572	574	576	578	580	582	584	586	588	590	592	594	596	598	600	602	604	606	608	610	612	614	616	618	620	622	624	626	628	630	632	634	636	638	640	642	644	646	648	650	652	654	656	658	660	662	664	666	668	670	672	674	676	678	680	682	684	686	688	690	692	694	696	698	700	702	704	706	708	710	712	714	716	718	720	722	724	726	728	730	732	734	736	738	740	742	744	746	748	750	752	754	756	758	760	762	764	766	768	770	772	774	776	778	780	782	784	786	788	790	792	794	796	798	800	802	804	806	808	810	812	814	816	818	820	822	824	826	828	830	832	834	836	838	840	842	844	846	848	850	852	854	856	858	860	862	864	866	868	870	872	874	876	878	880	882	884	886	888	890	892	894	896	898	900	902	904	906	908	910	912	914	916	918	920	922	924	926	928	930	932	934	936	938	940	942	944	946	948	950	952	954	956	958	960	962	964	966	968	970	972	974	976	978	980	982	984	986	988	990	992	994	996	998	1000	1002	1004	1006	1008	1010	1012	1014	1016	1018	1020	1022	1024	1026	1028	10
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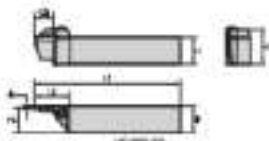
Self-Report

[illegible]

Wiley-Blackwell, 108 Cowley Road, Oxford OX4 1JF, UK and 350 Main Street, Malden, MA 02148, USA

Fluoridated that wasn't here and here with tooth here up today's here.

Indicates that sample was written with pen or pencil with a standard size.



Capex In

order number	catalogue number	width mm	M	L	S	TC	CD	CD max	CD min	CD	L1	L2	chip length	chip width
right hand														
30430	WMT 30430 WMT 30430	3	3.0	14.0	14.0	11.0	10	100	30	30	100	30	—	W1000
30434	WMT 30434 WMT 30434	3	3.0	14.0	14.0	11.0	10	100	30	30	100	30	—	W1000
30435	WMT 30435 WMT 30435	3	3.0	14.0	14.0	11.0	10	100	30	30	100	30	W1000	W1000
left hand														
30436	WMT 30436 WMT 30436	3	3.0	14.0	14.0	11.0	10	100	30	30	100	30	—	W1000
30437	WMT 30437 WMT 30437	3	3.0	14.0	14.0	11.0	10	100	30	30	100	30	—	W1000

WMT: Solid carbide toolholder for turning, grooving, and cut-off. Our tools are being produced in Germany. WMT: Solid carbide toolholder for turning, grooving, and cut-off. Our tools are being produced in Germany. WMT: Solid carbide toolholder for turning, grooving, and cut-off. Our tools are being produced in Germany.

Excludes the support frame and frame with inserts are supplied with a diamond chip.



Close view with
grooving feature



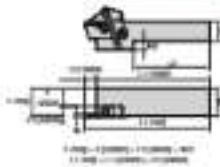
right hand tool



right hand tool

W.D. Turning Bars

order number	catalogue number	length mm	W	F	CD	CD	CD max	L1	R	length mm	dia
right hand											
5A7301	A25WM7301000	3	31.8	16.0	34	35.00	44	316	0.40	316000	3 mm
5A7303	A25WM7303000	3	31.8	16.0	34	35.00	44	316	0.40	316000	3 mm
5A7305	A25WM7305000	4	31.8	16.0	34	35.00	44	316	0.40	316000	3 mm
5A7307	A25WM7307000	4	31.8	16.0	34	35.00	44	316	0.40	316000	3 mm
5A7309	A25WM7309000	5	31.8	16.0	34	35.00	44	316	0.40	316000	3 mm
5A7313	A25WM7313000	5	31.8	20.0	37	40.00	58	316	0.40	316000	3 mm
5A7315	A25WM7315000	6	31.8	16.0	34	35.00	44	316	0.40	316000	3 mm
5A7319	A25WM7319000	5	31.8	16.0	34	35.00	44	316	0.40	316000	3 mm
left hand											
5A7300	A25WM7300000	3	31.8	16.0	34	35.00	44	316	0.40	316000	3 mm
5A7302	A25WM7302000	3	31.8	16.0	34	35.00	44	316	0.40	316000	3 mm
5A7304	A25WM7304000	4	31.8	16.0	34	35.00	44	316	0.40	316000	3 mm
5A7306	A25WM7306000	4	31.8	16.0	34	35.00	44	316	0.40	316000	3 mm
5A7308	A25WM7308000	5	31.8	16.0	34	35.00	44	316	0.40	316000	3 mm
5A7310	A25WM7310000	5	31.8	20.0	37	40.00	58	316	0.40	316000	3 mm
5A7312	A25WM7312000	6	31.8	16.0	34	35.00	44	316	0.40	316000	3 mm
5A7314	A25WM7314000	5	31.8	16.0	34	35.00	44	316	0.40	316000	3 mm
5A7316	A25WM7316000	5	31.8	16.0	34	35.00	44	316	0.40	316000	3 mm



• Straight Mount • Grooving, Cut-Off, and Face Grooving

order number	catalogue number	Ø	Ø	L1	L2	L3	Ø	Ø	Ø	Ø
right hand										
WMT001	WMT001000	10	10	100	100	100	10	10	10	10
WMT002	WMT002000	10	10	100	100	100	10	10	10	10
WMT003	WMT003000	10	10	100	100	100	10	10	10	10
left hand										
WMT001	WMT001000	10	10	100	100	100	10	10	10	10
WMT002	WMT002000	10	10	100	100	100	10	10	10	10
WMT003	WMT003000	10	10	100	100	100	10	10	10	10

NOTE: Use the larger end size toolholder for optimal performance.
(Both models end sizes are included with toolholder.)

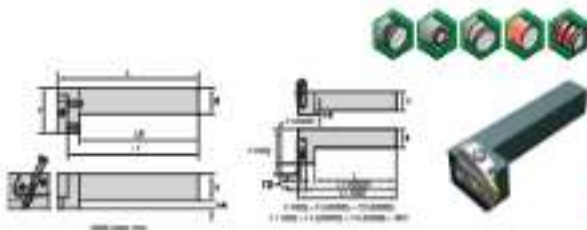
Toolholder Type	Hand of Holder	Hand of Blade
WMT - Straight Mount	Right	Right
	Left	Left
WMT - End Mount	Right	Left
	Left	Right



Grooving and Cut-Off Blade
Mount at page 1-10



Face Grooving Blade Mount at
page 1-10

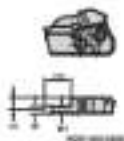

End Mount – Grooving, Cut-Off, and Face Grooving

Order Number	Toolholder Number	01	02	1	1.1	1.2	2	10
Right Hand								
1044010	WMT010100	30	30	150.0	150.0	145.0	60.0	0
1010010	WMT010102	30	30	150.0	150.0	145.0	60.0	—
Left Hand								
1044010	WMT010100	30	30	150.0	150.0	145.0	60.0	0
1010010	WMT010102	30	30	150.0	150.0	145.0	60.0	—

Toolholder Style	Head of Toolbit	Head of Blade
WMT – Straight Mount	Right	Right
	Left	Left
WMT – End Mount	Right	Left
	Left	Right


 Grooving and Cut-Off Blade
 Insert on page 1-16

 Face Grooving Blade Insert on
 page 1-16

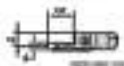


Grooving and Cut-Off

Order Number	Subgroup Number	Tool Size	ISO	W	TS	MS
Right Hand						
0204-02	WMTN100014-02	1	10-02	3.00	11.00	1.00
0204-03	WMTN100014-03	2	12-03	3.00	15.01	1.00
0204-05	WMTN100014-05	10	12-04	3.00	15.71	1.00
0204-06	WMTN100014-06	3	16-06	3.00	17.00	1.00
0204-08	WMTN100014-08	4	16-08	4.00	17.00	1.00
0204-09	WMTN100015-09	2	21-09	3.00	19.00	1.00
0204-10	WMTN100015-10	5	21-10	3.00	19.00	1.00
Left Hand						
0204-02	WMTN100014-02	1	10-02	3.00	11.00	1.00
0204-03	WMTN100014-03	2	12-03	3.00	15.01	1.00
0204-05	WMTN100014-05	10	12-04	3.00	15.71	1.00
0204-06	WMTN100014-06	3	16-06	3.00	17.00	1.00
0204-08	WMTN100014-08	4	16-08	4.00	17.00	1.00
0204-09	WMTN100015-09	2	21-09	3.00	19.00	1.00
0204-10	WMTN100015-10	5	21-10	3.00	19.00	1.00

NOTE: Check with shop worker before using toolholder.

Toolholder Type	Depth of Groove	Depth of Chamfer
WMTN - Straight Mount	Right	Right
	Left	Left
WMTN - End Mount	Right	Left
	Left	Right



Face Grooving

order number	catalogue number	tool size	2 mm	3 mm	4 mm	W	PS
right hand							
120010	WMTWMT010000-000	3	10.00	10.00	11.00	3.00	11.00
120011	WMTWMT010000-010	3	11.00	11.00	12.00	3.00	11.00
120012	WMTWMT010000-015	4	11.00	11.00	12.00	4.00	11.00
120013	WMTWMT010000-020	3	11.00	11.00	12.00	3.00	11.00
120014	WMTWMT010000-025	4	11.00	11.00	12.00	4.00	11.00
120015	WMTWMT010000-030	3	12.00	12.00	13.00	3.00	11.00
120016	WMTWMT010000-035	4	12.00	12.00	13.00	4.00	11.00
120017	WMTWMT010000-040	5	12.00	12.00	13.00	5.00	11.00
120018	WMTWMT010000-045	6	12.00	12.00	13.00	6.00	11.00
left hand							
120019	WMTWMT010000-000	3	10.00	10.00	11.00	3.00	11.00
120020	WMTWMT010000-010	3	11.00	11.00	12.00	3.00	11.00
120021	WMTWMT010000-015	4	11.00	11.00	12.00	4.00	11.00
120022	WMTWMT010000-020	3	11.00	11.00	12.00	3.00	11.00
120023	WMTWMT010000-025	4	11.00	11.00	12.00	4.00	11.00
120024	WMTWMT010000-030	5	12.00	12.00	13.00	5.00	11.00
120025	WMTWMT010000-035	6	12.00	12.00	13.00	6.00	11.00
120026	WMTWMT010000-040	5	12.00	12.00	13.00	5.00	11.00
120027	WMTWMT010000-045	6	12.00	12.00	13.00	6.00	11.00
120028	WMTWMT010000-050	7	12.00	12.00	13.00	7.00	11.00
120029	WMTWMT010000-055	8	12.00	12.00	13.00	8.00	11.00
120030	WMTWMT010000-060	9	12.00	12.00	13.00	9.00	11.00
120031	WMTWMT010000-065	10	12.00	12.00	13.00	10.00	11.00
120032	WMTWMT010000-070	11	12.00	12.00	13.00	11.00	11.00
120033	WMTWMT010000-075	12	12.00	12.00	13.00	12.00	11.00
120034	WMTWMT010000-080	13	12.00	12.00	13.00	13.00	11.00
120035	WMTWMT010000-085	14	12.00	12.00	13.00	14.00	11.00
120036	WMTWMT010000-090	15	12.00	12.00	13.00	15.00	11.00
120037	WMTWMT010000-095	16	12.00	12.00	13.00	16.00	11.00
120038	WMTWMT010000-100	17	12.00	12.00	13.00	17.00	11.00

WTC: Steel and coated screw design equals 4 - 40 mm

Toolholder Style	Stand of Tool	Stand of Blade
WMT - Straight Mount	Right	Right
	Left	Left
WMT - Cool Mount	Right	Left
	Left	Right

WIDIA™ TopGroove™ for Shallow Grooving and Face Grooving

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.

Rigidity, Versatility, and Chip Control

- TopGroove clamping design features a rugged bridge clamp which locates in a groove machined 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, shoulder and deep face grooving, back turning, undercutting, and Plug Hole grooving.
- The proprietary WIDIA chip control design works in both axial and turning as well as radial tool applications to provide excellent chip evacuation in deep grooving applications.



Chip clearing provides indexing between these elements to create marks in place through the depth of cut.

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

The WIDA™ TopGrown™ shimming system offers a complete line of growing geometries and an extensive grade selection.



Carbide Grades and Proven Solutions for High Productivity

- The TopGrown system has a carbide grade to match your application needs that include uncoated grades, PVD-coated grades, CVD-coated grades, and advanced metal matrix grades, including cermets, Cermets, PCBNs, and PCBNs (for tandem grinding).
- PVD CVD-coated grades are designed to cut a variety of workpiece materials.
- Versatile design enables new options to handle G2 and L2 grinding, fair grinding, flank turning, contouring, and cross-hatching operations.

The Most Advanced Turning Solutions in the Industry

Designed to reduce grinding operations, the WDG™ TopGraver turning system provides a combination of grinding geometries and an automatic gear reduction to meet any face, inner, external, application requirements. For increased rigidity, versatility, chip control, and reduced grade options, the TopGraver turning system is the ground solution.

With maximum rigidity, rigidity and superior versatility, TopGraver inserts provide a unique top side chip control geometry that efficiently removes chips and produces better quality parts, faster than any other.

Follow this comprehensive step-by-step guide for the information necessary to identify, choose, and select the appropriate cutting tool for your specific work.

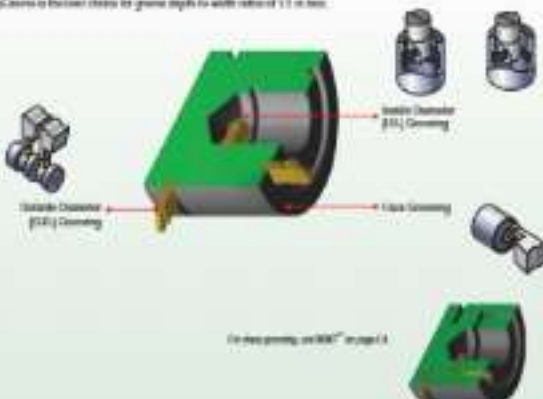
What you need to know:

- Manufacturing material
- Groove depth, width, and profile
- Application to be performed (e.g., ID, OD, or face grinding)
- Machine requirements (e.g., kW, RPM, etc.)

1. Choose the application to be performed:

Groove depth, width, and profile.

TopGraver is the most choice for groove depths for widths ratios of 1:1 or less.



TopGraver™ for Internal, External, and Face Grooving Applications

system capabilities		width		maximum
	OD ID Grooving	width	0.0040	0.0040
		depth	—	0.0040
	Face Grooving	width	0.0040	0.0040
		depth	—	0.0040
	Internal Grooving	Standard	0.0040	—
	Face Grooving Inserts	Standard	0.0040	—
		Depth	—	—
	Deep ID OD Grooving	width	0.0040	0.0040
		depth	—	0.0040
	Deep Face Grooving	width	0.0040	0.0040
		depth	—	0.0040

4. Select cabinetation style for the application:

See application guide on page 140 for a complete list of floor styles.

NOTE: Chair always recommended for all chairs.

See page 140.

WIDA TopDrawer™
Floor System & Components

TopDrawer™ 100 1/2" x 21 1/2" x 48" H




100 1/2" x 21 1/2" x 48" H

100 1/2" x 21 1/2" x 48" H

100 1/2" x 21 1/2" x 48" H



TopDrawer™ 100 1/2" x 21 1/2" x 48" H




100 1/2" x 21 1/2" x 48" H

100 1/2" x 21 1/2" x 48" H

100 1/2" x 21 1/2" x 48" H



TopDrawer™ 100 1/2" x 21 1/2" x 48" H




100 1/2" x 21 1/2" x 48" H

100 1/2" x 21 1/2" x 48" H

100 1/2" x 21 1/2" x 48" H



5. Choose the appropriate level width:
 10" for your specific application.
 12" Select the required corner cabinet value 10".

WIDA TopDrawer™
Floor System



100 1/2" x 21 1/2" x 48" H

Model	Width	Depth	Height	Weight	Material	Finish	Color
100 1/2" x 21 1/2" x 48" H	10"	21 1/2"	48"	100 lbs	Steel	Black	Black
100 1/2" x 21 1/2" x 48" H	12"	21 1/2"	48"	120 lbs	Steel	Black	Black
100 1/2" x 21 1/2" x 48" H	10"	21 1/2"	48"	100 lbs	Steel	Black	Black
100 1/2" x 21 1/2" x 48" H	12"	21 1/2"	48"	120 lbs	Steel	Black	Black
100 1/2" x 21 1/2" x 48" H	10"	21 1/2"	48"	100 lbs	Steel	Black	Black
100 1/2" x 21 1/2" x 48" H	12"	21 1/2"	48"	120 lbs	Steel	Black	Black

2 Select grade

Cutting condition		Recommended Grade					
		Steel	Stainless Steel	Cast Iron	Non Ferrous Metals	High Speed Steels	Toolsteel Applications
Smoothed, pre-finished surface		TM210	TM210	TM210	TM210 2-M	TM210	TM210
Smoothed or not, casting or forging steel		TM210	TM210	TM210	TM210 2-M	TM210	TM210
Lightly interrupted cut		TM210	TM210	TM210	TM210 2-M	TM210	TM210
Heavily interrupted cut		TM210	TM210	TM210	TM210	TM210	TM210

See page C17 for Grades and Grade Descriptions

3 Determine cutting data

- Choose an external group and grade, usually starting with (a)
- Find the recommended speed in the table

See page C18 for cutting data

Feedrate		Recommended Cutting Speed (m/min)															
Grade	Feedrate (mm/min)	Cutting Speed (m/min)															
		10	12	15	18	20	25	30	35	40	45	50	55	60	65	70	75
Steel	0.1	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
	0.2	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
	0.3	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
	0.4	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
Stainless Steel	0.1	80	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700
	0.2	80	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700
	0.3	80	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700
	0.4	80	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700
Cast Iron	0.1	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
	0.2	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
	0.3	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
	0.4	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
Non Ferrous Metals	0.1	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
	0.2	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
	0.3	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
	0.4	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
High Speed Steels	0.1	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
	0.2	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
	0.3	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
	0.4	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
Toolsteel Applications	0.1	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
	0.2	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
	0.3	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750
	0.4	100	120	150	180	200	250	300	350	400	450	500	550	600	650	700	750

TopGroomer[®] Insert Identification System



N	G	D	2	M	150	R		K	
Type of Insert	Insert Type	Additional Information	Insert Size	Size Identification	Grinder Size ¹	Hardness Rating	Cutting Depth	Chipbreaker Design	Selection of Teeth
W – TopGroomer		D – Deep grooving B – Positive C – Groove and Chatter		M – Semi-rigid groove width C – Collar groove insert width is critical, consult catalog Blank – External tool width insert		L – Left hand R – Right hand	Range for grooving and chamfering inserts Inserts for rough operations	B – Standard chip breaker A – Advanced	Options on Jet L – Plug two teeth I – Internal face grooving
		D – Deep Grooving Insert F – 140° Pointing G – Grooving P – Dual Grooving B – Flat Bottom M – Chamfering and Milling F – Plug-In							

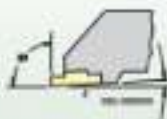
¹Consult guidelines for TopGroomer 150 applications.

TopGroomer TopThread Threading and Grooving Insert Dimensions



Insert size	mm	inch	mm	inch
1	2.00	.078	1.00	.039
2	3.00	.118	1.50	.059
3	4.00	.157	2.00	.078
4	5.00	.196	2.50	.098
5	6.00	.236	3.00	.118
6	7.00	.275	3.50	.138
8	9.00	.354	4.50	.177

TopGroomer TopThread Holder Design



ICCT[®] holders are designed to handle most toolholders 1/2" to 1.000" diam. Insert diameters range from .039" to .177" diam.

WIDIA[®] TopGroomer TopThread[®] tooling technology continues to bring you the very best threading and grooving system available in the world today.

Insert size	Application	Index range	Page(s)	Insert size	Application	Index range	Page(s)
B1 	• General purpose grinding • Chipping • Light grinding	medium	428-432	B1-12° 	• General purpose grinding with increased efficiency • For extra loading from the wheel of less grains	12° profile	—
B1-4 	• Chip control grinding • General purpose grinding • Chipping • Chisel grinding • Light grinding	12° profile	434-438	B1-6 	• Grinding • Light chisel grinding • Feeding with chip control	12° profile	438
B12 8° 	• Combined grinding and mechanical edge work in one position change with 120-120° • Designed for 120-120° wheel on only grinders	12° profile	—	B1 	• Full wheel grinding • Grinding and cutting	medium	432-438
B12° 	• Chisel grinding	medium	—	B1-8 	• Chip control grinding • Full wheel grinding, grinding and cutting	12° profile	438
B12-6 	• Chip control grinding • Chisel grinding • Light grinding	12° profile	438-442	B10 	• Chisel grinding • Full wheel rim dress	medium	437
B1P 	• General purpose grinding • Chipping • Chisel grinding	12° profile	438-439	B12P 	• Full wheel grinding • Light grinding/cutting	12° profile	—
B1° 	• Grinding • Full wheel rim dressing	medium	—	B1° 	• Chisel cutting	medium	—
B1-8 	• Full wheel grinding with chip control • Additional rim dressing	12° profile	439	B1° 	• Full wheel grinding	medium	—
B1-14 	• Chisel, full grinding with chip control • Additional rim dressing	12° profile	440	B12/B12L 	• Grinding • Grinding rim dressing • Available in uncoated grade only	—	440

*Inserts are available in surface condition.

TopGroove • NG-K, NG-IL, and NG


NG-K

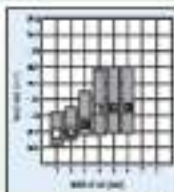


NG



NG-IL

- Chip control enables high speed and productivity
- For general purpose, O chip, and chip grinding applications
- Positive ground for accurate edge location
- Can be used in both wet and dry cutting



Recommended Cutting Data

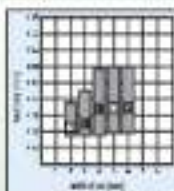
TopGroove • NGP and NGD-K


NGP



NGD-K

- Positive rake angles
- For deep, O chip, chip, and general purpose grinding applications
- Chip geometry for excellent chip control
- Positive ground for accurate edge location
- Can be used in both wet and dry cutting



Recommended Cutting Data

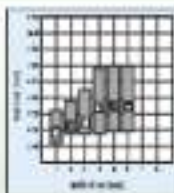
TopGroove • NR and NR-K


NR



NR-K

- For all metal grinding and turning grinding applications
- Chip geometry for excellent chip control
- Positive ground for accurate edge location
- Can be used in both wet and dry cutting



Recommended Cutting Data

Material Group		Cutting Speed – m/min											
		1800H			1800S			18T-HS			110M		
		mm	Steel	mm	mm	Steel	mm	mm	Steel	mm	mm	Steel	mm
	1	140	175	210	130	160	190	160	200	230	90	80	100
	2	110	140	170	110	140	170	110	200	230	70	60	100
	3	110	140	170	110	140	170	110	200	230	70	60	100
	4	75	100	120	75	100	120	110	140	170	50	40	60
	5	60	80	100	60	80	100	100	130	160	40	30	50
	1	80	100	120	80	100	120	–	–	–	80	70	100
	2	60	70	90	60	70	90	–	–	–	60	50	70
	3	60	80	100	60	80	100	–	–	–	60	50	100
	1	100	120	140	90	110	130	170	200	230	70	60	100
	2	100	120	140	90	110	130	160	200	230	60	50	100
	3	110	140	170	100	130	160	180	230	260	60	70	100
	1	600	750	900	500	750	900	–	–	–	600	750	900
	2	300	400	500	250	350	450	–	–	–	300	400	500
	3	200	250	300	150	200	250	–	–	–	200	250	300
	4	100	150	200	100	150	200	–	–	–	100	150	200
	5	70	90	110	70	90	110	–	–	–	100	120	140
	6	140	180	220	140	180	220	–	–	–	120	150	180
	7	300	350	400	250	300	350	–	–	–	250	300	350
	1	60	80	100	60	80	100	–	–	–	70	90	100
	2	60	80	100	60	80	100	–	–	–	60	80	100
	3	60	70	90	60	80	100	–	–	–	60	70	100
	4	60	80	100	60	80	100	–	–	–	60	80	100
	1	10	20	30	10	20	30	–	–	–	10	20	30
	2	10	20	30	10	20	30	–	–	–	10	20	30
	3	10	20	30	10	20	30	–	–	–	10	20	30
	4	10	20	30	10	20	30	–	–	–	10	20	30



DAE, LUF
 ogni nuovo contratto deve essere
 posto a posto nuovo

◆ 歡迎訂閱
訂閱電話：020-83333333



■ **WU • Growing Imports**

category number	level size	W	SD	t
right hand				
W22010	0	0.00	0.00	0.00
W22011	0	0.00	0.00	0.00
W22012	0	0.00	0.00	0.00
W22013	0	0.00	0.00	0.00
W22014	0	0.00	0.00	0.00
W22015	0	0.00	0.00	0.00
W22016	0	0.00	0.00	0.00
W22017	0	0.00	0.00	0.00
W22018	0	0.00	0.00	0.00
W22019	0	0.00	0.00	0.00
left hand				
W22020	0	0.00	0.00	0.00
W22021	0	0.00	0.00	0.00
W22022	0	0.00	0.00	0.00
W22023	0	0.00	0.00	0.00
W22024	0	0.00	0.00	0.00

continued

Wronski and Carcetti

RG – Grooving inserts – cutthroat



* Not shown
in separate sheets



catalogue number

insert size

W

H

T

RG2000

2

1.50

0.50

0.50

RG3000

3

1.66

0.66

0.66

RG34000

4

1.60

0.60

0.60

RG4000

4

2.00

0.75

0.75

catalogue number

insert size

W

H

T

cutting edge

RG1000

1

1.25

0.50

0.50

RG1500

1

1.50

0.50

0.50

RG1800

1

1.80

0.50

0.50

NG-11 – Grooving inserts



NG-11: Width tolerance is ± 0.02mm on NG-11 inserts



Right: view from top; left: view from side

* Not visible
in alternative drawing



WIDIA K • Growing inserts with Chip Control

Ordering number	Insert size	W	Chip area	ED	T	Material	Coating	Chip Control	Inserts per tray	Tray size
WIDIA K 000000	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000001	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000002	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000003	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000004	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000005	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000006	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000007	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000008	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000009	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000010	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000011	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000012	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000013	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000014	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000015	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000016	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000017	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000018	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000019	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000020	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000021	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000022	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000023	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000024	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000025	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000026	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000027	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000028	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000029	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000030	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000031	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000032	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000033	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000034	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000035	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000036	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000037	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000038	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000039	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000040	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000041	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000042	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000043	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000044	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000045	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000046	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000047	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000048	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000049	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100
WIDIA K 000050	0	0.2	0.2	0.2	0.2	WIDIA	WIDIA	WIDIA	100	100

(continued)

W6-A Grooving Insert with Chip Control — continued



High speed steel inserts are used
to machine steel alloys.

* Feed direction
indicates shape

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----

catalogue number

insert
size

W

Ap max

ISO

T

W6A01000

0

1.0

100

12.50

0.20

W6A01000

0

1.0

100

12.50

0.20

W6A01010

1

1.0

100

12.50

0.20

W6A01020

2

1.0

100

12.50

0.20

W6A01030

3

1.0

100

12.50

0.20

W6A01040

4

1.0

100

12.50

0.20

W6A01050

5

1.0

100

12.50

0.20

W6A01060

6

1.0

100

12.50

0.20

W6A01070

7

1.0

100

12.50

0.20

W6A01080

8

1.0

100

12.50

0.20

W6A01090

9

1.0

100

12.50

0.20

W6A01100

10

1.0

100

12.50

0.20

W6A01110

11

1.0

100

12.50

0.20

W6A01120

12

1.0

100

12.50

0.20

W6A01130

13

1.0

100

12.50

0.20

W6A01140

14

1.0

100

12.50

0.20

Part 4 • Growing Hearts with Love, Control —continued



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• [Study collection](#)

2	3	4	5	6	7
8	9	10	11	12	13
14	15	16	17	18	19
20	21	22	23	24	25
26	27	28	29	30	31
32	33	34	35	36	37

category number	weight class	W	kg class	100	T
WOMEN'S 55	55	1.00	0.75	0.60	0.45
WOMEN'S 60	60	1.00	0.75	0.65	0.50
WOMEN'S 65	65	1.00	0.75	0.60	0.45
WOMEN'S 70	70	1.00	0.75	0.65	0.50
WOMEN'S 75	75	1.00	0.75	0.65	0.50
WOMEN'S 80	80	1.00	0.75	0.65	0.50
WOMEN'S 85	85	1.00	0.75	0.65	0.50
WOMEN'S 90	90	1.00	0.75	0.65	0.50
WOMEN'S 95	95	1.00	0.75	0.65	0.50
WOMEN'S 100	100	1.00	0.75	0.65	0.50
WOMEN'S 105	105	1.00	0.75	0.65	0.50
WOMEN'S 110	110	1.00	0.75	0.65	0.50
WOMEN'S 115	115	1.00	0.75	0.65	0.50
WOMEN'S 120	120	1.00	0.75	0.65	0.50
WOMEN'S 125	125	1.00	0.75	0.65	0.50
WOMEN'S 130	130	1.00	0.75	0.65	0.50
WOMEN'S 135	135	1.00	0.75	0.65	0.50
WOMEN'S 140	140	1.00	0.75	0.65	0.50
WOMEN'S 145	145	1.00	0.75	0.65	0.50
WOMEN'S 150	150	1.00	0.75	0.65	0.50
WOMEN'S 155	155	1.00	0.75	0.65	0.50
WOMEN'S 160	160	1.00	0.75	0.65	0.50
WOMEN'S 165	165	1.00	0.75	0.65	0.50
WOMEN'S 170	170	1.00	0.75	0.65	0.50
WOMEN'S 175	175	1.00	0.75	0.65	0.50
WOMEN'S 180	180	1.00	0.75	0.65	0.50
WOMEN'S 185	185	1.00	0.75	0.65	0.50
WOMEN'S 190	190	1.00	0.75	0.65	0.50
WOMEN'S 195	195	1.00	0.75	0.65	0.50
WOMEN'S 200	200	1.00	0.75	0.65	0.50
WOMEN'S 205	205	1.00	0.75	0.65	0.50
WOMEN'S 210	210	1.00	0.75	0.65	0.50
WOMEN'S 215	215	1.00	0.75	0.65	0.50
WOMEN'S 220	220	1.00	0.75	0.65	0.50
WOMEN'S 225	225	1.00	0.75	0.65	0.50
WOMEN'S 230	230	1.00	0.75	0.65	0.50
WOMEN'S 235	235	1.00	0.75	0.65	0.50
WOMEN'S 240	240	1.00	0.75	0.65	0.50
WOMEN'S 245	245	1.00	0.75	0.65	0.50
WOMEN'S 250	250	1.00	0.75	0.65	0.50
WOMEN'S 255	255	1.00	0.75	0.65	0.50
WOMEN'S 260	260	1.00	0.75	0.65	0.50
WOMEN'S 265	265	1.00	0.75	0.65	0.50
WOMEN'S 270	270	1.00	0.75	0.65	0.50
WOMEN'S 275	275	1.00	0.75	0.65	0.50
WOMEN'S 280	280	1.00	0.75	0.65	0.50
WOMEN'S 285	285	1.00	0.75	0.65	0.50
WOMEN'S 290	290	1.00	0.75	0.65	0.50
WOMEN'S 295	295	1.00	0.75	0.65	0.50
WOMEN'S 300	300	1.00	0.75	0.65	0.50
WOMEN'S 305	305	1.00	0.75	0.65	0.50
WOMEN'S 310	310	1.00	0.75	0.65	0.50
WOMEN'S 315	315	1.00	0.75	0.65	0.50
WOMEN'S 320	320	1.00	0.75	0.65	0.50
WOMEN'S 325	325	1.00	0.75	0.65	0.50
WOMEN'S 330	330	1.00	0.75	0.65	0.50
WOMEN'S 335	335	1.00	0.75	0.65	0.50
WOMEN'S 340	340	1.00	0.75	0.65	0.50
WOMEN'S 345	345	1.00	0.75	0.65	0.50
WOMEN'S 350	350	1.00	0.75	0.65	0.50
WOMEN'S 355	355	1.00	0.75	0.65	0.50
WOMEN'S 360	360	1.00	0.75	0.65	0.50
WOMEN'S 365	365	1.00	0.75	0.65	0.50
WOMEN'S 370	370	1.00	0.75	0.65	0.50
WOMEN'S 375					

Wentling and Cusack

Part 4 • Growing Up with 1 Step Control—continued



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• [Study collection](#)

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

sample number	depth (cm)	W	Sp. mass	LOI	T
WCHW001.0	0	0.00	1.00	0.00	0.70
WCHW001.0	1	0.00	1.00	0.00	0.60
WCHW001.0	2	0.00	1.00	0.00	0.60
WCHW001.0	3	0.00	1.00	0.00	0.60
WCHW001.0	4	0.00	1.00	0.00	0.60
WCHW001.0	5	0.00	1.00	0.00	0.60
WCHW001.0	6	0.00	1.00	0.00	0.60
WCHW001.0	7	0.00	1.00	0.00	0.60
WCHW001.0	8	0.00	1.00	0.00	0.60
WCHW001.0	9	0.00	1.00	0.00	0.60
WCHW001.0	10	0.00	1.00	0.00	0.60
WCHW001.0	11	0.00	1.00	0.00	0.60
WCHW001.0	12	0.00	1.00	0.00	0.60
WCHW001.0	13	0.00	1.00	0.00	0.60
WCHW001.0	14	0.00	1.00	0.00	0.60
WCHW001.0	15	0.00	1.00	0.00	0.60
WCHW001.0	16	0.00	1.00	0.00	0.60
WCHW001.0	17	0.00	1.00	0.00	0.60
WCHW001.0	18	0.00	1.00	0.00	0.60
WCHW001.0	19	0.00	1.00	0.00	0.60
WCHW001.0	20	0.00	1.00	0.00	0.60
WCHW001.0	21	0.00	1.00	0.00	0.60
WCHW001.0	22	0.00	1.00	0.00	0.60
WCHW001.0	23	0.00	1.00	0.00	0.60
WCHW001.0	24	0.00	1.00	0.00	0.60
WCHW001.0	25	0.00	1.00	0.00	0.60
WCHW001.0	26	0.00	1.00	0.00	0.60
WCHW001.0	27	0.00	1.00	0.00	0.60
WCHW001.0	28	0.00	1.00	0.00	0.60
WCHW001.0	29	0.00	1.00	0.00	0.60
WCHW001.0	30	0.00	1.00	0.00	0.60
WCHW001.0	31	0.00	1.00	0.00	0.60
WCHW001.0	32	0.00	1.00	0.00	0.60
WCHW001.0	33	0.00	1.00	0.00	0.60
WCHW001.0	34	0.00	1.00	0.00	0.60
WCHW001.0	35	0.00	1.00	0.00	0.60
WCHW001.0	36	0.00	1.00	0.00	0.60
WCHW001.0	37	0.00	1.00	0.00	0.60
WCHW001.0	38	0.00	1.00	0.00	0.60
WCHW001.0	39	0.00	1.00	0.00	0.60
WCHW001.0	40	0.00	1.00	0.00	0.60
WCHW001.0	41	0.00	1.00	0.00	0.60
WCHW001.0	42	0.00	1.00	0.00	0.60
WCHW001.0	43	0.00	1.00	0.00	0.60
WCHW001.0	44	0.00	1.00	0.00	0.60
WCHW001.0	45	0.00	1.00	0.00	0.60
WCHW001.0	46	0.00	1.00	0.00	0.60
WCHW001.0	47	0.00	1.00	0.00	0.60
WCHW001.0	48	0.00	1.00	0.00	0.60
WCHW001.0	49	0.00	1.00	0.00	0.60
WCHW001.0	50	0.00	1.00	0.00	0.60
WCHW001.0	51	0.00	1.00	0.00	0.60
WCHW001.0	52	0.00	1.00	0.00	0.60
WCHW001.0	53	0.00	1.00	0.00	0.60
WCHW001.0	54	0.00	1.00	0.00	0.60
WCHW001.0	55	0.00	1.00	0.00	0.60
WCHW001.0	56	0.00	1.00	0.00	0.60
WCHW001.0	57	0.00	1.00	0.00	0.60
WCHW001.0	58	0.00	1.00	0.00	0.60
WCHW001.0	59	0.00	1.00	0.00	0.60
WCHW001.0	60	0.00	1.00	0.00	0.60
WCHW001.0	61	0.00	1.00	0.00	0.60
WCHW001.0	62	0.00	1.00	0.00	0.60
WCHW001.0	63	0.00	1.00	0.00	0.60
WCHW001.0	64	0.00	1.00	0.00	0.60
WCHW001.0	65	0.00	1.00	0.00	0.60
WCHW001.0	66	0.00	1.00	0.00	0.60
WCHW001.0	67	0.00	1.00	0.00	0.60
WCHW001.0	68	0.00	1.00	0.00	0.60
WCHW001.0	69	0.00	1.00	0.00	0.60
WCHW001.0	70	0.00	1.00	0.00	0.60
WCHW001.0	71	0.00	1.00	0.00	0.60
WCHW001.0	72	0.00	1.00	0.00	0.60
WCHW001.0	73	0.00	1.00	0.00	0.60
WCHW001.0	74	0.00	1.00	0.00	0.60
WCHW001.0	75	0.00	1.00	0.00	0.60
WCHW001.0	76	0.00	1.00	0.00	0.60
WCHW001.0	77	0.00	1.00	0.00	0.60
WCHW001.0	78	0.00	1.00	0.00	0.60
WCHW001.0	79	0.00	1.00	0.00	0.60
WCHW001.0	80	0.00	1.00	0.00	0.60
WCHW001.0	81	0.00	1.00	0.00	0.60
WCHW001.0	82	0.00	1.00	0.00	0.60
WCHW001.0	83	0.00	1.00	0.00	0.60
WCHW001.0	84	0.00	1.00	0.00	0.60
WCHW001.0	85	0.00	1.00	0.00	0.60
WCHW001.0	86	0.00	1.00	0.00	0.60
WCHW001.0	87	0.00	1.00	0.00	0.60
WCHW001.0	88	0.00	1.00	0.00	0.60
WCHW001.0	89	0.00	1.00	0.00	0.60
WCHW001.0	90	0.00	1.00	0.00	0.60
WCHW001.0	91	0.00	1.00	0.00	0.60
WCHW001.0	92	0.00	1.00	0.00	0.60
WCHW001.0	93	0.00	1.00	0.00	0.60
WCHW001.0	94	0.00	1.00	0.00	0.60
WCHW001.0	95	0.00	1.00	0.00	0.60
WCHW001.0	96	0.00	1.00	0.00	0.60
WCHW001.0	97	0.00	1.00	0.00	0.60
WCHW001.0	98	0.00	1.00	0.00	0.60
WCHW001.0	99	0.00	1.00	0.00	0.60
WCHW001.0	100	0.00	1.00	0.00	0.60

Abstract



right-hand-side entry, always
read in this design

WIDIA®
cultivated tissue



■ NG20-R • Deep Growing Inserts with Chip Control

catalogue number	insert size	W	by mm	SD	T	cutting edges	total length	total width	total height
right-hand-side									
WID20R001	1	1.25	1.25	0.40	0.40	1	1.25	1.25	0.40
WID20R002	2	1.25	1.25	0.40	0.40	2	1.25	1.25	0.40
WID20R003	3	1.25	1.25	0.40	0.40	3	1.25	1.25	0.40
WID20R004	4	1.25	1.25	0.40	0.40	4	1.25	1.25	0.40
WID20R005	5	1.25	1.25	0.40	0.40	5	1.25	1.25	0.40
WID20R006	6	1.25	1.25	0.40	0.40	6	1.25	1.25	0.40
WID20R007	7	1.25	1.25	0.40	0.40	7	1.25	1.25	0.40
WID20R008	8	1.25	1.25	0.40	0.40	8	1.25	1.25	0.40
WID20R009	9	1.25	1.25	0.40	0.40	9	1.25	1.25	0.40
WID20R010	10	1.25	1.25	0.40	0.40	10	1.25	1.25	0.40
WID20R011	11	1.25	1.25	0.40	0.40	11	1.25	1.25	0.40
WID20R012	12	1.25	1.25	0.40	0.40	12	1.25	1.25	0.40
WID20R013	13	1.25	1.25	0.40	0.40	13	1.25	1.25	0.40
WID20R014	14	1.25	1.25	0.40	0.40	14	1.25	1.25	0.40
WID20R015	15	1.25	1.25	0.40	0.40	15	1.25	1.25	0.40
WID20R016	16	1.25	1.25	0.40	0.40	16	1.25	1.25	0.40
WID20R017	17	1.25	1.25	0.40	0.40	17	1.25	1.25	0.40
WID20R018	18	1.25	1.25	0.40	0.40	18	1.25	1.25	0.40
WID20R019	19	1.25	1.25	0.40	0.40	19	1.25	1.25	0.40
WID20R020	20	1.25	1.25	0.40	0.40	20	1.25	1.25	0.40
WID20R021	21	1.25	1.25	0.40	0.40	21	1.25	1.25	0.40
WID20R022	22	1.25	1.25	0.40	0.40	22	1.25	1.25	0.40
WID20R023	23	1.25	1.25	0.40	0.40	23	1.25	1.25	0.40
WID20R024	24	1.25	1.25	0.40	0.40	24	1.25	1.25	0.40
WID20R025	25	1.25	1.25	0.40	0.40	25	1.25	1.25	0.40
WID20R026	26	1.25	1.25	0.40	0.40	26	1.25	1.25	0.40
WID20R027	27	1.25	1.25	0.40	0.40	27	1.25	1.25	0.40
WID20R028	28	1.25	1.25	0.40	0.40	28	1.25	1.25	0.40
WID20R029	29	1.25	1.25	0.40	0.40	29	1.25	1.25	0.40
WID20R030	30	1.25	1.25	0.40	0.40	30	1.25	1.25	0.40
WID20R031	31	1.25	1.25	0.40	0.40	31	1.25	1.25	0.40
WID20R032	32	1.25	1.25	0.40	0.40	32	1.25	1.25	0.40
WID20R033	33	1.25	1.25	0.40	0.40	33	1.25	1.25	0.40
WID20R034	34	1.25	1.25	0.40	0.40	34	1.25	1.25	0.40
WID20R035	35	1.25	1.25	0.40	0.40	35	1.25	1.25	0.40
WID20R036	36	1.25	1.25	0.40	0.40	36	1.25	1.25	0.40
WID20R037	37	1.25	1.25	0.40	0.40	37	1.25	1.25	0.40
WID20R038	38	1.25	1.25	0.40	0.40	38	1.25	1.25	0.40
WID20R039	39	1.25	1.25	0.40	0.40	39	1.25	1.25	0.40
WID20R040	40	1.25	1.25	0.40	0.40	40	1.25	1.25	0.40
WID20R041	41	1.25	1.25	0.40	0.40	41	1.25	1.25	0.40
WID20R042	42	1.25	1.25	0.40	0.40	42	1.25	1.25	0.40
WID20R043	43	1.25	1.25	0.40	0.40	43	1.25	1.25	0.40
WID20R044	44	1.25	1.25	0.40	0.40	44	1.25	1.25	0.40
WID20R045	45	1.25	1.25	0.40	0.40	45	1.25	1.25	0.40
WID20R046	46	1.25	1.25	0.40	0.40	46	1.25	1.25	0.40
WID20R047	47	1.25	1.25	0.40	0.40	47	1.25	1.25	0.40
WID20R048	48	1.25	1.25	0.40	0.40	48	1.25	1.25	0.40
WID20R049	49	1.25	1.25	0.40	0.40	49	1.25	1.25	0.40
WID20R050	50	1.25	1.25	0.40	0.40	50	1.25	1.25	0.40

continued

WJ-34 • Overcoming Inertia with Top-Leverage — continued



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● 中国工商银行

[illegible]

Love & Honor

Abstract



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Journal of Internal Medicine 255: 111–118



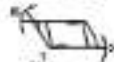
● **WCD** • **Conceiving Positive Policy Issues**

[illegible]

2008-09-01

Investing and Growth

(N2 = Uncovering Positive Relationships — continued)



High level view shows, of field
from a high angle.

✉ info@blackrock.com

27					
28					
29					
30					
31					
32					
33					

[illegible]



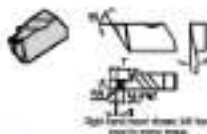
Single Positive Rake Groove - left hand
based on metric design

• steel coolant
○ alternative coolant



■ NF-K • Face Grooving Positive Rake Inserts

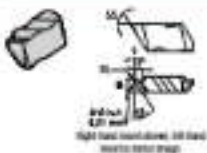
catalogue number	insert size	W	Ap max	DB	T	FLANK	CHAMFER	COOLANT
right hand								
NF0600000	0	0.00	0.00	0.10	1.00	0.00	0.00	•
NF0600000	0	0.00	0.00	0.10	3.00	0.00	0.00	•
NF0600000	0	0.10	0.00	0.10	3.00	0.00	0.00	•
left hand								
NF0600000	0	0.00	0.00	0.10	1.00	0.00	0.00	•
NF0600000	0	0.00	0.00	0.10	3.00	0.00	0.00	•
NF0600000	0	0.10	0.00	0.10	3.00	0.00	0.00	•
NF0600000	0	0.00	0.00	0.10	3.00	0.00	0.00	•



- **first choice**
- **second choice**

■ MFD-K • Face Grooving Deep-Grooving Inserts

rotational number	shaft size	W	Ap max	Q1	T	cutting edges	ISO 1030 V2010	ISO 1030 V2010	ISO 1030 V2010
right hand									
WCD4000R	2	2.00	1.00	0.18	0.20	1	1	1	1
WCD4250R	3	2.18	1.00	0.18	0.20	1	1	1	1
WCD4500R	4	2.30	1.00	0.07	0.09	1	1	1	1
WCD4000L	4	0.50	0.01	0.50	0.20	1	1	1	1
left hand									
WCD4000L	3	2.00	1.00	0.18	0.20	1	1	1	1
WCD4250L	3	2.18	1.00	0.18	0.20	1	1	1	1
WCD4000L	4	0.50	0.01	0.07	0.09	1	1	1	1



■ NP-K + Probing Inserts

catalogue number	heart size	W	CL	T	W1/4	W1/2	W3/4	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	W18	W19	W20	W21	W22	W23	W24	W25	W26	W27	W28	W29	W30	W31	W32	W33	W34	W35	W36	W37	W38	W39	W40	W41	W42	W43	W44	W45	W46	W47	W48	W49	W50	W51	W52	W53	W54	W55	W56	W57	W58	W59	W60	W61	W62	W63	W64	W65	W66	W67	W68	W69	W70	W71	W72	W73	W74	W75	W76	W77	W78	W79	W80	W81	W82	W83	W84	W85	W86	W87	W88	W89	W90	W91	W92	W93	W94	W95	W96	W97	W98	W99	W100	W101	W102	W103	W104	W105	W106	W107	W108	W109	W110	W111	W112	W113	W114	W115	W116	W117	W118	W119	W120	W121	W122	W123	W124	W125	W126	W127	W128	W129	W130	W131	W132	W133	W134	W135	W136	W137	W138	W139	W140	W141	W142	W143	W144	W145	W146	W147	W148	W149	W150	W151	W152	W153	W154	W155	W156	W157	W158	W159	W160	W161	W162	W163	W164	W165	W166	W167	W168	W169	W170	W171	W172	W173	W174	W175	W176	W177	W178	W179	W180	W181	W182	W183	W184	W185	W186	W187	W188	W189	W190	W191	W192	W193	W194	W195	W196	W197	W198	W199	W200	W201	W202	W203	W204	W205	W206	W207	W208	W209	W210	W211	W212	W213	W214	W215	W216	W217	W218	W219	W220	W221	W222	W223	W224	W225	W226	W227	W228	W229	W230	W231	W232	W233	W234	W235	W236	W237	W238	W239	W240	W241	W242	W243	W244	W245	W246	W247	W248	W249	W250	W251	W252	W253	W254	W255	W256	W257	W258	W259	W260	W261	W262	W263	W264	W265	W266	W267	W268	W269	W270	W271	W272	W273	W274	W275	W276	W277	W278	W279	W280	W281	W282	W283	W284	W285	W286	W287	W288	W289	W290	W291	W292	W293	W294	W295	W296	W297	W298	W299	W300	W301	W302	W303	W304	W305	W306	W307	W308	W309	W310	W311	W312	W313	W314	W315	W316	W317	W318	W319	W320	W321	W322	W323	W324	W325	W326	W327	W328	W329	W330	W331	W332	W333	W334	W335	W336	W337	W338	W339	W340	W341	W342	W343	W344	W345	W346	W347	W348	W349	W350	W351	W352	W353	W354	W355	W356	W357	W358	W359	W360	W361	W362	W363	W364	W365	W366	W367	W368	W369	W370	W371	W372	W373	W374	W375	W376	W377	W378	W379	W380	W381	W382	W383	W384	W385	W386	W387	W388	W389	W390	W391	W392	W393	W394	W395	W396	W397	W398	W399	W400	W401	W402	W403	W404	W405	W406	W407	W408	W409	W410	W411	W412	W413	W414	W415	W416	W417	W418	W419	W420	W421	W422	W423	W424	W425	W426	W427	W428	W429	W430	W431	W432	W433	W434	W435	W436	W437	W438	W439	W440	W441	W442	W443	W444	W445	W446	W447	W448	W449	W450	W451	W452	W453	W454	W455	W456	W457	W458	W459	
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doi:10.1017/S0007122614000066



• Eggs hard-boiled, steamed, or hard-boiled
• Eggs in tomato sauce

• Best choice:
• Affordable choice

[illegible]

■ NFI • Full Radius Inserts

[illegible]

Continued



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Journal of Internal Medicine 255: 103–110

20	21	22	23	24	25
26	27	28	29	30	31
32	33	34	35	36	37
38	39	40	41	42	43
44	45	46	47	48	49
50	51	52	53	54	55

■ **WFD + Full Radius Deep-Grooving Inserts**

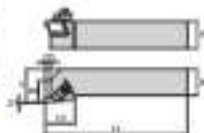
Call sign tested	Lead size	W	L	Leading edges	Notes
Right hand					
W000000	0	0.0	0.0	0	
W000000	0	0.0	0.0	0	
W000000	0	0.0	0.0	0	
W000000	0	0.0	0.0	0	
Left hand					
W000000	0	0.0	0.0	0	
W000000	0	0.0	0.0	0	
W000000	0	0.0	0.0	0	
W000000	0	0.0	0.0	0	

1997

TipGroove™
Holder Identification System



N	S	R		2525	M	4	
Insert Holding Method	Insert Mounting Location	Head at Tool	Chip Head	Head Size	Tool Length	Insert Size	Qualified Surface and Length
  TipGroove insert only	End mount  Side mount (flat)  Side mount (for extra reach)  MT (backmount) 		Head length and width in mm and holder length according to ISO standard  ISO - Chip Head		 1.5 200 2. 200 3. 200 4. 200 5. 200 6. 200 7. 200 8. 200 9. 200 10. 200 11. 200 12. 200 13. 200 14. 200 15. 200 16. 200 17. 200 18. 200 19. 200 20. 200 21. 200 22. 200 23. 200 24. 200 25. 200 26. 200 27. 200 28. 200 29. 200 30. 200 31. 200 32. 200 33. 200 34. 200 35. 200 36. 200 37. 200 38. 200 39. 200 40. 200 41. 200 42. 200 43. 200 44. 200 45. 200 46. 200 47. 200 48. 200 49. 200 50. 200 51. 200 52. 200 53. 200 54. 200 55. 200 56. 200 57. 200 58. 200 59. 200 60. 200 61. 200 62. 200 63. 200 64. 200 65. 200 66. 200 67. 200 68. 200 69. 200 70. 200 71. 200 72. 200 73. 200 74. 200 75. 200 76. 200 77. 200 78. 200 79. 200 80. 200 81. 200 82. 200 83. 200 84. 200 85. 200 86. 200 87. 200 88. 200 89. 200 90. 200 91. 200 92. 200 93. 200 94. 200 95. 200 96. 200 97. 200 98. 200 99. 200 100. 200 101. 200 102. 200 103. 200 104. 200 105. 200 106. 200 107. 200 108. 200 109. 200 110. 200 111. 200 112. 200 113. 200 114. 200 115. 200 116. 200 117. 200 118. 200 119. 200 120. 200 121. 200 122. 200 123. 200 124. 200 125. 200 126. 200 127. 200 128. 200 129. 200 130. 200 131. 200 132. 200 133. 200 134. 200 135. 200 136. 200 137. 200 138. 200 139. 200 140. 200 141. 200 142. 200 143. 200 144. 200 145. 200 146. 200 147. 200 148. 200 149. 200 150. 200 151. 200 152. 200 153. 200 154. 200 155. 200 156. 200 157. 200 158. 200 159. 200 160. 200 161. 200 162. 200 163. 200 164. 200 165. 200 166. 200 167. 200 168. 200 169. 200 170. 200 171. 200 172. 200 173. 200 174. 200 175. 200 176. 200 177. 200 178. 200 179. 200 180. 200 181. 200 182. 200 183. 200 184. 200 185. 200 186. 200 187. 200 188. 200 189. 200 190. 200 191. 200 192. 200 193. 200 194. 200 195. 200 196. 200 197. 200 198. 200 199. 200 200. 200	 Start Size End Size 	

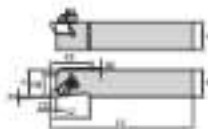


■ NE

Downloaded from <http://www.jstor.org/stable/2346418>

[illegible]

NEED: C dimensions measured two days prior to onset



WIDIA

order number	catalogue number	10	12	14	1.7	1.2	10	12	14	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
right hand																	
204-007	WIDIA 204-007	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0	10.0	CMT	WIDIA	—	10.0
204-008	WIDIA 204-008	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0	10.0	CMT	WIDIA	—	10.0
204-009	WIDIA 204-009	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0	10.0	CMT	WIDIA	—	10.0
left hand																	
204-010	WIDIA 204-010	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0	10.0	CMT	WIDIA	—	10.0
204-011	WIDIA 204-011	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0	10.0	CMT	WIDIA	—	10.0
204-012	WIDIA 204-012	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0	10.0	CMT	WIDIA	—	10.0

WIDIA 1 shows the measured size of the toolholder.

Drawing unit: mm



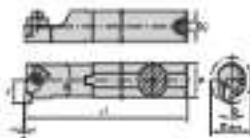
#NE

												  				
code number	catalogue number	0	5	7	11	12	14	16	18	22	chip length	image	image	image	Real Tool Plus	
right hand																
20-024	W1100002	6,0	6,0	6,0	10	10	10	—	4	6,0	—	chip	W1100002	—	100	
20-025	W1100003	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	W1100003	—	100	
20-026	W1100004	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	W1100004	—	100	
20-027	W1100005	10,0	10,0	10,0	10	10	10	—	4	6,0	—	chip	—	W1100005	100	
20-028	W1100006	10,0	10,0	10,0	10	10	10	—	4	6,0	—	chip	—	W1100006	100	
20-029	W1100007	10,0	10,0	10,0	10	10	10	—	4	6,0	—	chip	—	W1100007	100	
20-030	W1100008	10,0	10,0	10,0	10	10	10	—	4	6,0	—	chip	—	W1100008	100	
20-031	W1100009	10,0	10,0	10,0	10	10	10	—	4	6,0	—	chip	—	W1100009	100	
20-032	W1100010	10,0	10,0	10,0	10	10	10	—	4	6,0	—	chip	W1100010	—	100	
left hand																
20-020	W1100001	6,0	6,0	6,0	10	10	10	—	4	6,0	—	chip	W1100001	—	100	
20-021	W1100002	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	W1100002	—	100	
20-022	W1100003	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	W1100003	—	100	
20-023	W1100004	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100004	100	
20-024	W1100005	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100005	100	
20-025	W1100006	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100006	100	
20-026	W1100007	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100007	100	
20-027	W1100008	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100008	100	
20-028	W1100009	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100009	100	
20-029	W1100010	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100010	100	
20-030	W1100011	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100011	100	
20-031	W1100012	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100012	100	
20-032	W1100013	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100013	100	
20-033	W1100014	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100014	100	
20-034	W1100015	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100015	100	
20-035	W1100016	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100016	100	
20-036	W1100017	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100017	100	
20-037	W1100018	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100018	100	
20-038	W1100019	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100019	100	
20-039	W1100020	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100020	100	
20-040	W1100021	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100021	100	
20-041	W1100022	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100022	100	
20-042	W1100023	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100023	100	
20-043	W1100024	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100024	100	
20-044	W1100025	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100025	100	
20-045	W1100026	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100026	100	
20-046	W1100027	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100027	100	
20-047	W1100028	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100028	100	
20-048	W1100029	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100029	100	
20-049	W1100030	10,0	10,0	10,0	10	10	10	10	4	6,0	—	chip	—	W1100030	100	

NOTE: 1. Always use maximum chip width of 1mm.



Chip break with through coolant



right-hand double-flute



W A RNT

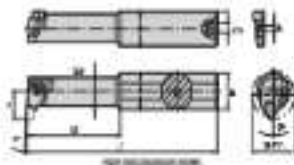
							  				
Widia function	Widia type number	Ø	Ø max	L	F	CD	Widia brand	Widia type	Widia type	Widia type	Widia type
right hand											
W0104	A1000W0102	12	14.5	120	11	010.17 MPa	W010	W010	W010	—	2.5 mm
W0105	A1000W0103	16	19.0	150	11	10.07 MPa	W010	W010	W010	—	2.5 mm
W0106	A1000W0104	20	24.0	180	11	10.07 MPa	W010	W010	W010	—	2.5 mm
W0107	A1000W0105	25	29.0	220	11	10.07 MPa	W010	W010	W010	—	2.5 mm
W0108	A1000W0106	32	36.0	280	11	10.07 MPa	W010	W010	—	W010	2.5 mm
W0109	A1000W0107	40	44.0	350	11	10.07 MPa	W010	W010	—	W010	2.5 mm
W0110	A1000W0108	50	54.0	430	11	10.07 MPa	W010	W010	—	W010	2.5 mm
W0111	A1000W0109	63	68.0	540	11	10.07 MPa	W010	W010	—	W010	2.5 mm
left hand											
W0112	A1000W0110	12	14.5	120	11	010.17 MPa	W010	W010	W010	—	2.5 mm
W0113	A1000W0111	16	19.0	150	11	10.07 MPa	W010	W010	W010	—	2.5 mm
W0114	A1000W0112	20	24.0	180	11	10.07 MPa	W010	W010	W010	—	2.5 mm
W0115	A1000W0113	25	29.0	220	11	10.07 MPa	W010	W010	W010	—	2.5 mm
W0116	A1000W0114	32	36.0	280	11	10.07 MPa	W010	W010	—	W010	2.5 mm
W0117	A1000W0115	40	44.0	350	11	10.07 MPa	W010	W010	—	W010	2.5 mm
W0118	A1000W0116	50	54.0	430	11	10.07 MPa	W010	W010	—	W010	2.5 mm
W0119	A1000W0117	63	68.0	540	11	10.07 MPa	W010	W010	—	W010	2.5 mm

W010: Minimum hole capacity value with depth is given. See pages 100-127 for details.

F: Recommended maximum feed rate (mm/min)



See how the stone is built with through coolant.



WA RWT-1

order number	catalogue number	Ø1	Ø max	Ø2	1.1	1.2	1.3	1.4	1.5	Ø max	Ø max	Ø max	Ø max
right hand													
3000000	WIDIA RWT-1	10	11.2	10.2	10.2	—	—	—	—	10.2	10.2	10.2	10.2
3000001	WIDIA RWT-1	11	11.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2

NOTE: Minimum recommended depth of groove is 0.05 mm. See page 10 for more details.
1. dimension reduced over chip load is noted.

Grinding wheel RWT-1

TopGroove™ Inserts: The Best Platform for Customization

All TopGroove custom order inserts benefit from the superior rigidity of our TopGroove technology and damping capacity for great productivity, great custom order service and improved life for double-fluted inserts.

Custom order inserts with unique WIDIA® custom grade technology are the basis for optimizing tool performance. Tooling for other grades are also available in most inserts.

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

There are multiple variations of the flat-top TopGroove design. Additionally, deep inserts for short custom applications enable free optimization and processing with other flat-top and WIDIA-side insert designs to suit your needs and to extend tool life in your shop.

Whether your specific grinding requirements may be, WIDIA can provide an efficient solution. We have the technical expertise, resources, and commitment to help you develop tool designs that satisfy your manufacturing application demands.



TopGroove



step 1



step 2



step 3



step 4



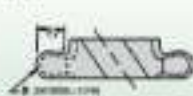
step 5



step 6



step 7



step 8



step 9



WIDIA® Custom order inserts are shown here in right hand versions. Left hand versions are also available.

TopGreener Growing Systems

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

Visit our [support and resources](#) web page for more information to design the best solution for you.

Date	
Customer-Specified Dimensions	
Style (inches)	16 18 20 22 24 26 28 30 32 34 36
Orientation (inches)	all face right face
Top Size	Side Width (")
Looking Width (ft)	Height 1
Corner Height 1 (ft)	Height 2
Corner Height 2 (ft)	Offset (ft)
Looking Length (ft)	Other (please specify)
Special Instructions (Please indicate necessary notes or drawings for installation)	
Closest Catalogue Standard	
Customer	
Staff Name	
Shipping Requirements	
Please Distributor Use this worksheet to select information for your customer.	
☐ 16' 0" x 16' 0"	☐ 16' 0" x 24' 0"
☐ 16' 0" x 32' 0"	☐ 16' 0" x 48' 0"

W.A.-OK Specials

3D positive cutting action

- Grooving
- Chamfering



Insert catalogue number		width range W	corner radii range R _x and R _y	S	T	grades
light load	full load					
W12-01-00	W12-01-00	0,40 - 1,40	0,30 - 0,40	0,07	0,05	Optima grades specified upon request See page 240
or W12-01-00	or W12-01-00	0,40 - 0,80	0,30 - 0,30	0,10		
		0,07 - 0,70	0,30 - 0,30	0,10		
		0,10 - 0,80	0,10 - 0,30	0,10		
		0,80 - 0,80	0,10 - 0,30	0,10		
W12-01-00	W12-01-00	0,10 - 0,20	0,10 - 0,20	0,10		
or	or	0,08 - 0,10	0,10 - 0,20	0,10	0,05	
W12-01-00	W12-01-00	0,10 - 0,10	0,10 - 0,10	0,10		
		0,10 - 0,10	0,10 - 0,10	0,10		
		0,08 - 0,10	0,10 - 0,10	0,10		
		0,07 - 0,08	0,08 - 0,10	0,10		
		0,10 - 0,70	0,10 - 0,30	0,10		Optima grades specified upon request See page 240
		0,08 - 0,10	0,10 - 0,30	0,10		
		0,10 - 0,10	0,10 - 0,10	0,10		
W12-01-00	W12-01-00	0,10 - 0,10	0,10 - 0,10	0,10		
or	or	0,08 - 0,10	0,10 - 0,10	0,10	0,05	
W12-01-00	W12-01-00	0,10 - 0,10	0,10 - 0,10	0,10		
		0,10 - 0,10	0,10 - 0,10	0,10		
		0,08 - 0,10	0,10 - 0,10	0,10		
		0,07 - 0,08	0,08 - 0,10	0,10		
		0,10 - 0,70	0,10 - 0,30	0,10		
		0,08 - 0,10	0,10 - 0,30	0,10		

W12-01-00, W12-01-00, and W12-01-00 inserts have a special
groove with the specifications listed in the above table.

Table ranges W12-01-00 ... 0,10

R_x ... 0,10, R_y ... 0,10, grade W12-01

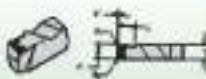
Unless otherwise specified, standard dimensions of inserts
are used. If not, be noted, and a standard tolerance of
±0,005 mm will be applied.

If using cutting fluid (C) is required, please specify, refer to
the application drawing attachments to determine best grade
quality and minimum flow pressure, flow rate.

In addition to the positive action, all negative action grooves
may be applied. Under certain conditions, top-coated performance
may vary from standard best grades.

WA GK Specials

- 10° positive cutting angles
- Deep grooving
- Deep-flare grooving



Insert catalogue number		width range W	corner radii range R ₁ and R ₂	d	T	grades
right hand	left hand					
W022-0-08	W022-L-08	1.60-1.75	0.05-0.08	0.40	0.40	10° positive grades specified above inserted See page 640
W	W	1.75-2.00	0.05-0.08	0.50		
W023-0-08	W023-L-08	2.00-2.25	0.05-0.08	0.60		
W024-0-08	W024-L-08	2.25-2.50	0.05-0.08	0.80	0.50	
W	W	2.50-2.75	0.05-0.08	0.90		
W024-0-08	W024-L-08	2.75-3.00	0.05-0.08	1.00		

Use cutting edge

W022, W0-08, W023-08, and W024-08 inserts may be specially ordered with the specification K0202 08 0800 0000.

Order example: W022-08 W - 000

R₁ = 0.05 R₂ = 0.08 grade: 08000000

Inserts otherwise specified: a standard tolerance of ±0.01mm on width (W) will be applied, and a standard tolerance of ±0.01mm on both d₁ and d₂ will be applied.

If deeper cutting results in a heavier gross weight, there is the adjustment: double the width of the insert and double the corner radii from gross dimensions.

In addition to the positive angles, 10° radius from gross inserts may be ordered. Check corner conditions, top surface, and bottom top edge from standard insert order.

CI-SK Specials

- Grooves with chamfers



Insert catalogue number		width range W	corner radii range R ₁ and R ₂	d	T	grades
right hand	left hand					
W023-0-08	W023-L-08	1.50-1.75	0.05-0.08	0.50	0.50	10° positive grades specified above inserted See page 640
W024-0-08	W024-L-08	1.75-2.00	0.05-0.08	0.60	0.60	

W023, the above insert size is for simultaneous groove and chamfer operations with chip control.

TopGroove Toolholders and Shaving Bars



					
Insert type and shape		Code	Code with	ØD	ØD x L
ISO-K		280-100	2-280	—	—
ISO-L		280-180	2-280	—	—
ISO-H		280-160	2-280	—	—
ISO-J		280-70	2-280	—	—
ISO-K		280-70	2-280	—	—
ISO-L		280-140	2-280	—	—
ISO-H		280-180	2-280	—	—
ISO-J		280-70	2-280	—	—
ISO-K		280-70	2-280	—	—
ISO-L		280-70	2-280	—	—
ISO-H		280-70	2-280	—	—
ISO-K		280-70	2-280	280-70	2-280
ISO-L		280-70	2-280	—	—
ISO-H		280-70	2-280	—	—
ISO-K		280-100	2-280	280-100	2-280
ISO-L		280-100	2-280	280-100	2-280

TopGroove® solid grooving
Toolholder and shaving bar
Tooling bar

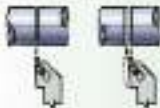
Grooving Tool Failure and Solution Guide

Practical Solutions to Common Grooving Problems

Holder Position for Grooving Operation

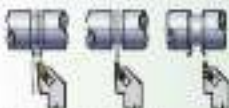


How to Cut a Groove Slightly Wider than the Groove Tool



1. Change the center of the groove.
2. Place the side of the groove to get the specified width. Use a slower feed rate when cutting grooves.

How to Cut Wider Grooves



1. Change feed rate value of groove width.
2. Change cutting area to ensure feed of material stability.
3. Change both side of groove at the required angle, using approximately one-half the width of the grooving tool for maximum profile of cut.

Finish Turning the Groove



1. Follow recommendations explained above.
2. To avoid finish chipping and to achieve groove wall perpendicularity, follow the tool path outlined below.
3. Use the lighter depth of cut that still enables good chip removal.

problem	solution
too	1. Check tool center height. 2. Use sharp tool (check wear effect). 3. Use correct rate of feed (avoid feed). 4. Use correct grade for workpiece material. 5. Use correct geometry (e.g., profile angle for work face being machined). 6. Check tool path. 7. Check tool path.
cut width limit	1. Increase speed. 2. Use sharp tool (check wear effect). 3. Check tool in holder. 1. 2. installation limit. 4. Use proper chip control geometry. 5. Increase coolant flow/concentration. 6. Increase proper setup (workholding, work rest). 7. Use correct geometry (e.g., profile angle for work face being machined).
groove bottom tool not flat	1. Use sharp tool (check wear effect). 2. Check tool in holder. 1. 2. installation limit. 3. Reduce feed (workholding, increase rigidity). 4. Increase coolant flow/concentration. 5. Reduce feed rate of groove bottom. 6. Use a wider tool. 7. Increase tool center height.
cut material	1. Use 10° chip control geometry tool. 2. Use sharp tool (check wear effect). 3. Increase coolant concentration. 4. Adjust feed rate (avoid increase feed).
chatter	1. Reduce feed and maximum overhang. 2. Adjust speed and feed (avoid increase feed). 3. Check center height.
tool chipping	1. Use correct grade for workpiece material. 2. Increase speed. 3. Check tool. 4. Use a stronger grade. 5. Increase tool feed setup rigidity.
chip break incomplete	1. Check tool alignment for square. 2. Use correct speed feed. 3. Reduce workpiece and tool overhang. 4. Use sharp tool (check wear effect).

Machining Guidelines for Chip Control • Grooving

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

- Cutter height at least should be positioned at the center of the workpiece or up to 1/2 cutter above.
- Avoid force to the bottom of the groove below that force mentioned is not recommended.
- Chip control is best with coolant and should be adjusted to fit the particular situation. The recommended feed range is 0.104-0.2 mm/rev.



Machining Guidelines for Chip Control • Turning/Profiling

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

- 0.174-1.0 mm wide tool: can cut up to 1.0 mm deep
- 1.2-3.0 mm wide tool: can cut up to 0.5 mm deep
- 3.2-4.0 mm wide tool: can cut up to 0.3 mm deep
- 5-6.0 mm wide tool: can cut up to 0.2 mm deep

Finish Turning the Groove



1. Change back roller to groove width.
2. Change setup area to remove wall of material remaining.
3. To avoid tool chipping and to achieve groove wall perpendicularity, move the tool with coolant.
4. Use the highest depth of cut that still allows good chipforming, tool life, and surface finish.

Groove width		
tool material number	maximum (ideal) groove depth mm	maximum tool diameter mm
WG-00001	1.0	0.174
—	1.0	0.174
WG-00002	1.0	0.174
WG-00003	—	—
WG-00004	—	—
—	0.174	0.174
WG-00005	1.0	0.174
WG-00006	1.0	0.174
WG-00007	1.0	0.174
—	1.0	0.174
WG-00008	—	—
WG-00009	1.0	0.174
WG-00010	1.0	0.174
WG-00011	1.0	0.174
WG-00012	—	—
WG-00013	—	—
WG-00014	1.0	0.174
WG-00015	1.0	0.174
WG-00016	1.0	0.174
WG-00017	—	—
WG-00018	1.0	0.174
WG-00019	—	—
WG-00020	1.0	0.174
WG-00021	1.0	0.174
WG-00022	1.0	0.174
WG-00023	1.0	0.174
WG-00024	1.0	0.174
WG-00025	1.0	0.174
WG-00026	1.0	0.174
WG-00027	1.0	0.174
WG-00028	1.0	0.174
WG-00029	1.0	0.174
WG-00030	1.0	0.174
WG-00031	1.0	0.174
WG-00032	1.0	0.174
WG-00033	1.0	0.174
WG-00034	1.0	0.174
WG-00035	1.0	0.174
WG-00036	1.0	0.174
WG-00037	1.0	0.174
WG-00038	1.0	0.174
WG-00039	1.0	0.174
WG-00040	1.0	0.174
WG-00041	1.0	0.174
WG-00042	1.0	0.174
WG-00043	1.0	0.174
WG-00044	1.0	0.174
WG-00045	1.0	0.174
WG-00046	1.0	0.174
WG-00047	1.0	0.174
WG-00048	1.0	0.174
WG-00049	1.0	0.174
WG-00050	1.0	0.174
WG-00051	1.0	0.174
WG-00052	1.0	0.174
WG-00053	1.0	0.174
WG-00054	1.0	0.174
WG-00055	1.0	0.174
WG-00056	1.0	0.174
WG-00057	1.0	0.174
WG-00058	1.0	0.174
WG-00059	1.0	0.174
WG-00060	1.0	0.174
WG-00061	1.0	0.174
WG-00062	1.0	0.174
WG-00063	1.0	0.174
WG-00064	1.0	0.174
WG-00065	1.0	0.174
WG-00066	1.0	0.174
WG-00067	1.0	0.174
WG-00068	1.0	0.174
WG-00069	1.0	0.174
WG-00070	1.0	0.174
WG-00071	1.0	0.174
WG-00072	1.0	0.174
WG-00073	1.0	0.174
WG-00074	1.0	0.174
WG-00075	1.0	0.174
WG-00076	1.0	0.174
WG-00077	1.0	0.174
WG-00078	1.0	0.174
WG-00079	1.0	0.174
WG-00080	1.0	0.174
WG-00081	1.0	0.174
WG-00082	1.0	0.174
WG-00083	1.0	0.174
WG-00084	1.0	0.174
WG-00085	1.0	0.174
WG-00086	1.0	0.174
WG-00087	1.0	0.174
WG-00088	1.0	0.174
WG-00089	1.0	0.174
WG-00090	1.0	0.174
WG-00091	1.0	0.174
WG-00092	1.0	0.174
WG-00093	1.0	0.174
WG-00094	1.0	0.174
WG-00095	1.0	0.174
WG-00096	1.0	0.174
WG-00097	1.0	0.174
WG-00098	1.0	0.174
WG-00099	1.0	0.174
WG-00100	1.0	0.174

Notes: 1. For wide maximum groove depth and maximum tool diameter values also apply to tools: WG-A-1 (chip control) and WG-B (surface finish) or apply the same internal groove depth limits as a function of chip material width tool diameter.

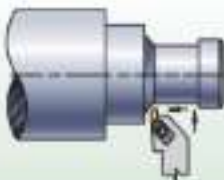
Internal Groove Depth versus The Interference



NOTE: Internal grooving inserts must be a function of the diameter of maximum diameter.

Machining Guidelines for Back Turning/Turning/Profiling

The MP is only TopGroove inserts were engineered specifically for back turning on small diameter lathe, but they can be used for turning on other lathe turning and profiling operations. For general applications, maximum depth of cut should not exceed 0.125mm for size 1 inserts or 0.25mm for size 2 inserts.



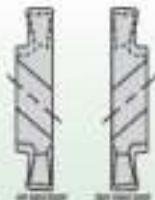
Machining Guidelines for Using TopGroove Deep Grooving Inserts (MCL)

Typically, these MCL and MCLT slots inserts with two cutting edges require no machine offset changes. However, these inserts with only one cutting edge do require offset changes. Refer to the chart below to ensure proper offset adjustments.

Insert catalog number	ISO T17 Dimension mm	ISO T17 Dimension in
6010-3001	0.50	0.01
6010-3004	0.50	0.01
6010-3010	0.50	0.01
6010-3000	0.50	0.01
6010-4011	0.50	0.01
6010-4019	0.50	0.01
6010-4016	0.50	0.01
6010-3001	0.50	0.01
6010-3001	0.50	0.01
6010-4001	0.50	0.01
6010-4004	0.50	0.01
6010-4011	0.50	0.01

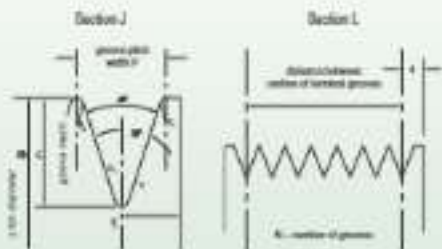
TopGroove Insert Selection Guide

- All TopGroove inserts are precision ground to provide accurate edge locations and secure seating of the insert in the holder's pocket.
- TopGroove inserts can be used in either configurations or facing bars.
- Right hand TopGroove configurations are right hand inserts.
- Left hand TopGroove configurations are left hand inserts.
- Right hand TopGroove facing bars use left hand inserts.
- Left hand TopGroove facing bars use right hand inserts.



Machining Guidelines for Poly-Vee Grooving with Custom Solution and TegalGroove WV Inseals (NW3-2 and NW4-1)

- To machine cross section "J", use insert NW3-2.
- To machine cross section "L", use insert NW4-1.

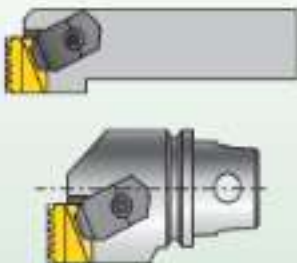


Groove Dimensions and Tolerances for Shims:

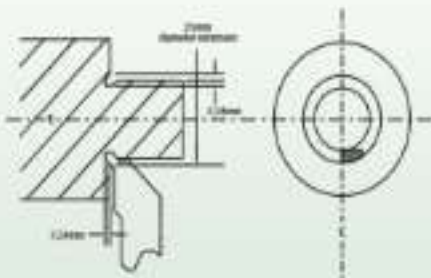
groove cross section	pitch width (P)	groove depth (D)	average radius (R)	radius (R)	breakfil distance	distance between centers of formed grooves and maximum assembled clearance
J	1.25 +0.05 -0.00	0.11 +0.01 -0.00	0.00	0.00 +0.05 -0.00	0.00	0.10-0.08 +0.01 -0.00
L	4.00 +0.05 -0.00	0.11 +0.01 -0.00	0.00	0.00 +0.05 -0.00	0.00	0.10-0.01 +0.01 -0.00

Multiple Tooth Poly-Vin Grooving

TopGroove™ applications include both new grinding applications. One standard insert width/height are available. The strong TopGroove design holds the insert tight and reduces the risk of insert failure.

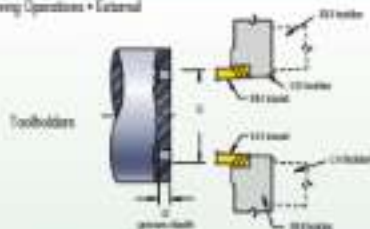


Machining Guidelines for Undercutting Operations Performed with Custom Solution and TopGroove NI Inserts (N10004, N10125, and N10150)



WIDIA: Best in class grinding solutions

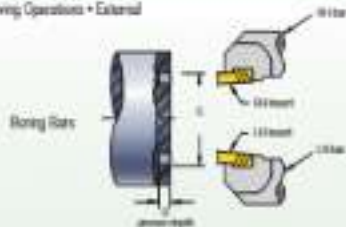
Machining Guidelines for Face Grooving Operations • External



Standard W-MAX inserts

Insert Grade	Standard W-MAX inserts	
	Maximum groove depth E mm	Minimum groove diameter E mm
W-2	1.25	2.50
W-3	1.25	2.50
W-10	1.25	2.50
W-2	1.25	2.50
W-3	1.25	2.50
W-10	1.25	2.50
W-2	1.25	2.50
W-3	1.25	2.50
W-10	1.25	2.50

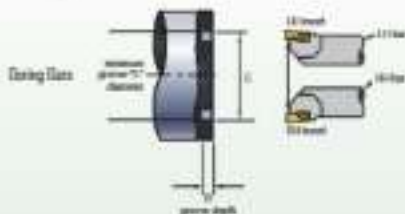
Machining Guidelines for Face Grooving Operations • External



Standard W-MAX inserts

Insert Grade	Standard W-MAX inserts	
	Maximum groove depth E mm	Minimum groove diameter E mm
W-2	1.25	2.50
W-3	1.25	2.50
W-10	1.25	2.50
W-2	1.25	2.50
W-3	1.25	2.50
W-10	1.25	2.50
W-2	1.25	2.50
W-3	1.25	2.50
W-10	1.25	2.50

Machining Guidelines for Face Grooving Operations • Internal



Standard WIDIA inserts		
Insert family	Maximum groove width Ø mm	Maximum groove diameter C mm
MG 1-1-01	0.5	0.5
		NOTE: Also check minimum face diameter of workpiece. See page 172.

ProGroove™ •
Grooving and Cut-Off

ProGroove



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

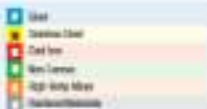
- Single and grooving and cut-off inserts.
- Offered with integral backstops and flanks.
- Shallow, deep grooving, and cut-off operations.
- Available in two different geometries.





Coatings provide high speed capability and are optimized for finishing to tight tolerances.

- * Surface optical finish — high speed and heat capability
- * Coated tool life — rock multiple tooling products before wear becomes

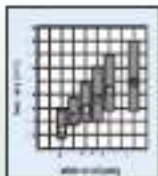


Coating	Coater Description	WIDIA Capabilities										Lengths	
		10	15	20	25	30	35	40	45	50	55	60	65
TiN/TiAlN	ISO 1000 TiN/TiAlN coated carbide. Medium and heavy machining for steel and stainless steel tools. Recommended if medium cutting speeds where good toughness properties are required.												
	ISO 1000 TiN/TiAlN												
TiN/TiAlN	ISO 1000 TiN/TiAlN coated carbide. Light and medium machining for steel and stainless steel tools.												
	ISO 1000 TiN/TiAlN												
TiN/TiAlN	ISO 1000 TiN/TiAlN coated carbide. Medium and heavy machining for steel and stainless steel tools.												
	ISO 1000 TiN/TiAlN												
TiN/TiAlN	ISO 1000 TiN/TiAlN coated carbide. Light and medium machining of various steels. Can be used with or without coolant.												
	ISO 1000 TiN/TiAlN												
TiN/TiAlN	ISO 1000 TiN/TiAlN coated carbide. Light and medium machining for steel and stainless steel tools. Also capable of machining hardened materials at low cutting speeds.												
	ISO 1000 TiN/TiAlN												
TiN/TiAlN	ISO 1000 TiN/TiAlN coated carbide. High speed and heat capability. Recommended for steel and stainless steel tools.												
	ISO 1000 TiN/TiAlN												

P20

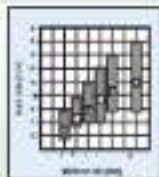


For growing and pupating operations, universal wax flasks (regardless of size) for light coating within high front and left front edges with 1" wax rings.



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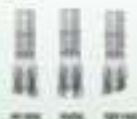
P20



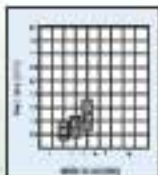
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For growing and pupating, also requires of wax and straight flaring to reduce clumping, with additional ring flaring shown for good ring control with varying degrees of wax.

P20

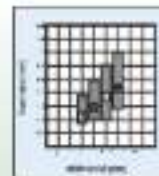


1 or low wax coating with straight flares and smooth surface flares. All insects are recommended for pupating and growing, except for those, just described, others, and the wax flares.



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P20



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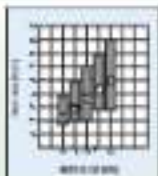
Mid-sized flares for pupating, growing, and ring flaring. Very good ring control for insect control use. Accurately reproduces existing wax positioning.

LD System - 0 and 1



0 Insects with wide range of applications in growing and ring growing. With additional ring control shown for good ring control, wax with varying widths of wax.

1 Insects with wide range of use in growing and ring growing of about 100% of available.



© Biochemical Supply, Inc.

Material Group	Material	Cutting Speed - m/min																	
		16Mn			16Mn2			16Mn3			16Mn4			16Mn5			16Mn6		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
Blue	1	120	140	160	140	170	190	140	170	190	—	—	—	—	—	—	80	90	100
	2	140	160	170	170	200	210	170	200	210	—	—	—	—	—	—	10	100	110
	3	140	160	170	170	220	230	170	210	230	—	—	—	—	—	—	15	100	110
	4	70	80	110	110	140	150	70	100	110	—	—	—	—	—	—	10	80	90
	5	140	160	170	170	200	210	140	160	170	—	—	—	—	—	—	10	80	100
Yellow	6	80	90	100	—	—	—	80	90	100	—	—	—	—	—	—	10	80	90
	7	100	110	120	—	—	—	100	110	120	—	—	—	—	—	—	10	80	100
	8	100	110	120	—	—	—	100	110	120	—	—	—	—	—	—	10	80	100
Red	9	100	110	120	100	110	120	—	—	—	—	—	—	100	110	120	—	—	—
	10	100	110	120	100	110	120	—	—	—	—	—	—	100	110	120	—	—	—
	11	100	110	120	100	110	120	—	—	—	—	—	—	100	110	120	—	—	—
Green	12	—	—	—	—	—	—	—	—	—	—	—	—	100	110	120	—	—	—
	13	—	—	—	—	—	—	—	—	—	—	—	—	100	110	120	—	—	—
	14	—	—	—	—	—	—	—	—	—	—	—	—	100	110	120	—	—	—
	15	—	—	—	—	—	—	—	—	—	—	—	—	100	110	120	—	—	—
	16	—	—	—	—	—	—	—	—	—	—	—	—	100	110	120	—	—	—
	17	—	—	—	—	—	—	—	—	—	—	—	—	100	110	120	—	—	—
	18	—	—	—	—	—	—	—	—	—	—	—	—	100	110	120	—	—	—
Orange	19	—	—	—	—	—	—	—	—	—	—	—	—	100	110	120	—	—	—
	20	—	—	—	—	—	—	—	—	—	—	—	—	100	110	120	—	—	—
	21	—	—	—	—	—	—	—	—	—	—	—	—	100	110	120	—	—	—
	22	—	—	—	—	—	—	—	—	—	—	—	—	100	110	120	—	—	—
Grey	23	—	—	—	—	—	—	—	—	—	—	—	—	100	110	120	—	—	—
	24	—	—	—	—	—	—	—	—	—	—	—	—	100	110	120	—	—	—
	25	—	—	—	—	—	—	—	—	—	—	—	—	100	110	120	—	—	—
	26	—	—	—	—	—	—	—	—	—	—	—	—	100	110	120	—	—	—

ProGrip® System



To change the cutting insert, place the insert into the clamping insert.
The clamping insert is secured by locking through the hole.



In this position, the insert is self-locking. Inserting each insert has
for changing the cutting insert.



The cutting insert is pressed against the new seat of the clamping insert,
releasing the workpiece. The insert is automatically positioned and securely secured.



END—continued



† *in situ*

Blue	Blue	Blue	Blue	Blue	Blue
Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Red	Red	Red	Red	Red	Red
Green	Green	Green	Green	Green	Green
Orange	Orange	Orange	Orange	Orange	Orange
Grey	Grey	Grey	Grey	Grey	Grey

category number	total size	W	IS	g1	total
0000000	0	0.00	0.00	0	0.0000
0000001	0	0.00	0.00	0	0.0000

category number	total size	W	IS	g1	total
0000000	0	0.00	0.00	0	0.0000
0000001	0	0.00	0.00	0	0.0000

doi:10.1017/S0022292412001000



- **Highly variable**
- **Highly variable**



■ **PCB**

catalogue number	board size	W	D	h	board
00007130	0	1,25	1,25		W - Neutral
00007132	0	1,25	1,25		W - Neutral
00007134	0	1,50	1,25		W - Neutral
00007136	0	1,25	1,25	0	U - 1-40
00007138	0	1,25	1,25	0	U - 1-40
00007140	0	1,25	1,25	0	W - Right
00007142	0	1,25	1,25	0	W - Right
00007144	0	1,25	1,25	0	W - Right

Address: 800 University Ave., Suite 600, San Francisco, CA 94107

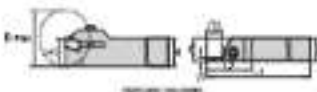


right hand / gauche



• Growing and Cut Off

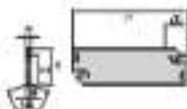
															
order number	catalogue number	tool size	M	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	Lap 1/2" 12.7	Lap 3/4" 19.0	WIDIA
right hand															
200110	1001100000	2	2.15	30.0	45	50.0	55.0	60.0	65	70	75	80	—	01-00110000	01-00110000
200170	1001700000	3	3.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200190	1001900000	5	5.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200100	1001100000	2	3.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200140	1001100000	3	3.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200150	1001100000	5	3.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200170	1001100000	4	4.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200190	1001100000	6	4.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200200	1001100000	5	5.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200220	1001100000	7	5.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200240	1001100000	8	5.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200260	1001100000	9	5.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200280	1001100000	10	5.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200300	1001100000	11	5.15	30.0	50	55.0	60.0	65.0	70	75	80	85	—	01-00110000	01-00110000
200320	1001100000	12	5.15	30.0	50	55.0	60.0	65.0	70	75	80	85	—	01-00110000	01-00110000
left hand															
200110	1001100000	2	2.15	30.0	50	55.0	60.0	65.0	70	75	80	85	—	01-00110000	01-00110000
200170	1001700000	3	3.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200190	1001100000	5	3.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200100	1001100000	2	3.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200140	1001100000	3	3.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200150	1001100000	5	3.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200170	1001100000	4	4.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200190	1001100000	6	4.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200200	1001100000	5	5.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200220	1001100000	7	5.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200240	1001100000	8	5.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200260	1001100000	9	5.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200280	1001100000	10	5.15	30.0	50	55.0	60.0	65.0	70	75	80	85	01-00100000	—	—
200300	1001100000	11	5.15	30.0	50	55.0	60.0	65.0	70	75	80	85	—	01-00110000	01-00110000
200320	1001100000	12	5.15	30.0	50	55.0	60.0	65.0	70	75	80	85	—	01-00110000	01-00110000



Grooving and Profiling

																
order number	catalogue number	tool dia.	M	CD	2 way	6	8	9	10	12	14	chip code	chip code	material		
right hand																
300100	120110000	2	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	—	CD4001000	CD4001100		
300107	120110000	2	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	—	CD4001000	CD4001100		
300110	120110000	2	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	CD4001000	—	—		
300117	120110000	2	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	CD4001000	—	—		
300118	120110000	2	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	CD4001000	—	—		
300120	120110000	4	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	—	CD4001000	CD4001100		
300146	120110000	4	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	—	—	—		
300150	120110000	4	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	—	—	—		
300151	120110000	5	1.0	16.0	—	—	16	16.0	16.0	16	16	—	—	—		
300152	120110000	6	1.0	16.0	—	—	16	16.0	16.0	16	16	—	CD4001100	CD4001100		
300153	120110000	6	1.0	16.0	—	—	16	16.0	16.0	16	16	—	CD4001100	CD4001100		
300154	120110000	6	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	—	—	—		
left hand																
300100	120110000	2	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	—	CD4001000	CD4001100		
300107	120110000	2	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	—	CD4001000	CD4001100		
300110	120110000	2	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	CD4001000	—	—		
300117	120110000	2	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	—	CD4001000	CD4001100		
300118	120110000	2	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	—	—	—		
300120	120110000	4	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	—	—	—		
300146	120110000	4	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	—	—	—		
300150	120110000	4	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	—	—	—		
300151	120110000	5	1.0	16.0	—	—	16	16.0	16.0	16	16	—	—	—		
300152	120110000	6	1.0	16.0	—	—	16	16.0	16.0	16	16	—	—	—		
300153	120110000	6	1.0	16.0	—	—	16	16.0	16.0	16	16	—	—	—		
300154	120110000	6	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	—	CD4001100	CD4001100		
300155	120110000	6	1.0	16.0	—	—	16	16.0	16.0	16	16	—	CD4001100	CD4001100		
300157	120110000	6	1.0	16.0	32.0	16	16.0	16.0	16.0	16	16	—	—	—		
300158	120110000	6	1.0	16.0	—	—	16	16.0	16.0	16	16	—	CD4001100	CD4001100		

NOTE: Catalogue CD dimension is radial stability



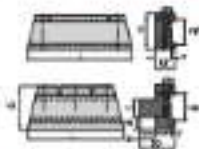
■ Cut-Off Blades



order number	catalogue number	max. size	B	H	L	L1	B1	L2	weight
201400	201400000	1	1,1	40,1	40,1	40	1,1	39	0,04000000
201402	201402000	2	1,1	40,1	40,1	40	1,7	39	0,04020000
201410	201410000	7	1,1	40,1	40,1	40	1,7	39	0,04100000
201420	201420000	1	1,1	40,1	40,1	40	2,6	40	0,04200000
201430	201430000	3	1,1	40,1	40,1	40	3,4	39	0,04300000
201441	201441000	4	1,1	40,1	40,1	40	3,7	40	0,04410000
201450	201450000	6	1,1	40,1	40,1	40	3,7	39	0,04500000
201460	201460000	6	1,1	40,1	40,1	40	4,0	39	0,04600000
201470	201470000	6	1,1	40,1	40,1	40	4,4	39	0,04700000
201480	201480000	6	1,1	40,1	40,1	40	4,6	39	0,04800000
201490	201490000	6	1,1	40,1	40,1	40	5,6	39	0,04900000

NOTE: Data subject to change.

Blade Holders



■ Cut-Off Blade Holders



order number	catalogue number	max. size	B	H	L	L1	B1	L2	weight
201400	201400000	1	1,1	40,1	40,1	40	1,1	39	0,04000000
201402	201402000	2	1,1	40,1	40,1	40	1,7	39	0,04020000
201410	201410000	7	1,1	40,1	40,1	40	1,7	39	0,04100000
201420	201420000	1	1,1	40,1	40,1	40	2,6	40	0,04200000
201430	201430000	3	1,1	40,1	40,1	40	3,4	39	0,04300000
201441	201441000	4	1,1	40,1	40,1	40	3,7	40	0,04410000
201450	201450000	6	1,1	40,1	40,1	40	3,7	39	0,04500000
201460	201460000	6	1,1	40,1	40,1	40	4,0	39	0,04600000
201470	201470000	6	1,1	40,1	40,1	40	4,4	39	0,04700000
201480	201480000	6	1,1	40,1	40,1	40	4,6	39	0,04800000
201490	201490000	6	1,1	40,1	40,1	40	5,6	39	0,04900000



• **Neuropharmacology**
• **Pharmacokinetics**



■ **LEADS**

relatório gerado em:	de:	até:	total de registros	total de registros exibidos	total de registros excluídos	total de registros excluídos	total de registros excluídos	total de registros excluídos	total de registros excluídos
2023/01/01	2023/01/01	2023/01/01	10	10	0	0	0	0	0
2023/01/02	2023/01/02	2023/01/02	10	10	0	0	0	0	0
2023/01/03	2023/01/03	2023/01/03	10	10	0	0	0	0	0
2023/01/04	2023/01/04	2023/01/04	10	10	0	0	0	0	0
2023/01/05	2023/01/05	2023/01/05	10	10	0	0	0	0	0

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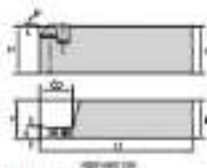


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right-hand tool



Grinding

order number	catalogue number	ISO code	W	D	S	B	L	L1	L2
right hand									
202096	12209 00 00	1	6.3	20.0	20	20.0	20.0	100	20
202101	12209 00 00	1	6.3	20.0	20	20.0	20.0	100	20
202110	12209 00 00	1	6.3	20.0	40	20.0	20.0	100	40
202111	12209 00 00	1	6.3	20.0	40	20.0	20.0	100	40
202097	12209 00 00	1	6.3	20.0	40	20.0	20.0	100	40
left hand									
202097	12209 00 00	1	6.3	20.0	20	20.0	20.0	100	20
202098	12209 00 00	1	6.3	20.0	20	20.0	20.0	100	20
202110	12209 00 00	1	6.3	20.0	40	20.0	20.0	100	40
202111	12209 00 00	1	6.3	20.0	40	20.0	20.0	100	40

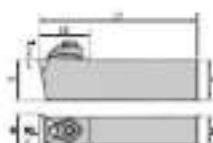
Spares Parts



catalogue number	clamping tool	wedge clamp	clamping screw	screw for clamping screw	screw for clamping screw	screw for clamping tool
right hand						
12201 00 00	121400000	121400000	121401000	121400100	—	121400000
12201 00 00	121400000	121400000	121401000	—	121400100	121400000
12201 00 00	121400000	121400000	121401000	—	121400100	121400000
12201 00 00	121400000	121400000	121401000	—	121400100	121400000
12201 00 00	121400000	121400000	121401000	121400100	121400100	—
left hand						
12201 00 00	121400000	121400000	121401000	121400100	—	121400000
12201 00 00	121400000	121400000	121401000	—	121400100	121400000
12201 00 00	121400000	121400000	121401000	—	121400100	121400000
12201 00 00	121400000	121400000	121401000	—	121400100	121400000
12201 00 00	121400000	121400000	121401000	121400100	121400100	—



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



Grooving

order number	W	W1	D	D1	L1	L2	γ	chip length
SDW005	10.40	10	10	10.2	10.2	11	3	30_400_101_01
SDW006	11.50	10	10	10.9	10.9	17	3	30_400_101_01
SDW007	11.50	10	10	10.9	10.9	10	3	30_400_101_01
SDW008	11.50	10	10	10.9	10.9	10	3	30_200_101_01
SDW009	11.50	10	10	10.9	10.9	25	3	30_200_101_01

NOTE: Tools have to be used on SD-MPCD type inserts.

Options are supplied without chipbreaker. For chipbreaker only options, see below.

For Grooving without Chipbreaker

catalogue number	chip clamp	chip clamp	chip clamp	chip clamp	chip clamp	chip clamp	chip clamp	chip clamp
SDW005	SDW005	SDW005	SDW005	SDW005	SDW005	SDW005	SDW005	SDW005
SDW006	SDW006	SDW006	SDW006	SDW006	SDW006	SDW006	SDW006	SDW006
SDW007	SDW007	SDW007	SDW007	SDW007	SDW007	SDW007	SDW007	SDW007
SDW008	SDW008	SDW008	SDW008	SDW008	SDW008	SDW008	SDW008	SDW008
SDW009	SDW009	SDW009	SDW009	SDW009	SDW009	SDW009	SDW009	SDW009

For Grooving with Chipbreaker (Order Additional Clamp and Chipbreaker)

insert	chip clamp	D	chipbreaker					D
			1/2mm	1/2mm	1/2mm	1/2mm	1/2mm	
SD_400	SDW005	10.40	SDW005-1	SDW005-1	SDW005-1	SDW005-1	SDW005-1	SDW005-1
SD_400	SDW006	11.50	SDW006-1	SDW006-1	SDW006-1	SDW006-1	SDW006-1	SDW006-1
SD_200	SDW007	11.50	SDW007-1	SDW007-1	SDW007-1	SDW007-1	SDW007-1	SDW007-1



Separator™ for Cut-Off

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

Separator



Features

- Insert width: 7.6mm
- Toolholder shank sizes: 16, 20, 25mm
- Cut off up to 30mm bar capacity

Benefits

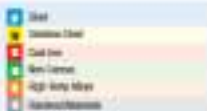
- Quick, intuitive insert indexing
- Positive mechanical clamping
- CNC square shank, screw machine, and PL blade style toolholders





Coatings provide high speed capability and are engineered for finishing to tight tolerancing.

- Inlays apply brass — high speed and fast capability
- Coated tool bits — use in drilling cutting products for wear resistance



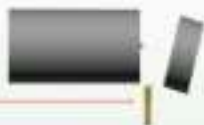
Grade	Coating	Grade Description	Wear Resistance										Strength									
			10	15	20	25	30	35	40	45	50	55	10	15	20	25	30	35	40	45	50	55
1000		A premium, high-chrome PVD TiN coating over a tough, specially formulated substrate. Performs well under extreme heat to maintain speed and dimensional accuracy. Most for carbon steels, alloy steels, most stainless steels, and very high-temperature alloys.																				
	1000 TiN																					
1001		PVD TiN multiple coating over a tough, specially formulated substrate. Performs well under extreme heat to maintain speed and dimensional accuracy. Most for carbon steels, alloy steels, most stainless steels, and very high-temperature alloys.																				
	1001 TiN																					
1002		PVD TiN multiple coating over a tough, specially formulated substrate. Performs well under extreme heat to maintain speed and dimensional accuracy. Most for carbon steels, alloy steels, most stainless steels, and very high-temperature alloys.																				
	1002 TiN																					
1003		A premium PVD TiN coating, thick enough to provide a tough, specially formulated substrate. Performs well under extreme heat to maintain speed and dimensional accuracy. Most for carbon steels, alloy steels, most stainless steels, and very high-temperature alloys.																				
	1003 TiN																					
1004		PVD TiN multiple coating over a tough, specially formulated substrate. Performs well under extreme heat to maintain speed and dimensional accuracy. Most for carbon steels, alloy steels, most stainless steels, and very high-temperature alloys.																				
	1004 TiN																					

1. Choose the application to be performed:

Choose insert angle of insert for application:



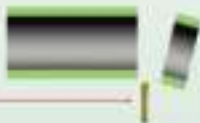
0.11 Lead Angle



1.11 Lead Angle

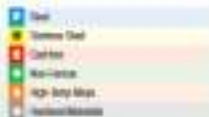


6.11 Lead Angle



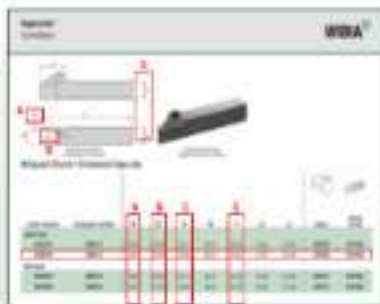
2. Identify the material to be machined:

Each bar has a material grade marked with a color indicating the material that can be machined.



3. Select your toolholder based on the application:

- Choose the appropriate width of insert required for the application.
- Choose the shortest cutting length "L" dimension for maximum tool rigidity.
- Select the longest toolholder shank "T" and "D" dimensions for maximum rigidity.



4 Select chipmaker style for the application

Use the application guide on page 1111 for a complete list of inert chips.

Application	Steel	Aluminum Steel	Cast Iron	Non-Ferrous Metals	High Temp Alloys	Exhausted materials
Welding	2° 15' to 2° 30'	2° 15' to 2° 30'	2° 15' to 2° 30'	2° 15' to 2° 30'	2° 15' to 2° 30'	—
General Machining	2° 15' to 2° 30'	2° 15' to 2° 30'	2° 15' to 2° 30'	2° 15' to 2° 30'	2° 15' to 2° 30'	2°

5 Select grade

Working condition	Recommended Grades					
	Steel	Aluminum Steel	Cast Iron	Non-Ferrous Metals	High Temp Alloys	Exhausted materials
High performance	M11	M110	M11	M11	M110	—
It requires excellent surface finish and better control, higher metal removal	—	M11	—	—	M11	—
General purpose	M11	M11	M11	M11	M11	M11
Use blades to general machining	M11	M11	M11	M11	M11	—
Difficult-to-machine conditions (interrupted cuts, low speeds, etc.)	M11	M11	M11	M11	M11	—

See page 1111 for grades and tooling descriptions.

6 Determine cutting data

- Determine material group and grade, identify working speed (m/min)
- Find chosen working speed & its feed

See page 1111 for cutting data



Separator • 2^l and 2^s-Ultra



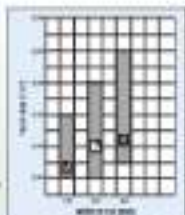
2^l

This insert has the same geometry as the NM-UX™. Long vertical geometry offers the widest range of speed and feed capabilities and provides excellent fatigue and finish. The chipbreaker rolls with the least amount of tool pressure, reducing tool life. The geometry also includes square and corner lathe. The geometry works well on a variety of materials.



2^s-Ultra

This insert has the same geometry as the NM-UX, but the 2^s-Ultra is an enhanced version of the 2^l and is ideal for stainless steels, nickel-based alloys, tool steel, INCOEL™, and titanium.



2^l Recommended Cutting Tool

Separator • 5^l and 5^s-Ultra



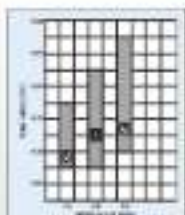
5^l

High positive rake with a more open chipbreaker enables increased speeds and feeds for stainless steels in high speed applications. The geometry includes square and a corner radius that provides superior fatigue and finish. This insert is not available with sharp corners. Its greatest strength can be seen on stainless steels and tool-giving steels.



5^s-Ultra

The 5^s-Ultra is an enhanced version of the 5^l and is ideal for SS and stainless steels, nickel-based alloys, tool steel, INCOEL™, and titanium or titanium for high speeds and feeds.



5^l Recommended Cutting Tool

Separator • Classic and 1^l



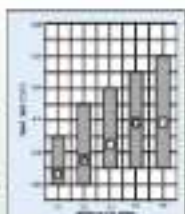
Classic

A good general purpose insert for carbon steels, alloy steels, and most stainless steels. The Separator Classic chipbreaker is designed to produce well-defined chips in slow speeds and feeds. The Classic provides excellent high feed finish and chip control, making it ideal for choice when choosing an insert for all-around use.



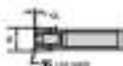
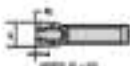
1^l

This insert provides superior fatigue and finish on a wide variety of materials. Ideal for both end mills or cutting off large diameter parts to finish. The Separator 1^l performs well at slow to moderate speeds and feeds.



1^l Recommended Cutting Tool

Material Group		Cutting Speed - m/min											
		P40			P42			P4125			P40		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max
Blue	10	40	50	110	110	140	140	—	—	—	40	50	110
	2	50	60	120	120	150	150	—	—	—	50	60	120
	3	50	60	120	120	150	150	—	—	—	50	60	120
	4	50	60	120	120	150	150	50	60	120	50	60	120
	5	50	60	120	120	150	150	50	60	120	50	60	120
Yellow	6	40	50	110	110	140	140	50	60	120	50	60	120
	7	50	60	120	120	150	150	50	60	120	50	60	120
	8	50	60	120	120	150	150	50	60	120	50	60	120
Red	9	50	60	120	120	150	150	150	180	180	150	180	180
	10	60	70	130	130	160	160	160	190	190	160	190	190
	11	60	70	130	130	160	160	160	190	190	160	190	190
Green	12	110	130	220	170	190	220	—	—	—	110	130	220
	13	110	130	220	170	190	220	—	—	—	110	130	220
	14	110	130	220	170	190	220	—	—	—	110	130	220
	15	110	130	220	170	190	220	—	—	—	110	130	220
	16	110	130	220	170	190	220	—	—	—	110	130	220
	17	110	130	220	170	190	220	—	—	—	110	130	220
	18	110	130	220	170	190	220	—	—	—	110	130	220
Orange	19	50	60	120	120	150	150	50	60	120	50	60	120
	20	60	70	130	130	160	160	60	70	130	60	70	130
	21	60	70	130	130	160	160	60	70	130	60	70	130
	22	60	70	130	130	160	160	60	70	130	60	70	130
Grey	23	—	—	—	—	—	—	—	—	—	—	—	—
	24	—	—	—	—	—	—	—	—	—	—	—	—
	25	—	—	—	—	—	—	—	—	—	—	—	—
	26	—	—	—	—	—	—	—	—	—	—	—	—



• **Substrate:**
• **different substrate**

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36
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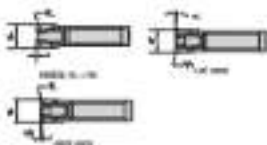
■ **EXPLORE**

colleague number	test score	W	DF	test	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461
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catalogue number	board size	h	b	g	board	h	b	g	board
30700	1	1,20	0,71	0	1-148	1	1,20	0,71	0
30700	2	1,20	0,71	0	1-148	2	1,20	0,71	0

catalogue number	exam area	Q	Q ₁	Q ₂	total	Q ₃	Q ₄	Q ₅	Q ₆	Q ₇	Q ₈	Q ₉	Q ₁₀	Q ₁₁	Q ₁₂	Q ₁₃	Q ₁₄	Q ₁₅	Q ₁₆	Q ₁₇	Q ₁₈	Q ₁₉	Q ₂₀	Q ₂₁	Q ₂₂	Q ₂₃	Q ₂₄	Q ₂₅	Q ₂₆	Q ₂₇	Q ₂₈	Q ₂₉	Q ₃₀	Q ₃₁	Q ₃₂	Q ₃₃	Q ₃₄	Q ₃₅	Q ₃₆	Q ₃₇	Q ₃₈	Q ₃₉	Q ₄₀	Q ₄₁	Q ₄₂	Q ₄₃	Q ₄₄	Q ₄₅	Q ₄₆	Q ₄₇	Q ₄₈	Q ₄₉	Q ₅₀	Q ₅₁	Q ₅₂	Q ₅₃	Q ₅₄	Q ₅₅	Q ₅₆	Q ₅₇	Q ₅₈	Q ₅₉	Q ₆₀	Q ₆₁	Q ₆₂	Q ₆₃	Q ₆₄	Q ₆₅	Q ₆₆	Q ₆₇	Q ₆₈	Q ₆₉	Q ₇₀	Q ₇₁	Q ₇₂	Q ₇₃	Q ₇₄	Q ₇₅	Q ₇₆	Q ₇₇	Q ₇₈	Q ₇₉	Q ₈₀	Q ₈₁	Q ₈₂	Q ₈₃	Q ₈₄	Q ₈₅	Q ₈₆	Q ₈₇	Q ₈₈	Q ₈₉	Q ₉₀	Q ₉₁	Q ₉₂	Q ₉₃	Q ₉₄	Q ₉₅	Q ₉₆	Q ₉₇	Q ₉₈	Q ₉₉	Q ₁₀₀	Q ₁₀₁	Q ₁₀₂	Q ₁₀₃	Q ₁₀₄	Q ₁₀₅	Q ₁₀₆	Q ₁₀₇	Q ₁₀₈	Q ₁₀₉	Q ₁₁₀	Q ₁₁₁	Q ₁₁₂	Q ₁₁₃	Q ₁₁₄	Q ₁₁₅	Q ₁₁₆	Q ₁₁₇	Q ₁₁₈	Q ₁₁₉	Q ₁₂₀	Q ₁₂₁	Q ₁₂₂	Q ₁₂₃	Q ₁₂₄	Q ₁₂₅	Q ₁₂₆	Q ₁₂₇	Q ₁₂₈	Q ₁₂₉	Q ₁₃₀	Q ₁₃₁	Q ₁₃₂	Q ₁₃₃	Q ₁₃₄	Q ₁₃₅	Q ₁₃₆	Q ₁₃₇	Q ₁₃₈	Q ₁₃₉	Q ₁₄₀	Q ₁₄₁	Q ₁₄₂	Q ₁₄₃	Q ₁₄₄	Q ₁₄₅	Q ₁₄₆	Q ₁₄₇	Q ₁₄₈	Q ₁₄₉	Q ₁₅₀	Q ₁₅₁	Q ₁₅₂	Q ₁₅₃	Q ₁₅₄	Q ₁₅₅	Q ₁₅₆	Q ₁₅₇	Q ₁₅₈	Q ₁₅₉	Q ₁₆₀	Q ₁₆₁	Q ₁₆₂	Q ₁₆₃	Q ₁₆₄	Q ₁₆₅	Q ₁₆₆	Q ₁₆₇	Q ₁₆₈	Q ₁₆₉	Q ₁₇₀	Q ₁₇₁	Q ₁₇₂	Q ₁₇₃	Q ₁₇₄	Q ₁₇₅	Q ₁₇₆	Q ₁₇₇	Q ₁₇₈	Q ₁₇₉	Q ₁₈₀	Q ₁₈₁	Q ₁₈₂	Q ₁₈₃	Q ₁₈₄	Q ₁₈₅	Q ₁₈₆	Q ₁₈₇	Q ₁₈₈	Q ₁₈₉	Q ₁₉₀	Q ₁₉₁	Q ₁₉₂	Q ₁₉₃	Q ₁₉₄	Q ₁₉₅	Q ₁₉₆	Q ₁₉₇	Q ₁₉₈	Q ₁₉₉	Q ₂₀₀	Q ₂₀₁	Q ₂₀₂	Q ₂₀₃	Q ₂₀₄	Q ₂₀₅	Q ₂₀₆	Q ₂₀₇	Q ₂₀₈	Q ₂₀₉	Q ₂₁₀	Q ₂₁₁	Q ₂₁₂	Q ₂₁₃	Q ₂₁₄	Q ₂₁₅	Q ₂₁₆	Q ₂₁₇	Q ₂₁₈	Q ₂₁₉	Q ₂₂₀	Q ₂₂₁	Q ₂₂₂	Q ₂₂₃	Q ₂₂₄	Q ₂₂₅	Q ₂₂₆	Q ₂₂₇	Q ₂₂₈	Q ₂₂₉	Q ₂₃₀	Q ₂₃₁	Q ₂₃₂	Q ₂₃₃	Q ₂₃₄	Q ₂₃₅	Q ₂₃₆	Q ₂₃₇	Q ₂₃₈	Q ₂₃₉	Q ₂₄₀	Q ₂₄₁	Q ₂₄₂	Q ₂₄₃	Q ₂₄₄	Q ₂₄₅	Q ₂₄₆	Q ₂₄₇	Q ₂₄₈	Q ₂₄₉	Q ₂₅₀	Q ₂₅₁	Q ₂₅₂	Q ₂₅₃	Q ₂₅₄	Q ₂₅₅	Q ₂₅₆	Q ₂₅₇	Q ₂₅₈	Q ₂₅₉	Q ₂₆₀	Q ₂₆₁	Q ₂₆₂	Q ₂₆₃	Q ₂₆₄	Q ₂₆₅	Q ₂₆₆	Q ₂₆₇	Q ₂₆₈	Q ₂₆₉	Q ₂₇₀	Q ₂₇₁	Q ₂₇₂	Q ₂₇₃	Q ₂₇₄	Q ₂₇₅	Q ₂₇₆	Q ₂₇₇	Q ₂₇₈	Q ₂₇₉	Q ₂₈₀	Q ₂₈₁	Q ₂₈₂	Q ₂₈₃	Q ₂₈₄	Q ₂₈₅	Q ₂₈₆	Q ₂₈₇	Q ₂₈₈	Q ₂₈₉	Q ₂₉₀	Q ₂₉₁	Q ₂₉₂	Q ₂₉₃	Q ₂₉₄	Q ₂₉₅	Q ₂₉₆	Q ₂₉₇	Q
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Investing and Growth



• front view
• alternate view



• SP Ultra

catalogue number	tool size	W	DL	tool	SP	SP	SP	SP
SP100	1	1.6	0.1	10-100	-	-	-	-
SP100	1	1.6	0.1	10-100	-	-	-	-

catalogue number	tool size	W	DL	DL	tool	SP	SP	SP
SP100	1	1.6	0.1	0	1-100	-	-	-
SP100	1	1.6	0.1	0	1-100	-	-	-

catalogue number	tool size	W	DL	DL	tool	SP	SP	SP
SP100	1	1.6	0.1	0	10-100	-	-	-
SP100	1	1.6	0.1	0	10-100	-	-	-


 • Non-chosen
 • Chosen

Classic

catalogue number	feed rate	W	Speed	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
32130	1	1.0	8 - 1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32140	1	1.0	8 - 1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32141	1	1.0	8 - 1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32146	1	1.0	8 - 1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32150	1	1.0	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32144	1	1.0	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32154	1	1.0	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32156	1	1.0	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32155	1	1.0	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(continued)

Brooding and Curvy

(Cont.)



as first person
as second person

[illegible]

Investing and Capital

catalogue number	breed size	W	g/l	band	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436
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NOTE: 20000 and 200000 are 2's and 10's respectively the number of days



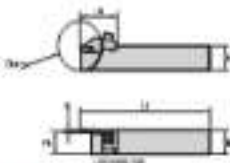
- **Gravitation**
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1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Figure 1

catalog number	board size	W	D	board
20286	2	1,20		H - Board
20289	3	1,20		H - Board
20290	2	1,20	10	L - 1,40
20291	3	1,20	10	L - 1,40
20294	2	1,20	4	E - 1,40
20295	3	1,20	10	E - 1,40
20296	2	1,20	10	E - 1,40
20297	3	1,20	10	E - 1,40
20298	3	1,20	4	E - 1,40
20299	3	1,20	10	E - 1,40
20300	3	1,20	10	E - 1,40
20301	3	1,20	10	E - 1,40
20302	3	1,20	10	E - 1,40
20303	3	1,20	10	E - 1,40
20304	3	1,20	10	E - 1,40
20305	3	1,20	10	E - 1,40
20306	3	1,20	10	E - 1,40
20307	3	1,20	10	E - 1,40
20308	3	1,20	10	E - 1,40
20309	3	1,20	10	E - 1,40
20310	3	1,20	10	E - 1,40
20311	3	1,20	10	E - 1,40
20312	3	1,20	10	E - 1,40
20313	3	1,20	10	E - 1,40
20314	3	1,20	10	E - 1,40
20315	3	1,20	10	E - 1,40
20316	3	1,20	10	E - 1,40
20317	3	1,20	10	E - 1,40
20318	3	1,20	10	E - 1,40
20319	3	1,20	10	E - 1,40
20320	3	1,20	10	E - 1,40
20321	3	1,20	10	E - 1,40
20322	3	1,20	10	E - 1,40
20323	3	1,20	10	E - 1,40
20324	3	1,20	10	E - 1,40
20325	3	1,20	10	E - 1,40
20326	3	1,20	10	E - 1,40
20327	3	1,20	10	E - 1,40
20328	3	1,20	10	E - 1,40
20329	3	1,20	10	E - 1,40
20330	3	1,20	10	E - 1,40
20331	3	1,20	10	E - 1,40
20332	3	1,20	10	E - 1,40
20333	3	1,20	10	E - 1,40
20334	3	1,20	10	E - 1,40
20335	3	1,20	10	E - 1,40
20336	3	1,20	10	E - 1,40
20337	3	1,20	10	E - 1,40
20338	3	1,20	10	E - 1,40
20339	3	1,20	10	E - 1,40
20340	3	1,20	10	E - 1,40
20341	3	1,20	10	E - 1,40
20342	3	1,20	10	E - 1,40
20343	3	1,20	10	E - 1,40
20344	3	1,20	10	E - 1,40
20345	3	1,20	10	E - 1,40
20346	3	1,20	10	E - 1,40
20347	3	1,20	10	E - 1,40
20348	3	1,20	10	E - 1,40
20349	3	1,20	10	E - 1,40
20350	3	1,20	10	E - 1,40
20351	3	1,20	10	E - 1,40
20352	3	1,20	10	E - 1,40
20353	3	1,20	10	E - 1,40
20354	3	1,20	10	E - 1,40
20355	3	1,20	10	E - 1,40
20356	3	1,20	10	E - 1,40
20357	3	1,20	10	E - 1,40
20358	3	1,20	10	E - 1,40
20359	3	1,20	10	E - 1,40
20360	3	1,20	10	E - 1,40
20361	3	1,20	10	E - 1,40
20362	3	1,20	10	E - 1,40
20363	3	1,20	10	E - 1,40
20364	3	1,20	10	E - 1,40
20365	3	1,20	10	E - 1,40
20366	3	1,20	10	E - 1,40
20367	3	1,20	10	E - 1,40
20368	3	1,20	10	E - 1,40
20369	3	1,20	10	E - 1,40
20370	3	1,20	10	E - 1,40
20371	3	1,20	10	E - 1,40
20372	3	1,20	10	E - 1,

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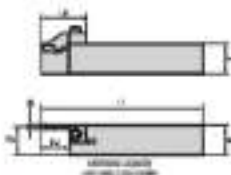


■ Square Shank

Drilling and Capacity

order number	catalogue number	W	D=mm	S	T9	S	L2	L1	range	chip length
right hand										
321490	321490	1.00	10.00	6.00	6.00	6.00	11.00	75.00	00000	MC10
323070	323070	1.00	10.00	7.00	7.00	7.00	11.00	60.00	00000	MC10
323072	323072	1.00	10.00	8.00	8.00	8.00	11.00	50.00	00000	MC10
321500	321500	1.00	10.00	7.00	7.00	7.00	11.00	100.00	00000	MC10
321502	321502	1.00	10.00	7.00	7.00	7.00	11.00	100.00	00000	MC10
323074	323074	1.00	10.00	9.00	9.00	9.00	11.00	110.00	00000	MC10
323076	323076	1.00	10.00	10.00	10.00	10.00	11.00	60.00	00000	MC10
323078	323078	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323079	323079	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323071	323071	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323072	323072	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323073	323073	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323074	323074	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323075	323075	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323076	323076	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323077	323077	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323078	323078	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323079	323079	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323080	323080	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323081	323081	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323082	323082	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323083	323083	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323084	323084	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323085	323085	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323086	323086	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323087	323087	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323088	323088	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323089	323089	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323090	323090	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323091	323091	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323092	323092	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323093	323093	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323094	323094	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323095	323095	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323096	323096	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323097	323097	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323098	323098	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323099	323099	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323100	323100	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323101	323101	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323102	323102	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323103	323103	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323104	323104	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323105	323105	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323106	323106	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323107	323107	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323108	323108	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323109	323109	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323110	323110	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10
323111	323111	1.00	10.00	10.00	10.00	10.00	11.00	100.00	00000	MC10

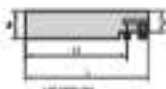
WIDIA: Always includes an applicator with long and deep corner.



✱ Square Shank • Extended Capacity

										
order number	catalogue number	W	L	B	H	R	L2	L1	clamping screw	clamping screw
right hand										
333810	333810	3.00	110.00	16.75	16.00	16.00	41.00	110.00	401000	301000
333812	333812	4.00	110.00	16.00	16.00	16.00	41.00	110.00	401000	301000
left hand										
333814	333814	3.00	110.00	16.75	16.00	16.00	41.00	110.00	401000	301000
333816	333816	4.00	110.00	16.00	16.00	16.00	41.00	110.00	401000	301000

WIDIA: all separator toolholders are supplied with clamping and clamping screw

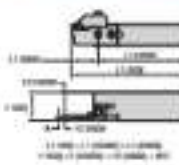
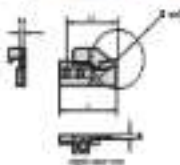


12mm and 20mm Shank Toolholders



order number	catalogue number	W	D	D1	L	L1	D2	D3	supported blade width	clamp width
right hand										
323070	323058	22.25	11.02	11.02	102.77	49.54	10.02	11.02	323087	402420
324054	323059	25.40	11.02	—	102.77	49.54	—	11.02	323087	402420
left hand										
323073	323060	22.25	11.02	11.02	102.77	49.54	10.02	11.02	323087	402420
324074	323061	25.40	11.02	—	102.77	49.54	—	11.02	323087	402420

Dappt Blade Assembly

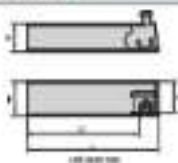


12mm and 20mm Shank Blades



order number	catalogue number	W	D blade	D1	L	L1	clamp
right hand							
323062	323062	11.02	41.28	11.02	49.54	41.28	402418
323063	323063	11.02	41.28	11.02	49.54	41.28	402419
323064	323064	11.02	41.28	11.02	49.54	41.28	402420
left hand							
323065	323065	11.02	41.28	11.02	49.54	41.28	402418
323066	323066	11.02	41.28	11.02	49.54	41.28	402419

WIDIA Clamps do not ship with blades. Blade clamps available.



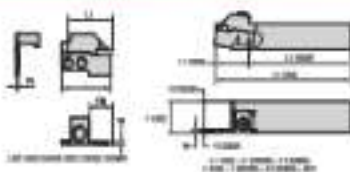
■ 2-flute and 3-flute Shank Toolholders

order number	catalogue number	11	12	13	14	15	support blade code	clamp code	clamp code
right hand									
201010	201010	11.00	11.00	11.00	11.00	11.00	00000	—	00000
201014	201014	11.00	11.00	11.00	11.00	11.00	00001	—	00000
201015	201015	11.00	11.00	11.00	11.00	11.00	00002	00001	—
left hand									
201016	201016	11.00	11.00	11.00	11.00	11.00	00001	—	00000
201017	201017	11.00	11.00	11.00	11.00	11.00	00001	—	00000
201018	201018	11.00	11.00	11.00	11.00	11.00	00002	00001	—



Drawing and Code 11

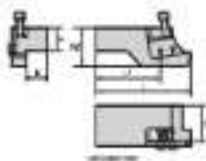
Support Blade Assembly



■ 2-flute and 3-flute Shank Blades

order number	catalogue number	W	CE	TS	L	L1	clamp
right hand							
201010	201010	11.00	11.00	11.00	11.00	11.00	00000
201014	201014	11.00	11.00	11.00	11.00	11.00	00001
201015	201015	11.00	11.00	11.00	11.00	11.00	00002
left hand							
201016	201016	11.00	11.00	11.00	11.00	11.00	00001
201017	201017	11.00	11.00	11.00	11.00	11.00	00001
201018	201018	11.00	11.00	11.00	11.00	11.00	00002

WTS: Check in our shop with dealer (for correct assembly)



left hand tool



right hand tool

Universal Style Toolholder - Minimum Capacity

Mounting and Capacity

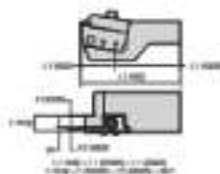
								
outer diameter	rolling pin number	0	10	20	30	40	50	inner diameter
right hand								
354/352	354/352	354.00	354.00	354.00	354.00	354.00	354.00	354.00

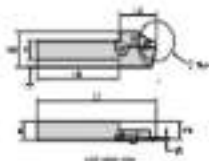
NOTE: Support block requires two screws.
Check holder capacity.

Components

#	L1	L2	left hand clamp for Z0440	left hand clamp for Z0440	support block	right hand clamp for Z0440	right hand clamp for Z0440	right hand clamp for Z0440
1.1	44.00	1.1	42140	42140	42140	42140	42140	42140
1.2	44.00	1.2	42140	42140	42140	42140	42140	42140
1.3	44.00	1.3	42140	42140	42140	42140	42140	42140

NOTE: All components are replaceable.





Lathe tool size

Sub Speeds

																	
Order number	Location number	W	W max	W	W	W	W	W	W	W	W	W	W	Right hand chip control	Clamp	Left hand chip control	Location
Right hand																	
2102100	20000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	W010	W010	W010	W010
Left hand																	
2102100	20000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	W010	W010	W010	W010
2102100	20000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	W010	W010	W010	W010

WIDIA™ Victory™

High-Temp Turning



The new -FS and -MG geometries from WIDIA are specifically designed for use in high temperature alloys, nickel-based (Inconel®, Hastelloy®, Invar®) materials, cobalt-based (Stavax®), Fe-based (Austenitic) materials, titanium and titanium alloys, as well as difficult-to-machine stainless (Austenitic, duplex, high alloy stainless), cobalt-chrome, and stainless-based powdered metals.

-FS FS Geometry

- All -FS FS inserts are periphery ground to provide a 0.5 tolerance. This is a critical feature in some applications, especially in the aerospace industry.
- Precision grinding provides a high quality cutting edge which reduces depth of cut machining and delivers consistent surface quality in finishing applications.
- Its nose protection by utilizing the higher speed capability provided by the latest in PVD-coating technology and optimized post-cut treatment.
- Active tool holder fits through the high-positive rake angle which reduces cutting forces and built-up edge.

-MG MG Geometry

- High positive rake angle delivers improved tool life by reducing cutting forces and built-up edge when machining high temp alloys.
- Improved chip control and reduced crater wear due to proprietary chipbreakers with varying shapes and locations.
- Reduced thermal wear and cracking due to outer strong cutting edge with optimized edge treatment.
- Improved chipbreaking at various depths of cut due to variable land width, which improves impact strength.
- All MG MG inserts are resheathed, which supports increased tool life due to the elimination of grinding process.

Substrates and Guidelines

1. Width of cut (W) – width of the insert.
2. Lead angle – θ° (insert), 45° , 0° , 15° , 30° (SIC or LLD)

Backward lean of cut-off inserts

- Use lead angle (see inserts of Figure 1 and 2). Lead angles on a cut-off insert enhance the force that removes the cut and cut the insert back the good dimensions back into collection and possibly recut them.

Figure 3

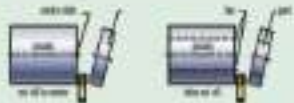
Insert under the half round lead



Left round lead round inserts under slide or bar or part and produce a clean back surface.

Figure 3

Insert under the right hand lead



Right hand lead round inserts under slide or bar or part and produce a clean part surface.

- Check tool height and maintain on center with part diameter.
- The cutting edge height should be within ± 0.1 mm to the center, recommended cutting position is to center above center.

Figure 3

Slide center



- If θ° lead angle is increasing, use the experiment procedure cut off lower and thicker. This will enhance the center slide or cut off the length. Increase the lead angle to maintain a corner or face of the solid where the insert is back with.
- The leading edge (see lead) requires a chamfer on the LLD, edge L2: chamfer lead with cut-off surface. This will enable the chamfering operation to actually separate the part from the bar per Figure 4. Also the edge may drop into the chamfering bar which in this case, will act like a catcher for the part.



Figure 4

Insert cut chamfer the top

Regress surface back of cut-off inserts

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



Figure 5

Regress condition of bar applying coolant

- Blows cut off feed rapidly down. This enables quality to remove chip and avoid cutting the chip back. Active blow of coolant the cut rapidly down it preventing them from wrapping between the feed insert and the groove side walls, which gets the side wall surface.

Improve chip control

- Adjust feed settings or draw in accessories chip formation.
- Use a 1/2" or smaller lead variable.
- Use simple amounts of feed directed control (see Figure 4).
- Maintain sharp cutting edges and corners.

Improve flatness of cut-off surface:

- Maintain tool position perpendicular alignment between cut-off tool and workpiece.
- If or low to moderate speed (chip), use Separator 1/2" or 3/4".
- If or moderate to high speed (chip), use Separator 1/2" or 3/4".
- Use strongest toolholder system possible.
- Use of lead negatively when possible. If lead angle isn't constant, reduce the lead rate.
- Check for minimum runout of holder and shank.
- Set up for minimum workpiece runout (distance out of round).
- Reduce feed rate.
- Maintain sharp edge and corner on cut-off tool.
- Increase speed (20%).
- Use simple amounts of feed directed control (see Figure 4).
- Maintain proper tool center height (C-H) from above center (see Figure 4).

Improve surface finish:

- If or low to moderate speed (chip), use Separator 1/2".
- If or moderate to high speed (chip), use Separator 1/2" or 3/4".
- Avoid overly aggressive chip control.
- Increase speed.
- Reduce feed angle and feed rate.
- Decrease H corner radius to less than 0.001.
- Use a coated grade.
- Use coolant (see Figure 4).

Figure A



Figure B



Avoidance edge chipping

- Check to see if tool is significantly above or below center.
- Reduce feed rate to part diameter.
- Use Separator 1/2" or 3/4".
- Check for proper speed consistent with the insert grade used.
- Cut back on support to use the sharp tool area in needed.
- Increase clearance.
- Avoid chip or rubbing.
- Check for three part workpiece position:
 - Entry face.
 - Undercut in diameter.
 - Backface (D) and/or (D) to cut of round.
 - Surface wheel.
 - Her wall collapse (formed in the cut).
 - Part to diameter.
 - Cut-off through external duct.
 - Excessive tool runout.
 - Feed or partly selected back stop.

(continued)

General

General chapter:

- Minimize tool chatter and holder vibration
- Minimize part vibration
- Use designed toolholder system
- Check secure clamping details of tool
- Chipload may be too aggressive (See Technical Chapter 1)
- Adjust speed and feed rate up or down
- Check workpiece rigidity
- Mill a longer part, support with steady rest or live center
- Avoid excessive load
- Use 1° or 3° to reduce loading forces

Reduce cut-off rate on work bar or I.D. bar on turning

- Check tool height. Insert cutting edge should be as close to center as possible above centerline of workpiece
- On outside lathe part, use a tool with angle-type insert. Lead angle on a cut-off insert reduces the rate, which remains on the workpiece. (See Figure 1) As higher the lead, the more the rate reduction
- Use the maximum possible cut-off height to maximize the cut-off tool height
- Reduce lead angle of the part of a cut
- On most lathe type parts, a 4° or 1° lead angle will be sufficient
- Add support to a long slender bar part
- Minimize proper tool holder alignment
- If up or lat position, add mechanical support above contacting force zone
- Check setup of the entire tool

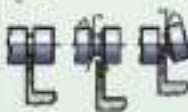
Eliminate built-up edge

- Select proper grade for tool
- Increase speed (RPM)
- Increase the feed rate
- Use single instead of double-fluted coolant (see Figure 1 on page 110)

Chamber and cut-off operations:

- Use Separide 1° or 3°
- Groove or chamfer on workpiece surface facing machine
- Maximize the clearance
- For job requiring a chamfer on both ends of the part, begin by planning in a depth just beyond the depth of the chamber. Then, when in the part (1.0) spot grind each chamber individually. Finish the cut-off after completion of the second chamfer
- Cut off the workpiece (see Figure 1)

Figure 1



Modifications for Increased Depth of Cut



Figure 1
Standard tool capacity shown

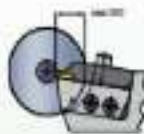


Figure 2
Target tool diameter shown

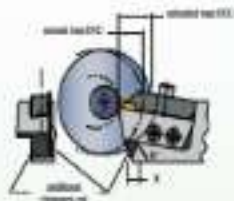


Figure 3
Modified toolholder with target tool diameter shown

Capacity Chart for 50,000mm Diameter Tool Capacity Testing

Tool diameter	63,00	76,20	88,90	101,60	114,30	127,00	152,40	NOTE
max DDC	25,00	30,00	33,75	34,20	35,30	33,04	31,30	with no modification on toolholder
	20,40	20,00	18,04	16,66	15,30	13,54	10,00	with no modification on toolholder X : 45,0mm A : 127,0mm

Capacity Chart for 76,20mm Diameter Tool Capacity Testing

Tool diameter	63,00	76,20	88,90	101,60	114,30	NOTE
max DDC	30,45	35,40	37,30	36,00	37,30	with no modification on toolholder
	26,10	24,00	22,07	21,70	19,00	with no modification on toolholder X : 45,0mm A : 127,0mm



Turning • Threading

Threading Application Guide	F2-F3
Top Thread	F4-F37
Lead-in Threading	F38-F79
Technical Information	F79-F131

TopThread External Threading



System/Work Toolholder Sizes
 • Minorsize — 10.5/12mm

Cooling Fluid Pressure
 10/12 MPa (150/175 psi)

SP Threading Toolbit — End Type
 SP1 and SP2
 10/12 A, L, T1
 10/12 10/12mm pitch

TopThread Internal Threading



System/Work Toolholder
 • Minorsize — 10.5/12mm
 • Minorsize bore — 10.5/12mm
 • End

Cooling Fluid Pressure
 10/12 MPa (150/175 psi)

SP Threading Toolbit — End Type
 SP1, SP2, and SP3
 10/12 A, L, T1
 10/12 10/12mm pitch

**Laydown
External Threading**

Super Shank Toolholder Size
 H-Max = 6.35mm

Coating (Full Profile)
 05-45-4-75
 02-5-12-10mm-plate

60° Taper Chiller
 05-45-4-75
 02-5-12-10mm-plate

**Laydown
Internal Threading**

Super Shank Toolholder Size
 H-Max = 6.35mm
 H-Minimum Size = 3.175mm
 H-Maximum Size = 6.35mm

Coating (Full Profile)
 05-45-4-75
 02-5-12-10mm-plate

60° Taper Chiller
 05-45-4-75
 02-5-12-10mm-plate

22° Taper Chiller
 05-45-4-75
 02-5-12-10mm-plate

TopThread



High bore and high edge line load concentrated to a small nose radius, combined with high feed rates, places high demands on carbide threading inserts. The WIDIA TopThread system is the best solution for these problems.

The WIDIA TopThread system is the superior choice for high-demand applications like machining Aero, Railroad, and API threads.

TopThread Insert Technology

TopThread insert technology brings superior chip control to your threading operations. Unlike competitors' designs, the WIDIAround chip grows, when used according to our recommendations, with control the chip is used applications, bringing you better tool life and lower cutting pressures.

- Reduced tool wear and better workpiece finish.
- Superior chip control reduces the danger to operators.
- Increased productivity in all of your threading operations.
- Excellent choice for special thread forms and toolholder designs.

TopThread™ inserts are available in TNG100™ and TNG105™ grades to withstand the 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: Inserts are designed to have a 10° rake angle and a 10° flank angle.

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.

- High design for increased insert stability during threading applications.
- Good quality threads, improved tool life, and improved surface finishes.
- Turning forces in three directions for superior resistance to tangential force.
- Unique 3° insert relief angle for back clearance.
- Available in partial profile inserts for 50° thread forms.

Step 1 • Select Threading Method and Kind of Tooling

Required Information:

- External/Internal operation
- Type of chip formation of thread
- Feed direction



Feed direction toward the thread • (WIDIA® BT322)



external left-hand thread



external right-hand thread



internal left-hand thread



internal right-hand thread

Feed direction away from the thread



external left-hand thread



external right-hand thread



internal left-hand thread



internal right-hand thread

Step 2 • Select Holder from Catalogue Page

The thread size must match the page number in our toolholder selection.

Required Information:

- External/Internal operation
- Minimum hole diameter for internal operation
- Threaded tool
- Thread size (page 104)

catalogue number	min. hole
WID-1220	6.35
WID-1230	9.53

NOTE: TopThread toolholders and boring bar tool holders with a tapered shank are also available. They are compatible with both grinding and threading function on the same tool.

Select the appropriate holder for the insert size and thread.



NOTE: Select your threading guide (using the proper thread method and the recommended wheel value).

See the Technical section on page 179 of 26 catalogue for internal threading, minimum hole limits depending on thread type, design and the results.

Step 3 • Choose Insert for Application

- See threading insert overview on page 14.
- Select threading inserts to take particular thread form including standard inserts. Threading inserts eliminate the need for drawing.
- High-speed, positive profile inserts can cut a variety of thread profiles.
- Also, insert size for toolholder selection.



Insert Size	Available Handed	TM200	TM200H
1	60-120	*	*
2	60-200	*	*
3	60-400	*	*

Step 4 • Select Grade and Speed

Recommendations for Grade and Speed Selection – insert

workpiece material	steel	stainless steel	cast iron	non-ferrous metals	high temp alloys
Insert type	chip coolant or coolant 	chip coolant or coolant 	chip coolant 	coolant 	coolant 
optimum cutting conditions	TM200 60-120	TM200H 60-400	TM200 60-180	—	TM200H 60-300
feed rates	TM200 1.0-4.0	TM200 1.0-4.0	TM200 1.0-2.0	TM200 0.5-1.0	TM200 0.5-2.0

Example

Chip Coolant: 010 or 011 (chip coolant type)
 Material: A1, A2-C, B1, B2, A3, A4
 Feedrate: A1, A2, A3, A4

Tap Thread Threading Example

application: 4 1/4" brass threaded
right-hand thread
 material: alloy steel
 workpiece diameter: 1 1/4" (free
ground, cutting from brass
and turning the chuck)

Recommendations:
 insert: WLA 2
 grade: TM200
 insert size: 1
 cutting bar: A100-10
 pipe insert: 12.0
 speed: 100 rev/min
 thread profile*: 11.0 mm



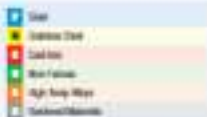
*Insert recommendations provided in technical data section on pages 140-144.

Fig. number - 5	Type		Steel grade	Standard	Welded steel	Welding	Application	Weight
	front	profile						
10-4			Hydramax 10"	-	-	10	Control steel for 10" steel forms, such as 10" and 12" where non-welding steels are desired to cut a variety of shapes.	103-410
10-12			Hydramax 10" - 12" (10-12)	-	-	10	Control steel for 10" steel forms, such as 10" and 12" where non-welding steels are desired to cut a variety of shapes.	110
			Hydramax 10" - 10-12 (10-12)	-	-	10	For 10" and 12" steel forms, such as 10" and 12" where non-welding steels are desired to cut a variety of shapes - with a steel plate in between.	116
			Hydramax 10"	1010 S 1.1.1.1	1010	Y	Water pipe steel based 10" in form for all steels.	117
			1010	1010/1010	1010	10	Controlled carbon steels are selected for welding and pressure resistance.	118
			1010 - 1010/1010	1010/1010	1010	10	Controlled carbon steels are selected for welding and pressure resistance - with a steel plate in between.	118
10-14			1010	1010/1010 S 1.1.1.1	1010/1010	10	Water pipe steel based 10" in form for all steels.	118
10-14-10			1010 - 1010/1010	1010/1010 S 1.1.1.1	1010/1010	Y	High conductivity steel with flowing resistance for 10" steels.	119
10-16			Hydramax 10-16 (10-16)	1010/1010 S 1.1.1.1	1010/1010	Y	Water pipe steel based 10" in form for all steels.	119
10-18			1010/1010	1010/1010	1010/1010	Y	Water pipe steel based 10" in form for all steels.	120
10-20			1010	1010/1010	1010/1010	10	Water pipe steel based 10" in form for all steels.	121
10-22			1010	1010/1010	1010/1010	10	Water pipe steel based 10" in form for all steels.	122
10-24			Hydramax 10-24 (10-24)	1010/1010	1010/1010	10	Water pipe steel based 10" in form for all steels.	123



Coatings provide high-speed capability and are engineered for finishing to tight tolerances.

- Faster cycle times – high-speed capability
- Longer tool life – non-multiple coating provides better wear resistance



	Coating	Coating Description	Wear Resistance										Throughput									
			10	15	20	25	30	35	40	45	50	55	10	15	20	25	30	35	40	45	50	55
Single		As advanced PVD TiAlN coating has a very optimum balanced analytical coating structure. (TiAlN) is also the best for general machining of most products, especially at higher speeds. Perfect for machining most steels, stainless steels, and brass, and various materials and heat alloys under stable conditions. It also performs well in machining hardened and heat-treating materials.																				
	NC 700																					
		As advanced PVD TiAlN coating grade with a rough, ultra-fine grain structure. For general purpose machining of most steels, stainless steels, high-temp alloys, titanium, brass, and various materials. Speed may vary from low to medium and will require intermediate and high feed rates.																				
Dual		Designed for light and medium machining, for cast iron, alloy steels, and stainless steels. The outside of typically finished materials at low cutting speeds.																				
	DM 400																					
																						

- All Top Thread inserts are precision-ground to provide accurate edge location and accurate loading of the insert in the subholder pocket.

- Top Thread inserts can be used in either subholders or turning bars.

- All wear-resistant Top Thread inserts can be used for either external or internal applications. All coating-type inserts are designed specifically for external internal use.

- High-Speed Top Thread and Subholders use right-hand inserts. Low-Speed Top Thread Subholders use left-hand inserts.

- Dual-Speed Top Thread turning bars use left-hand inserts. Left-hand Top Thread turning bars use right-hand inserts.

- See the paper for outside guide selection and mechanical interferences.



Cutting Speed – m/min										
		SAE52100			SAE52100			718		
		min	Start	max	min	Start	max	min	Start	max
Blue	1	100	120	150	100	140	150	50	50	100
	2	110	140	170	110	160	170	70	100	150
	3	110	140	170	110	160	170	70	100	150
	4	70	100	120	70	90	110	50	80	100
	5	100	140	170	100	120	140	70	80	100
Yellow	6	40	50	70	40	50	60	20	40	60
	7	50	70	100	40	70	90	30	70	90
	8	20	70	90	40	50	70	20	80	70
Red	9	40	50	70	40	50	60	30	30	30
	1	100	120	150	40	50	60	70	90	100
	2	110	140	170	40	70	90	30	30	60
	3	110	140	170	40	70	90	30	70	90
Green	1	100	120	150	100	120	150	100	120	150
	2	120	160	180	120	160	180	100	120	150
	3	120	160	180	120	160	180	100	120	150
	4	120	160	180	120	160	180	100	120	150
	5	70	90	110	70	90	110	120	120	120
	6	110	120	130	110	120	130	120	120	120
	7	100	120	150	100	120	150	100	120	150
Orange	1	20	30	30	30	30	30	20	20	30
	2	20	30	30	30	30	30	20	20	30
	3	20	30	30	30	30	30	20	20	30
	4	20	30	30	30	30	30	20	20	30
Grey	1	10	20	20	—	—	—	—	—	—
	2	10	20	20	—	—	—	—	—	—
	3	10	20	20	—	—	—	—	—	—
	4	10	20	20	—	—	—	—	—	—

The best solution for demanding threading applications



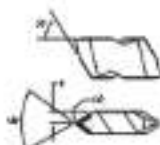
**EXTREME CHALLENGES.
EXTREME RESULTS.**

The **WIDIA™ TopThread** system is the best solution for demanding threading applications. With unmatched tooling technology, you can trust **WIDIA TopThread** tools to solve your threading and grinding needs.

- Large selection of insert geometries and grades.
- High insert clamping design ensures the best tool life, surface finish, and workpiece quality.
- Frequent, accurate, high-quality threads. Excellent for internal threading operations.

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

WIDIA 


WNT-K


cutting direction

 * feed direction
 = cutting direction

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24

catalogue number	ISO	ISO	insert size	external thread pitch (mm)	internal thread pitch (mm)	external ISO	internal ISO	ISO 1418	ISO 1419
right hand									
WTK10	0.10	1.00	0	1.00/0.50	1.00/0.50	0.10	1.00	WTK10	WTK10
WTK20	0.10	1.00	0	1.00/0.50	1.00/0.50	0.10	1.00	WTK20	WTK20
WTK30	0.10	1.00	0	1.00/0.50	1.00/0.50	0.10	1.00	WTK30	WTK30
left hand									
WTK10	0.10	1.00	0	1.00/0.50	1.00/0.50	0.10	1.00	WTK10	WTK10
WTK20	0.10	1.00	0	1.00/0.50	1.00/0.50	0.10	1.00	WTK20	WTK20


WNT-L


cutting direction

catalogue number	ISO	ISO	insert size	external thread pitch (mm)	internal thread pitch (mm)	external ISO	internal ISO	ISO 1418	ISO 1419
left hand									
WTL	0.10	1.00	0	—	1.00/0.50	—	0.10	WTL	WTL

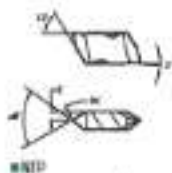


W: Insert width
L: Insert length



WIDIA

catalogue number	ISO	Z	insert size	external thread pitch size	internal thread pitch size	external ISO	internal ISO	ISO 13637	ISO 13637	ISO 13637	ISO 13637
right hand											
W120	0.40	1.60	0	1.75/1.00	1.75/1.00	0.40	1.60	W120	W120	W120	W120
W125	0.47	1.60	0	1.75/1.00	1.75/1.00	0.40	1.60	W125	W125	W125	W125
W150	0.47	3.00	0	1.75/1.00	1.75/1.00	0.40	1.60	W150	W150	W150	W150
left hand											
W120	0.40	1.60	0	1.75/1.00	1.75/1.00	0.40	1.60	W120	W120	W120	W120
W125	0.47	1.60	0	1.75/1.00	1.75/1.00	0.40	1.60	W125	W125	W125	W125
W150	0.47	3.00	0	1.75/1.00	1.75/1.00	0.40	1.60	W150	W150	W150	W150


 * Not shown
in this view


catalogue number	DC	D	tool size	external thread pitch/mm	internal thread pitch/mm	external TPI	internal TPI	length mm	length inch
right hand									
WNTD	0.33	1.61	3	1.25/0.50	1.25/0.50	8/32	7/32	100	3.94
WNTD	0.37	1.88	3	1.25/0.50	1.25/0.50	8/32	7/32	125	4.92
WNTD	0.37	2.04	3	1.25/0.50	1.25/0.50	8/32	7/32	150	5.91
left hand									
WNTD	0.33	1.61	3	1.25/0.50	1.25/0.50	8/32	7/32	100	3.94
WNTD	0.37	1.88	3	1.25/0.50	1.25/0.50	8/32	7/32	125	4.92



catalogue number	DC	D	tool size	external thread pitch/mm	internal thread pitch/mm	external TPI	internal TPI	length mm	length inch
right hand									
WNT-CK	0.37	1.61	3	1.25/0.50	1.25/0.50	8/32	7/32	100	3.94

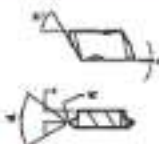


4 Ball design
1 alternative design



NOTE

catalogue number	ISO	2	Insert size	external thread pitch & size	internal thread pitch & size	external TPI	internal TPI	ISO 529	ISO 529
right hand									
HT20	1.58	1.58	0	0.60 x 0.5	0.60 x 0.5	24 TPI	24 TPI	1.58 x 1.58	1.58 x 1.58
HT20	1.58	1.58	0	0.60 x 0.5	0.60 x 0.5	24 TPI	24 TPI	1.58 x 1.58	1.58 x 1.58
left hand									
HTL	1.58	1.58	0	0.60 x 0.5	0.60 x 0.5	24 TPI	24 TPI	1.58 x 1.58	1.58 x 1.58



NOTE

catalogue number	ISO	2	Insert size	external thread pitch & size	internal thread pitch & size	external TPI	internal TPI	ISO 529	ISO 529
right hand									
HT20	1.58	1.58	0	0.60 x 0.5	0.60 x 0.5	24 TPI	24 TPI	1.58 x 1.58	1.58 x 1.58
HT20	1.58	1.58	0	0.60 x 0.5	0.60 x 0.5	24 TPI	24 TPI	1.58 x 1.58	1.58 x 1.58
left hand									
HTL	1.58	1.58	0	0.60 x 0.5	0.60 x 0.5	24 TPI	24 TPI	1.58 x 1.58	1.58 x 1.58

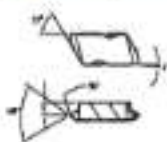


4 luminaire
1000mm x 1000mm



■ NLJ

catalogue number	100	2	beam size	external thread ø100 mm	internal thread ø100 mm	external 100	internal 100	height 1000mm	width 1000mm
light beam									
NLJ000000	2,20	0,40	0	-	-	0	-	1000	1000



■ NLK

catalogue number	100	2	beam size	external thread ø100 mm	internal thread ø100 mm	external 100	internal 100	height 1000mm	width 1000mm
light beam									
NLK000000	2,20	0,40	0	-	-	0	-	1000	1000



■ NDC V

catalogue number	100	2	beam size	external thread ø100 mm	internal thread ø100 mm	external 100	internal 100	height 1000mm	width 1000mm
light beam									
NDCV0000	0,40	0,40	0	0	0	0	0	1000	1000

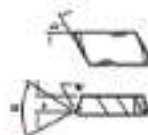


Widia color
different grades



WREC-Y-M

catalogue number	10	2	Insert size	100	150	Widia color	Topthrust
WREC-Y-M	0.10	0.20	0	100	150	WREC-Y-M	Topthrust
WREC-Y-M	0.10	0.20	0	0	150	WREC-Y-M	Topthrust



WRC-E

catalogue number	10	2	Insert size	100	150	Widia color	Topthrust
WRC-E	0.10	0.20	0	100	150	WRC-E	Topthrust
WRC-E	0.10	0.20	0	100	150	WRC-E	Topthrust



4 Face angles
1 diamond insert



WIDIA-400

catalogue number	50	5	insert size	100	150
right hand					
WIDIA-400-100	0,05	0,05	0	0	0,05
left hand					
WIDIA-400-100	0,05	0,05	0	0	0,05
WIDIA-400-100	0,05	0,05	0	0	0,05



4 face chamfers
1 chamfered corner



WAS

catalogue number	ISO	ISO	brand name	ISO	ISO
right hand					
WAS20	1.21	1.21	0	0	0
left hand					
WAS20-L	1.21	1.21	0	0	0
WAS20	1.21	1.21	0	0	0
WAS20	1.21	1.21	0	0	0



WTS-B

catalogue number	ISO	ISO	brand name	ISO	ISO
left hand					
WTS-B	1.21	1.21	0	0-10	0

—continued

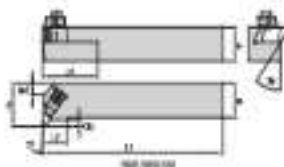
													  					
radio	model	freq	1	2	3	4	5	6	7	8	9	0	key	type	freq	type	freq	type
000000																		
300000	W0-000	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000	-	000	
300001	W0-0001	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000001	-	000	
300002	W0-0002	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000002	-	000	
300003	W0-0003	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000003	-	000	
300004	W0-0004	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000004	-	000	
300005	W0-0005	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000005	-	000	
300006	W0-0006	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000006	-	000	
300007	W0-0007	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000007	-	000	
300008	W0-0008	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000008	-	000	
300009	W0-0009	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000009	-	000	
300010	W0-0010	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000010	-	000	
300011	W0-0011	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000011	-	000	
300012	W0-0012	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000012	-	000	
300013	W0-0013	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000013	-	000	
300014	W0-0014	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000014	-	000	
300015	W0-0015	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000015	-	000	
300016	W0-0016	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000016	-	000	
300017	W0-0017	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000017	-	000	
300018	W0-0018	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000018	-	000	
300019	W0-0019	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000019	-	000	
300020	W0-0020	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000020	-	000	
300021	W0-0021	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000021	-	000	
300022	W0-0022	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000022	-	000	
300023	W0-0023	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000023	-	000	
300024	W0-0024	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000024	-	000	
300025	W0-0025	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000025	-	000	
300026	W0-0026	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000026	-	000	
300027	W0-0027	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000027	-	000	
300028	W0-0028	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000028	-	000	
300029	W0-0029	0	0	0	0	0	0	0	0	0	0	0	0.0	CMPL	000029	-	000	

NOTE: 1. American researchers are charged with finding

1



1995-1996



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●

																		
order number	catalogue number	size	2	3	4	5	6	7	8	9	10	grey steel	chrome	chrome mirror	chrome mirror	best Value Price		
right hand																		
304004	602000002	0	0	0	0	0	0	0	0	0	0	N/A	CHROME	6020000	—	1.0		
304002	602000003	0	0	0	0	0	0	0	0	0	0	N/A	CHROME	6020000	—	1.0		
304000	602000000	0	0	0	0	0	0	0	0	0	0	N/A	CHROME	6020000	—	1.0		
303004	601000002	0	0	0	0	0	0	0	0	0	0	N/A	CHROME P	—	602011	0.9		
303000	601000000	0	0	0	0	0	0	0	0	0	0	N/A	CHROME P	—	602011	0.9		
304002	601000004	4	0	0	0	0	0	0	0	0	0	N/A	CHROME P	—	602011	0.9		
304000	601000004	4	0	0	0	0	0	0	0	0	0	N/A	CHROME P	—	602011	0.9		
304002	601000005	4	0	0	0	0	0	0	0	0	0	N/A	CHROME P	—	602011	0.9		
304000	601000005	4	0	0	0	0	0	0	0	0	0	N/A	CHROME	6020000	—	0.9		
left hand																		
304004	601000002	0	0	0	0	0	0	0	0	0	0	N/A	CHROME	6020000	—	1.0		
304002	601000003	0	0	0	0	0	0	0	0	0	0	N/A	CHROME	6020000	—	1.0		
304000	601000000	0	0	0	0	0	0	0	0	0	0	N/A	CHROME	6020000	—	1.0		
303004	601000002	0	0	0	0	0	0	0	0	0	0	N/A	CHROME P	—	602011	0.9		
304000	601000000	0	0	0	0	0	0	0	0	0	0	N/A	CHROME P	—	602011	0.9		
304002	601000004	4	0	0	0	0	0	0	0	0	0	N/A	CHROME P	—	602011	0.9		
304000	601000004	4	0	0	0	0	0	0	0	0	0	N/A	CHROME P	—	602011	0.9		
304002	601000005	4	0	0	0	0	0	0	0	0	0	N/A	CHROME P	—	602011	0.9		
304000	601000005	4	0	0	0	0	0	0	0	0	0	N/A	CHROME	6020000	—	0.9		

NOTE: Figures are rounded to the nearest whole number.

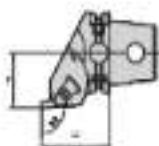
1



NE 52°



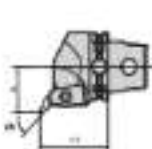
												
		1.6		2"		3 mm						
order number	catalogue number	mm	in	mm	in	mm	in	steel insert	clamping	clamping screw	kg	Qty.
right hand												
280200	KHM1108010	40	1.575	27	1.063	28	1.102	WJL	28x12	M14x60	0.20	10
280202	KHM1108012	40	1.575	33	1.300	34	1.340	WJL	28x12	M14x60	0.20	10
280207	KHM1108016	40	1.575	33	1.300	34	1.340	WJL	28x12	M14x60	0.20	10
left hand												
280210	KHM1108013	40	1.575	27	1.063	28	1.102	WJL	28x12	M14x60	0.20	10
280209	KHM1108013	40	1.575	33	1.300	34	1.340	WJL	28x12	M14x60	0.20	10
280204	KHM1108014	40	1.575	33	1.300	34	1.340	WJL	28x12	M14x60	0.20	10



W 125 517



order number	catalogue number	L1		L2		D mm		chip break	length	flank wear	kg	box
right hand		mm	°	mm	°	mm	°					
300103	KM40T10M102	40	1.25	17	1.00	10.00	0.00	0.00	100.00	0.00	0.00	10
300104	KM40T10M103	40	1.25	17	1.00	10.00	0.00	0.00	100.00	0.00	0.00	10
300105	KM40T10M104	40	1.25	17	1.00	10.00	0.00	0.00	100.00	0.00	0.00	10
left hand												
300106	KM40T10M102	40	1.25	17	1.00	10.00	0.00	0.00	100.00	0.00	0.00	10
300107	KM40T10M103	40	1.25	17	1.00	10.00	0.00	0.00	100.00	0.00	0.00	10
300108	KM40T10M104	40	1.25	17	1.00	10.00	0.00	0.00	100.00	0.00	0.00	10



W 125 427



order number	catalogue number	L1		L2		D mm		chip break	length	flank wear	kg	box
right hand		mm	°	mm	°	mm	°					
300201	KM40T10M102	40	1.25	17	1.00	10.00	0.00	0.00	100.00	0.00	0.00	10
left hand												
300202	KM40T10M102	40	1.25	17	1.00	10.00	0.00	0.00	100.00	0.00	0.00	10

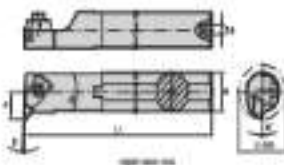
TopThread
Boring Bar Identification System



A	25	R	N	N	T	O	R	2																
Bar Type	Bar Diameter	Bar Length	Insert Holding Method	Insert Shape	Insert Location	Ratio Angle 0 - 30°	Feed of Tool	Feed Size																
Bar with coolant			Insert location		End insert		Right-hand	 <table><tr><th>Feed size</th><th>Feed size</th></tr><tr><td>0.2</td><td>0.25</td></tr><tr><td>0.3</td><td>0.35</td></tr><tr><td>0.4</td><td>0.45</td></tr><tr><td>0.5</td><td>0.55</td></tr><tr><td>0.6</td><td>0.65</td></tr><tr><td>0.7</td><td>0.75</td></tr><tr><td>0.8</td><td>0.85</td></tr></table>	Feed size	Feed size	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85
Feed size	Feed size																							
0.2	0.25																							
0.3	0.35																							
0.4	0.45																							
0.5	0.55																							
0.6	0.65																							
0.7	0.75																							
0.8	0.85																							
Bar with coolant			Through coolant only		Side insert		Left-hand																	
Bar																								
Bar																								



cross-section A-B
top view (turning bar)
side view (turning bar)



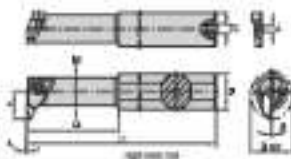
W.A. NW1

order number	catalogue number	lead mm	D	D max	L	R	CC	gross weight	clamping	clamping screw	clamping screw	lead Taper/Flute
right hand												
304502	6100001002	3	30	30.2	300	11	16.17 MPa	16.0	100%	M10x100	—	12 mm
304505	6100001005	5	30	30.2	300	15	16.17 MPa	16.0	100%	M10x100	—	12 mm
304507	6100001007	7	30	30.2	300	17	16.17 MPa	16.0	100%	M10x100	—	12 mm
304512	6100001012	12	30	30.2	300	17	16.17 MPa	16.2	100%	—	M12x110	12.0°
304515	6100001015	15	30	30.2	300	20	16.17 MPa	16.2	100%	—	M12x110	12.0°
304522	6100001022	22	30	30.2	300	27	16.17 MPa	16.2	100%	—	M12x110	12.0°
304525	6100001025	25	30	30.2	300	27	16.17 MPa	16.4	100%	—	M12x110	12.0°
304530	6100001030	30	30	30.2	300	30	16.17 MPa	16.6	100%	—	M12x110	12.0°
304534	6100001034	34	30	30.2	300	34	16.17 MPa	16.8	100%	M10x100	—	12 mm
left hand												
304504	6100001004	4	30	30.2	300	11	16.17 MPa	16.0	100%	M10x100	—	12 mm
304507	6100001007	7	30	30.2	300	15	16.17 MPa	16.0	100%	M10x100	—	12 mm
304510	6100001010	10	30	30.2	300	17	16.17 MPa	16.0	100%	M10x100	—	12 mm
304515	6100001015	15	30	30.2	300	17	16.17 MPa	16.20	100%	—	M12x110	12.0°
304520	6100001020	20	30	30.2	300	22	16.17 MPa	16.20	100%	—	M12x110	12.0°
304525	6100001025	25	30	30.2	300	27	16.17 MPa	16.20	100%	—	M12x110	12.0°
304530	6100001030	30	30	30.2	300	27	16.17 MPa	16.40	100%	—	M12x110	12.0°
304535	6100001035	35	30	30.2	300	30	16.17 MPa	16.40	100%	—	M12x110	12.0°
304540	6100001040	40	30	30.2	300	34	16.17 MPa	16.60	100%	M10x100	—	12 mm

NOTE: 1. Dimensions measured from clamping end of bar.



cross section
cross section
cross section
cross section

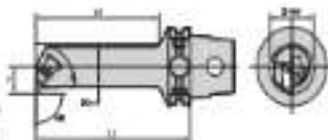


WIDIA

Topflaser

order number	catalogue number	type	D	D max	l1	l2	l3	A	CS	graph	shape	shape	shape
right hand													
20 000	WIDIA 1000	1	10	11.5	12.7	100	11	1	10	100	100	100	100
20 000	WIDIA 1000	1	10	11.5	12.7	100	11	1	10	100	100	100	100

WIDIA 1000 is a standard measurement (see page 10 of book)



• $\text{H}_2\text{O} = 18^\circ$ • $\text{CO}_2 = 44^\circ$

order number	subgroup number	20				21				22				23				page		
		min	50	max	50	min	50	max	50	min	50	max	50	min	50	max	50	count	avg	std
light band																				
300040	04007000000000	10	800	80	20	10	800	80	20	1000	10	1000	10	1000	10	1000	10	1000	9.97	10
300040	04007000000000	8	100	10	20	10	800	80	1000	10	1000	10	1000	10	1000	10	1000	9.98	10	
300040	04007000000000	8	700	10	40	10	100	10	1000	10	1000	10	1000	10	1000	10	1000	9.97	10	
300040	04007000000000	10	100	10	100	10	1000	10	1000	10	1000	10	1000	10	1000	10	1000	9.98	10	
300040	04007000000000	10	100	10	100	10	1000	10	1000	10	1000	10	1000	10	1000	10	1000	9.97	10	
300040	04007000000000	10	100	10	100	10	1000	10	1000	10	1000	10	1000	10	1000	10	1000	9.97	10	
300040	04007000000000	10	100	10	100	10	1000	10	1000	10	1000	10	1000	10	1000	10	1000	9.97	10	
300040	04007000000000	10	100	10	100	10	1000	10	1000	10	1000	10	1000	10	1000	10	1000	9.97	10	
300040	04007000000000	10	100	10	100	10	1000	10	1000	10	1000	10	1000	10	1000	10	1000	9.97	10	
300040	04007000000000	10	100	10	100	10	1000	10	1000	10	1000	10	1000	10	1000	10	1000	9.97	10	
300040	04007000000000	10	100	10	100	10	1000	10	1000	10	1000	10	1000	10	1000	10	1000	9.97	10	
dark band																				
300040	04007000000000	10	100	10	20	10	800	80	1000	10	1000	10	1000	10	1000	10	1000	9.97	10	
300040	04007000000000	8	100	10	20	10	800	80	1000	10	1000	10	1000	10	1000	10	1000	9.98	10	
300040	04007000000000	10	700	10	40	10	100	10	1000	10	1000	10	1000	10	1000	10	1000	9.97	10	
300040	04007000000000	10	100	10	100	10	1000	10	1000	10	1000	10	1000	10	1000	10	1000	9.98	10	
300040	04007000000000	10	100	10	100	10	1000	10	1000	10	1000	10	1000	10	1000	10	1000	9.97	10	
300040	04007000000000	10	100	10	100	10	1000	10	1000	10	1000	10	1000	10	1000	10	1000	9.97	10	
300040	04007000000000	10	100	10	100	10	1000	10	1000	10	1000	10	1000	10	1000	10	1000	9.97	10	
300040	04007000000000	10	100	10	100	10	1000	10	1000	10	1000	10	1000	10						

Continued

35. 37° x 36° – continued

Spare Parts



with gas nozzle	class	length mm
right hand		
W407 11-12-40.00	C400	400-400
W407 11-12-40.00	C400	400-400
W407 11-12-40.00	C400	400-400
W407 11-12-40.00	C400	400-400
W407 11-12-40.00	C400	400-400
W407 11-12-40.00	C400	400-400
W407 11-12-40.00	C400	400-400
W407 11-12-40.00	C400	400-400
left hand		
W407 11-12-40.10	C400	400-400
W407 11-12-40.10	C400	400-400
W407 11-12-40.10	C400	400-400
W407 11-12-40.10	C400	400-400
W407 11-12-40.10	C400	400-400
W407 11-12-40.10	C400	400-400
W407 11-12-40.10	C400	400-400
W407 11-12-40.10	C400	400-400

The WED® high-performance carbide grade is coated with an ultra-thin TiAlN bonding design, with the outstanding surface optimisation technology.

With the large turning of WED-coated products that of extremely stable and productive equipment, optimal turning tool feed levels makes possible most your major application needs.

The large turning of high-speed steel tools allows maximum flexibility in choosing surface design, especially in materials or all ball applications.

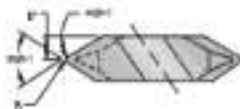
Common operation of material form on various tool. The constant part tool WED represents for maintenance, in achieving your special turning needs.

Features and benefits

- Coated can rapidly and efficiently using various of the tool life design software and electronic database system.
- Our Complete Custom Solution Design Team is now able to use of the industry's largest electronic database. They can solve your most challenging design problems.
- When necessary to install, internal design is available to facilitate your engineering development.
- A large number of high-performance carbide grade also available to optimize your productivity. The right of product design and tooling can provide carbide grade, allow you to optimize tool life performance.

style C2

12.1 mm



To download drawing

style C2

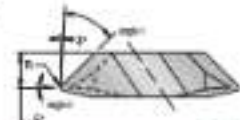
12.1 mm



To download drawing

style C4
(N15.4)

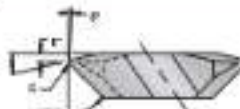
12.1 mm



To download drawing

style C5
(N15.5)

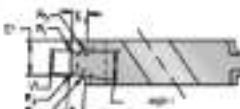
12.1 mm



To download drawing

style C6

12.1 mm



To download drawing

WED® high-speed steel alloy with hard inserts are also available.

TopThread and TopGroove
Toolholders and Turning Bars


Insert class and style	Class	Class 10/15	Class 20	Class 30
W8-0		W8-00	W8-00	—
W8-01		W8-00	W8-00	—
W8-02		W8-00	W8-00	—
W8-03		W8-10	W8-10	—
W8-04		W8-10	W8-10	—
W8-05		W8-10	W8-10	—
W8-06		W8-10	W8-10	—
W8-07		W8-10	W8-10	—
W8-08		W8-10	W8-10	—
W8-09		W8-10	W8-10	—
W8-10		W8-10	W8-10	—
W8-11		W8-10	W8-10	—
W8-12		W8-10	W8-10	—
W8-13		W8-10	W8-10	—
W8-14		W8-10	W8-10	—
W8-15		W8-10	W8-10	—
W8-16		W8-10	W8-10	—
W8-17		W8-10	W8-10	—
W8-18		W8-10	W8-10	—
W8-19		W8-10	W8-10	—
W8-20		W8-10	W8-10	—
W8-21		W8-10	W8-10	—
W8-22		W8-10	W8-10	—
W8-23		W8-10	W8-10	—
W8-24		W8-10	W8-10	—
W8-25		W8-10	W8-10	—
W8-26		W8-10	W8-10	—
W8-27		W8-10	W8-10	—
W8-28		W8-10	W8-10	—
W8-29		W8-10	W8-10	—
W8-30		W8-10	W8-10	—
W8-31		W8-10	W8-10	—
W8-32		W8-10	W8-10	—
W8-33		W8-10	W8-10	—
W8-34		W8-10	W8-10	—
W8-35		W8-10	W8-10	—
W8-36		W8-10	W8-10	—
W8-37		W8-10	W8-10	—
W8-38		W8-10	W8-10	—
W8-39		W8-10	W8-10	—
W8-40		W8-10	W8-10	—
W8-41		W8-10	W8-10	—
W8-42		W8-10	W8-10	—
W8-43		W8-10	W8-10	—
W8-44		W8-10	W8-10	—
W8-45		W8-10	W8-10	—
W8-46		W8-10	W8-10	—
W8-47		W8-10	W8-10	—
W8-48		W8-10	W8-10	—
W8-49		W8-10	W8-10	—
W8-50		W8-10	W8-10	—
W8-51		W8-10	W8-10	—
W8-52		W8-10	W8-10	—
W8-53		W8-10	W8-10	—
W8-54		W8-10	W8-10	—
W8-55		W8-10	W8-10	—
W8-56		W8-10	W8-10	—
W8-57		W8-10	W8-10	—
W8-58		W8-10	W8-10	—
W8-59		W8-10	W8-10	—
W8-60		W8-10	W8-10	—
W8-61		W8-10	W8-10	—
W8-62		W8-10	W8-10	—
W8-63		W8-10	W8-10	—
W8-64		W8-10	W8-10	—
W8-65		W8-10	W8-10	—
W8-66		W8-10	W8-10	—
W8-67		W8-10	W8-10	—
W8-68		W8-10	W8-10	—
W8-69		W8-10	W8-10	—
W8-70		W8-10	W8-10	—
W8-71		W8-10	W8-10	—
W8-72		W8-10	W8-10	—
W8-73		W8-10	W8-10	—
W8-74		W8-10	W8-10	—
W8-75		W8-10	W8-10	—
W8-76		W8-10	W8-10	—
W8-77		W8-10	W8-10	—
W8-78		W8-10	W8-10	—
W8-79		W8-10	W8-10	—
W8-80		W8-10	W8-10	—
W8-81		W8-10	W8-10	—
W8-82		W8-10	W8-10	—
W8-83		W8-10	W8-10	—
W8-84		W8-10	W8-10	—
W8-85		W8-10	W8-10	—
W8-86		W8-10	W8-10	—
W8-87		W8-10	W8-10	—
W8-88		W8-10	W8-10	—
W8-89		W8-10	W8-10	—
W8-90		W8-10	W8-10	—
W8-91		W8-10	W8-10	—
W8-92		W8-10	W8-10	—
W8-93		W8-10	W8-10	—
W8-94		W8-10	W8-10	—
W8-95		W8-10	W8-10	—
W8-96		W8-10	W8-10	—
W8-97		W8-10	W8-10	—
W8-98		W8-10	W8-10	—
W8-99		W8-10	W8-10	—
W8-100		W8-10	W8-10	—

 Class 10/15 for turning head
Turning 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. The Laydown Threading System maximizes tool life and thread quality.

Laydown



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 Insert Technology

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

- WIDIA's™ premium PVD TiAlN coated grade outperforms conventional PVD grades.
- Tooling superior chip control and reduced cutting forces.
- Full face and full profile insert options available for all common thread forms.

The Laydown Threading Solution

With the WIDIA™ Laydown Threading System, you experience total in counterbore accuracy looking for uninterrupted chip flow and precise insert positioning accuracy.

- Industry leading thread quality.
- Four insert sizes available to cover a wide range of thread making operations.
- Ideal for high helix/full-flute threads and single point threading in small diameter bores.
- Maximized tool life and low profile design for uninterrupted chip flow and superior performance.



Step 1 • Select Threading Method and Kind of Tooling

Required Information

- General/thread operation
- Type of chip formation of thread
- Feed direction



Feed direction toward the thread • standard tools • (SCL/MSCL/MSCL)



standard feed thread



standard right-hand thread



standard left-hand thread



standard right-hand thread

Feed direction away from the thread • reverse tools



reverse right-hand thread



reverse left-hand thread



reverse right-hand thread



reverse left-hand thread

*Negative values required

Step 3 • Select Holder from Catalogue Page

Required Information

- General/thread operation
- Minimum hole diameter for internal operations
- Feed direction
- Insert size (page 100)

Select the appropriate holder for the insert size and feed



The insert size must match the page insert size of your hole-drill selection

catalogue number	page feed	minimum hole diameter	range
W0000 0000	10/100	10/100	—
W0000 0000	10/100	10/100	100-150

Step 3 • Choose Insert for Application

- Cutting inserts proven to fully withstand thread-forming operations
- Cutting inserts enhance the wear life, accuracy and tool life when the thread tool life is short
- New coating, using special inserts after the thread is cut a variety of thread pitches, after one feed
- Recommended use for lathe threading

See Threading Insert Selection on page 141

	Insert size	Subtype number	TM0021
	1/2"	201402	+
	3/4"	201403	+

Step 4 • Select Appropriate Insert

Required Information

- Thread form (2D or 3D)
- Thread diameter
- Thread length (Start of lead, lead direction, lead of thread)
- Material of work

Select the proper size TM00... for external or internal 2D
TM00... for external or internal 3D

40 Thread 2D Threading 1:1 Thread 2D Threading

1:1 Thread 3D Threading 1:1 Thread 3D Threading

Thread Selection Chart

For recommended size of thread form, insert type, and insert size, see the chart.

TM00... Threading inserts are used for the proper thread range and the recommended thread size. See the Threading Inserts on pages 141-142.
Also see detailed insert selection information on pages 139-140.

Step 5 • Select Grade and Square

Recommendations for Grade and Square Selection - and size

Workpiece material	Steel	Aluminum alloy	Cast iron	Cast stainless steel	High alloy alloy
Insert type	positive grade				
Insert size	TM0021 1/2-1/2 (1/2-1/2)	TM0021 1/2-1/2 (1/2-1/2)	TM0021 1/2-1/2 (1/2-1/2)	TM0021 1/2-1/2 (1/2-1/2)	TM0021 1/2-1/2 (1/2-1/2)

ISO		Insert profile	Standard	Reference class	Coating	Application	Page(s)
	40°		Twisted profile 40°	—	—	Designed for 40° thread forms, both as ISO and DIN when non-coating inserts are fitted to cut a variety of steels.	198–207
	60°		Wedge ISO	ISO 10381, ISO 12	ISO 10381	Wedge sand inserts ISO 10381 for aluminium.	198–208
	60°		Wedge ISO	ISO 10381, ISO 12	ISO 10381	Wedge sand ISO 10381 ISO 10381 for aluminium.	198–207
	60°		Wedge ISO	ISO 10381, ISO 12	ISO 10381	Wedge sand ISO 10381 ISO 10381 for aluminium.	198–208
	60°		Wedge ISO	ISO 10381, ISO 12	ISO 10381	Wedge sand ISO 10381 ISO 10381 for aluminium.	198–208
	60°		Wedge ISO	ISO 10381, ISO 12	ISO 10381	Wedge sand ISO 10381 ISO 10381 for aluminium.	198–208
	60°		Wedge ISO	ISO 10381, ISO 12	ISO 10381	Wedge sand ISO 10381 ISO 10381 for aluminium.	198–208
	60°		Wedge ISO	ISO 10381, ISO 12	ISO 10381	Wedge sand ISO 10381 ISO 10381 for aluminium.	198–208
	60°		Wedge ISO	ISO 10381, ISO 12	ISO 10381	Wedge sand ISO 10381 ISO 10381 for aluminium.	198–208
	60°		Wedge ISO	ISO 10381, ISO 12	ISO 10381	Wedge sand ISO 10381 ISO 10381 for aluminium.	198–208



Thread guides provide high-speed capability and are engineered for threading to heavy roughing.

- Lessen cycle time – high-speed capability
- Longest tool life – interrupted cutting action before wear occurs

	Steel
	Stainless Steel
	Cool Iron
	Non-Ferrous
	High-Temp Alloys
	General Materials

Coating	Tool Description	Work Materials										Lengths									
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
 VFD PVD	VFD PVD New multi-layer coated inserts. General purpose threading for steady, standard steady, soft iron, non-ferrous materials, and difficult-to-machine materials. Recommended in more difficult cutting conditions where higher toughness is required.																				

Laydown Threading Thread Form Guide

- All Laydown Threading inserts are provided ground to provide accurate thread forms and tolerances.
- Both standard and non-standard partial profile inserts are specifically designed for other materials or internal threading operations.
- Coating inserts provide a fully controlled thread form, including chamfers for a given pitch. The tool life obtained is determined and the inserts are optimized for the best tool life at that pitch.
- Non-cutting partial profile inserts offer the flexibility to cut a variety of thread pitches with one insert.
- Right hand Laydown Threading Inserts use right hand inserts. Left hand Laydown Threading Inserts use left hand inserts.
- Right hand Laydown Threading Inserts have one right hand inserts. Left hand Laydown Threading Inserts have one left hand inserts.

		Cutting Speed - m/min		
		T90020		
Material Group		mm	Inch	mm
	01	150	60	60
	2	150	60	120
	3	150	60	120
	4	75	30	150
	5	600	225	480
	6	60	25	30
	1	60	25	60
	2	60	25	25
	3	60	25	60
	1	60	30	30
	2	60	25	30
	3	60	25	60
	1	600	225	600
	2	225	90	600
	3	225	90	225
	4	150	60	225
	5	75	30	150
	6	480	195	600
	7	225	90	600
	1	30	20	30
	2	15	20	30
	3	60	30	15
	4	30	20	30



WIDIA

* Standard
... Alternative design



■ C10L-60

	Inserts	10	12	16	Insert 100	Insert 120-140	100	120
Right hand	20-1000	1.00	0.8	0.6	1	0.2-0.3	10-15	—
	20-1000	1.00	0.8	0.6	4	0.2-0.3	10-15	—
	20-10000	1.00	1.2	1.7	2	0.2-0.3	10-15	—
	20-1000	1.00	1.2	1.7	4	0.2-0.3	10-15	—
	40-1000	1.20	1.7	2.5	4	0.2-0.3	10-15	—
	20-1000	1.00	1.1	1.7	1	0.2-0.3	10-15	—
Left hand	20-1000	1.00	1.2	1.7	1	0.2-0.3	10-15	—
	20-1000	1.00	1.2	1.7	4	0.2-0.3	10-15	—


 a 90° chamfer
 is always desired


■ SGL 60

catalogue number	PC	SA	S	insert size	insert pitch size	WT	HT
right hand							
201400	0.05	0.6	0.8	7	0.25-1.2	46-6	—
201402	0.05	0.6	0.8	8	0.25-1.2	46-6	—
201406	0.05	0.6	0.7	3	0.25-1.2	46-6	—
201500	0.12	0.6	0.7	6	0.25-1.2	46-6	—
401600	0.12	0.7	0.8	8	0.25-1.2	46	—
101700	0.16	0.6	0.7	6	0.25-1.2	46-6	—
left hand							
201400	0.05	0.6	0.8	7	0.25-1.2	46-6	—
201402	0.05	0.6	0.7	8	0.25-1.2	46-6	—
201500	0.12	0.6	0.7	6	0.25-1.2	46-6	—
401600	0.12	0.7	0.8	8	0.25-1.2	46	—



9 Insert sizes
11 Thread pitches



■ CMT-ED

catalogue number	ISO	ISO	Insert size	Insert pitch size	ISO	ISO
right hand						
300000	12	1/8	3	1.25	—	—
300001	16	1/4	3	1.25	—	—
300002	16	1/8	3	1.25	—	—
300003	16	1/8	3	1.25	—	—
300004	16	1/8	3	1.25	—	—
300005	16	1/8	3	1.25	—	—
300006	16	1/8	3	1.25	—	—
300007	16	1/8	3	1.25	—	—
300008	16	1/8	3	1.25	—	—
300009	16	1/8	3	1.25	—	—
300010	16	1/8	3	1.25	—	—
300011	16	1/8	3	1.25	—	—
300012	16	1/8	3	1.25	—	—
300013	16	1/8	3	1.25	—	—
300014	16	1/8	3	1.25	—	—
300015	16	1/8	3	1.25	—	—
300016	16	1/8	3	1.25	—	—
300017	16	1/8	3	1.25	—	—
300018	16	1/8	3	1.25	—	—
300019	16	1/8	3	1.25	—	—
300020	16	1/8	3	1.25	—	—
300021	16	1/8	3	1.25	—	—
300022	16	1/8	3	1.25	—	—
300023	16	1/8	3	1.25	—	—
300024	16	1/8	3	1.25	—	—
300025	16	1/8	3	1.25	—	—
300026	16	1/8	3	1.25	—	—
300027	16	1/8	3	1.25	—	—
300028	16	1/8	3	1.25	—	—
300029	16	1/8	3	1.25	—	—
300030	16	1/8	3	1.25	—	—
300031	16	1/8	3	1.25	—	—
300032	16	1/8	3	1.25	—	—
300033	16	1/8	3	1.25	—	—
300034	16	1/8	3	1.25	—	—
300035	16	1/8	3	1.25	—	—
300036	16	1/8	3	1.25	—	—
300037	16	1/8	3	1.25	—	—
300038	16	1/8	3	1.25	—	—
300039	16	1/8	3	1.25	—	—
300040	16	1/8	3	1.25	—	—
300041	16	1/8	3	1.25	—	—
300042	16	1/8	3	1.25	—	—
300043	16	1/8	3	1.25	—	—
300044	16	1/8	3	1.25	—	—
300045	16	1/8	3	1.25	—	—
300046	16	1/8	3	1.25	—	—
300047	16	1/8	3	1.25	—	—
300048	16	1/8	3	1.25	—	—
300049	16	1/8	3	1.25	—	—
300050	16	1/8	3	1.25	—	—
300051	16	1/8	3	1.25	—	—
300052	16	1/8	3	1.25	—	—
300053	16	1/8	3	1.25	—	—
300054	16	1/8	3	1.25	—	—
300055	16	1/8	3	1.25	—	—
300056	16	1/8	3	1.25	—	—
300057	16	1/8	3	1.25	—	—
300058	16	1/8	3	1.25	—	—
300059	16	1/8	3	1.25	—	—
300060	16	1/8	3	1.25	—	—
300061	16	1/8	3	1.25	—	—
300062	16	1/8	3	1.25	—	—
300063	16	1/8	3	1.25	—	—
300064	16	1/8	3	1.25	—	—
300065	16	1/8	3	1.25	—	—
300066	16	1/8	3	1.25	—	—
300067	16	1/8	3	1.25	—	—
300068	16	1/8	3	1.25	—	—
300069	16	1/8	3	1.25	—	—
300070	16	1/8	3	1.25	—	—
300071	16	1/8	3	1.25	—	—
300072	16	1/8	3	1.25	—	—
300073	16	1/8	3	1.25	—	—
300074	16	1/8	3	1.25	—	—
300075	16	1/8	3	1.25	—	—
300076	16	1/8	3	1.25	—	—
300077	16	1/8	3	1.25	—	—
300078	16	1/8	3	1.25	—	—
300079	16	1/8	3	1.25	—	—
300080	16	1/8	3	1.25	—	—
300081	16	1/8	3	1.25	—	—
300082	16	1/8	3	1.25	—	—
300083	16	1/8	3	1.25	—	—
300084	16	1/8	3	1.25	—	—
300085	16	1/8	3	1.25	—	—
300086	16	1/8	3	1.25	—	—
300087	16	1/8	3	1.25	—	—
300088	16	1/8	3	1.25	—	—
300089	16	1/8	3	1.25	—	—
300090	16	1/8	3	1.25	—	—
300091	16	1/8	3	1.25	—	—
300092	16	1/8	3	1.25	—	—
300093	16	1/8	3	1.25	—	—
300094	16	1/8	3	1.25	—	—
300095	16	1/8	3	1.25	—	—
300096	16	1/8	3	1.25	—	—
300097	16	1/8	3	1.25	—	—
300098	16	1/8	3	1.25	—	—
300099	16	1/8	3	1.25	—	—
300100	16	1/8	3	1.25	—	—

(continued)

440-551-5555



• **Non-vascular**
• **vascular** (stroke)

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253	254	255
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271	272	273
274	275	276
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298	299	300
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322	323	324
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412	413	414
415	416	417
418	419	420
421	422	423
424	425	426
427	428	429
430	431	432
433	434	43

Contingency action	Q1	Q2	Invest cost	Benefit 2012-2015	Q1	Q2
AC20000	0,7	0,1	0	0,0	—	—
AC20000	0,7	0,0	0	0,0	—	—
AC20000	0,0	0,0	0	0,0	—	—
Subtotal						
AC10000	0,0	0,0	0	0,0	—	—
AC10000	0,0	0,0	0	0,0	—	—
AC10000	0,0	0,0	0	0,0	—	—
AC10000	0,0	0,0	0	0,0	—	—
AC10000	0,0	0,0	0	0,0	—	—
AC10000	0,7	0,7	0	0,0	—	—
AC10000	0,0	0,0	0	0,0	—	—
AC10000	0,0	0,0	0	0,0	—	—
AC10000	0,0	0,7	0	0,0	—	—
AC10000	0,0	0,0	0	0,0	—	—
AC10000	0,7	0,0	0	0,0	—	—
AC10000	0,7	0,0	0	0,0	—	—

1

840-100 – continued



840-100
840-100-100



catalogue number	12	1	Insert size	Insert pitch size	12	12
840-1000	12	12	8	0.8	—	—
840-1001	12	12	8	0.8	—	—
840-1002	12	12	8	0.8	—	—
840-1003	12	12	8	0.8	—	—
840-1004	12	12	8	0.8	—	—
840-1005	12	12	8	0.8	—	—
840-1006	12	12	8	0.8	—	—
840-1007	12	12	8	0.8	—	—
840-1008	12	12	8	0.8	—	—
840-1009	12	12	8	0.8	—	—



* See chart
+ alternative design



■ PAI-50

catalogue number	1/2	3/4	1	1 1/4	1 1/2	2
right hand						
2017004	6.0	6.0	7	7.5	—	—
2017002	6.0	6.7	7	7.5	—	—
2017003	6.0	6.7	7	7.5	—	—
2017001	6.0	7.0	7	7.5	—	—
2017005	6.0	7.7	7	7.5	—	—
2017006	6.0	6.0	7	7.5	—	—
2017007	6.0	6.0	7	7.5	—	—
2017008	6.0	6.0	7	7.5	—	—
2017009	6.0	6.7	7	7.5	—	—
2017010	6.0	6.0	7	7.5	—	—
2017011	6.0	7.0	7	7.5	—	—
2017012	6.0	7.7	7	7.5	—	—
2017013	6.0	6.0	7	7.5	—	—
2017014	6.0	6.0	7	7.5	—	—
2017015	6.0	6.0	7	7.5	—	—
2017016	6.0	6.0	7	7.5	—	—
2017017	6.0	6.0	7	7.5	—	—
2017018	6.0	6.0	7	7.5	—	—
2017019	6.0	6.0	7	7.5	—	—
2017020	6.0	6.0	7	7.5	—	—
2017021	6.0	6.0	7	7.5	—	—
2017022	6.0	6.0	7	7.5	—	—
2017023	6.0	6.0	7	7.5	—	—
2017024	6.0	6.0	7	7.5	—	—
2017025	6.0	6.0	7	7.5	—	—
2017026	6.0	6.0	7	7.5	—	—
2017027	6.0	6.0	7	7.5	—	—
2017028	6.0	6.0	7	7.5	—	—
2017029	6.0	6.0	7	7.5	—	—
2017030	6.0	6.0	7	7.5	—	—
2017031	6.0	6.0	7	7.5	—	—
2017032	6.0	6.0	7	7.5	—	—
2017033	6.0	6.0	7	7.5	—	—
2017034	6.0	6.0	7	7.5	—	—
2017035	6.0	6.0	7	7.5	—	—
2017036	6.0	6.0	7	7.5	—	—
2017037	6.0	6.0	7	7.5	—	—
2017038	6.0	6.0	7	7.5	—	—
2017039	6.0	6.0	7	7.5	—	—
2017040	6.0	6.0	7	7.5	—	—
2017041	6.0	6.0	7	7.5	—	—
2017042	6.0	6.0	7	7.5	—	—
2017043	6.0	6.0	7	7.5	—	—
2017044	6.0	6.0	7	7.5	—	—
2017045	6.0	6.0	7	7.5	—	—
2017046	6.0	6.0	7	7.5	—	—
2017047	6.0	6.0	7	7.5	—	—
2017048	6.0	6.0	7	7.5	—	—
2017049	6.0	6.0	7	7.5	—	—
2017050	6.0	6.0	7	7.5	—	—
2017051	6.0	6.0	7	7.5	—	—
2017052	6.0	6.0	7	7.5	—	—
2017053	6.0	6.0	7	7.5	—	—
2017054	6.0	6.0	7	7.5	—	—
2017055	6.0	6.0	7	7.5	—	—
2017056	6.0	6.0	7	7.5	—	—
2017057	6.0	6.0	7	7.5	—	—
2017058	6.0	6.0	7	7.5	—	—
2017059	6.0	6.0	7	7.5	—	—
2017060	6.0	6.0	7	7.5	—	—
2017061	6.0	6.0	7	7.5	—	—
2017062	6.0	6.0	7	7.5	—	—
2017063	6.0	6.0	7	7.5	—	—
2017064	6.0	6.0	7	7.5	—	—
2017065	6.0	6.0	7	7.5	—	—
2017066	6.0	6.0	7	7.5	—	—
2017067	6.0	6.0	7	7.5	—	—
2017068	6.0	6.0	7	7.5	—	—
2017069	6.0	6.0	7	7.5	—	—
2017070	6.0	6.0	7	7.5	—	—
2017071	6.0	6.0	7	7.5	—	—
2017072	6.0	6.0	7	7.5	—	—
2017073	6.0	6.0	7	7.5	—	—
2017074	6.0	6.0	7	7.5	—	—
2017075	6.0	6.0	7	7.5	—	—
2017076	6.0	6.0	7	7.5	—	—
2017077	6.0	6.0	7	7.5	—	—
2017078	6.0	6.0	7	7.5	—	—
2017079	6.0	6.0	7	7.5	—	—
2017080	6.0	6.0	7	7.5	—	—
2017081	6.0	6.0	7	7.5	—	—
2017082	6.0	6.0	7	7.5	—	—
2017083	6.0	6.0	7	7.5	—	—
2017084	6.0	6.0	7	7.5	—	—
2017085	6.0	6.0	7	7.5	—	—
2017086	6.0	6.0	7	7.5	—	—
2017087	6.0	6.0	7	7.5	—	—
2017088	6.0	6.0	7	7.5	—	—
2017089	6.0	6.0	7	7.5	—	—
2017090	6.0	6.0	7	7.5	—	—
2017091	6.0	6.0	7	7.5	—	—
2017092	6.0	6.0	7	7.5	—	—
2017093	6.0	6.0	7	7.5	—	—
2017094	6.0	6.0	7	7.5	—	—
2017095	6.0	6.0	7	7.5	—	—
2017096	6.0	6.0	7	7.5	—	—
2017097	6.0	6.0	7	7.5	—	—
2017098	6.0	6.0	7	7.5	—	—
2017099	6.0	6.0	7	7.5	—	—
2017100	6.0	6.0	7	7.5	—	—

(continued)



1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84
85	86	87	88	89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104	105	106	107	108
109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132
133	134	135	136	137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152	153	154	155	156
157	158	159	160	161	162	163	164	165	166	167	168
169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192
193	194	195	196	197	198	199	200	201	202	203	204
205	206	207	208	209	210	211	212	213	214	215	216
217	218	219	220	221	222	223	224	225	226	227	228
229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252
253	254	255	256	257	258	259	260	261	262	263	264
265	266	267	268	269	270	271	272	273	274	275	276
277	278	279	280	281	282	283	284	285	286	287	288
289	290	291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310	311	312
313	314	315	316	317	318	319	320	321	322	323	324
325	326	327	328	329	330	331	332	333	334	335	336
337	338	339	340	341	342	343	344	345	346	347	348
349	350	351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370	371	372
373	374	375	376	377	378	379	380	381	382	383	384
385	386	387	388	389	390	391	392	393	394	395	396
397	398	399	400	401	402	403	404	405	406	407	408
409	410	411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430	431	432
433	434	435	436	437	438	439	440	441	442	443	444
445	446	447	448	449	450	451	452	453	454	455	456
457	458	459	460	461	462	463	464	465	466	467	468
469	470	471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490	491	492
493	494	495	496	497	498	499					

1

90°-60° - continued



★ Max. depth
of thread (mm)



Tool type	0.2	0	Insert size	Insert width, mm	DP	DP
90°-60°	0.2	0.2	0	0.20	—	—
90°-60°	0.2	0.2	0	0.40	—	—
90°-60°	0.2	0.2	0	0.50	—	—
90°-60°	0.2	0.2	0	0.80	—	—
90°-60°	0.2	0.2	0	1.00	—	—
90°-60°	0.2	0.2	0	1.50	—	—
90°-60°	0.2	0.2	0	2.00	—	—
90°-60°	0.2	0.2	0	2.50	—	—
90°-60°	0.2	0.2	0	3.00	—	—
90°-60°	0.2	0.2	0	4.00	—	—
90°-60°	0.2	0.2	0	5.00	—	—
90°-60°	0.2	0.2	0	6.00	—	—
90°-60°	0.2	0.2	0	8.00	—	—
90°-60°	0.2	0.2	0	10.00	—	—
90°-60°	0.2	0.2	0	12.00	—	—
90°-60°	0.2	0.2	0	16.00	—	—
90°-60°	0.2	0.2	0	20.00	—	—
90°-60°	0.2	0.2	0	25.00	—	—
90°-60°	0.2	0.2	0	32.00	—	—
90°-60°	0.2	0.2	0	40.00	—	—
90°-60°	0.2	0.2	0	50.00	—	—
90°-60°	0.2	0.2	0	63.00	—	—
90°-60°	0.2	0.2	0	80.00	—	—
90°-60°	0.2	0.2	0	100.00	—	—
90°-60°	0.2	0.2	0	125.00	—	—
90°-60°	0.2	0.2	0	160.00	—	—
90°-60°	0.2	0.2	0	200.00	—	—
90°-60°	0.2	0.2	0	250.00	—	—
90°-60°	0.2	0.2	0	315.00	—	—
90°-60°	0.2	0.2	0	400.00	—	—
90°-60°	0.2	0.2	0	500.00	—	—
90°-60°	0.2	0.2	0	630.00	—	—
90°-60°	0.2	0.2	0	800.00	—	—
90°-60°	0.2	0.2	0	1000.00	—	—



* See also
Laydown Threading



WIDIA-LIN

catalogue number	10	2	insert size	insert pitch size	10	10
right hand						
22140-06	10	10	2	—	40	—
22140-08	10	10	2	—	50	—
22150-06	10	10	3	—	30	—
22150-08	10	10	3	—	30	—
22150-09	10	10	3	—	30	—
22150-10	10	10	3	—	30	—
22150-12	10	10	3	—	30	—
22150-14	10	10	3	—	30	—
22150-16	10	10	3	—	30	—
22150-18	10	10	3	—	30	—
22150-20	10	10	3	—	30	—
22150-22	10	10	3	—	30	—
22150-24	10	10	3	—	30	—
22150-26	10	10	3	—	30	—
22150-28	10	10	3	—	30	—
22150-30	10	10	3	—	30	—
22150-32	10	10	3	—	30	—
22150-34	10	10	3	—	30	—
22150-36	10	10	3	—	30	—
22150-38	10	10	3	—	30	—
22150-40	10	10	3	—	30	—
22150-42	10	10	3	—	30	—
22150-44	10	10	3	—	30	—
22150-46	10	10	3	—	30	—
22150-48	10	10	3	—	30	—
22150-50	10	10	3	—	30	—
22150-52	10	10	3	—	30	—
22150-54	10	10	3	—	30	—
22150-56	10	10	3	—	30	—
22150-58	10	10	3	—	30	—
22150-60	10	10	3	—	30	—
22150-62	10	10	3	—	30	—
22150-64	10	10	3	—	30	—
22150-66	10	10	3	—	30	—
22150-68	10	10	3	—	30	—
22150-70	10	10	3	—	30	—
22150-72	10	10	3	—	30	—
22150-74	10	10	3	—	30	—
22150-76	10	10	3	—	30	—
22150-78	10	10	3	—	30	—
22150-80	10	10	3	—	30	—
22150-82	10	10	3	—	30	—
22150-84	10	10	3	—	30	—
22150-86	10	10	3	—	30	—
22150-88	10	10	3	—	30	—
22150-90	10	10	3	—	30	—
22150-92	10	10	3	—	30	—
22150-94	10	10	3	—	30	—
22150-96	10	10	3	—	30	—
22150-98	10	10	3	—	30	—
22150-100	10	10	3	—	30	—

(continued)

left-hand - outside



4-flute design
with 15° rake angle



tool designation	CC	0	insert size	insert shape	IP	IT
SD100	1,2	1,8	6	—	12	—
SD100	1,2	1,8	6	—	16	—
SD100	1,2	1,8	6	—	14	—
SD100	1,2	1,8	6	—	18	—
SD100	1,2	1,8	6	—	8	—
SD100	1,2	1,8	6	—	10	—
SD100	1,2	1,8	6	—	12	—
SD100	1,2	1,8	6	—	14	—
SD100	1,2	1,8	6	—	16	—
SD100	1,2	1,8	6	—	18	—



• Two-chamber
• Standard version



■ DVL UN

catalogue number	25	3	Insert size	Insert pitch size	ISO	ISO
250200	25	25	0	—	20	—
250208	25	25	0.1	—	20	—
250216	25	25	0.2	—	20	—
250225	25	25	0.3	—	20	—
250232	25	25	0.4	—	20	—
250240	25	25	0.5	—	20	—
250250	25	25	0.6	—	20	—
250260	25	25	0.8	—	20	—
250270	25	25	1.0	—	20	—
250280	25	25	1.2	—	20	—
250290	25	25	1.5	—	20	—
250300	25	25	2.0	—	20	—

continued

g91 - G94 - continuous



actual position
in different planes



catalogue number	1.8	5	Insert size	Insert pitch (mm)	115	135
2012.06	1.7	1.6	0	—	0	—
2012.06	1.2	1.2	0	—	0	—
2012.06	1.1	1.2	2	—	0	—
all round						
21.120.06	0.6	0.6	0	—	0	—
21.120.06	0.7	0.6	0	—	0	—
21.120.06	0.9	0.6	0	—	0	—
21.120.06	1.1	0.9	0	—	0	—
21.120.06	1.2	1.2	0	—	0	—
21.120.06	1.7	1.6	0	—	0	—



* See chart
→ alternate design



• CDS-40T

catalogue number	25	32	insert size	insert plate size	25	32
right hand						
CDT40T	1.1	1.6	8	11	11.5	15.5
CDT40T	1.1	1.6	8	11	11	15.5
CDT40T	1.1	1.6	8	11	11	15.5
CDT40T	1.1	1.6	8	11	11	15.5


 * Best choice
 Laylines Threading


WIDIA BEST

colleges number	12	16	20	25	32	40
1200000	1.2	1.2	1.2	1.2	1.2	1.2
1200000	1.2	1.2	1.2	1.2	1.2	1.2
1200000	1.2	1.2	1.2	1.2	1.2	1.2
1200000	1.2	1.2	1.2	1.2	1.2	1.2



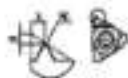
WIDIA THREADED
INSERTS

* See WIDIA
... alternative choices



WIDIA-DE

	Coating system	ISO	ISO	ISO	Insert size	Insert size	ISO	ISO
Right hand	WIDIA	100	100	100	1	100-100	100	100
	WIDIA	100	100	100	1	100-100	100	100
	WIDIA	100	100	100	1	100-100	100	100
	WIDIA	100	100	100	1	100-100	100	100
Left hand	WIDIA	100	100	100	1	100-100	100	100
	WIDIA	100	100	100	1	100-100	100	100
	WIDIA	100	100	100	1	100-100	100	100
	WIDIA	100	100	100	1	100-100	100	100


 # Tool classes
 1: External thread


92.1-55

Catalogue number	NC	CS	S	Feed rate	Spindle speed	SP	TP
right hand							
204020	125	0.8	0.8	7	220-22	60-6	—
204022	125	0.8	0.8	8	220-22	60-6	—
204025	125	0.7	0.7	8	220-22	60-6	—
204030	125	0.7	0.7	8	220-22	60-6	—
204035	125	0.7	0.8	8	220-22	60-6	—
left hand							
204020	125	0.8	0.8	8	220-22	60-6	—
204030	125	0.7	0.7	8	220-22	60-6	—



100% Ca^{2+} release

a. *Extraneous*
b. *Stimulus*



1

[illegible]



actual values
in different systems



W 500 - W

cutting speed	10	15	feed mm	thread pitch mm	10	15
right hand						
W 500	0.5	0.5	0	—	10	—
W 500	0.5	0.5	0	—	10	—
W 500	0.5	0.5	0	—	10	—
W 500	0.5	0.5	0	—	10	—
W 500	0.5	0.5	0	—	10	—
W 500	0.5	0.5	0	—	10	—
W 500	0.5	0.5	0	—	10	—
W 500	0.5	0.5	0	—	10	—
W 500	0.5	0.5	0	—	10	—
W 500	0.5	0.5	0	—	10	—



4-FLUTE DRILL

4-FLUTE DRILL
2-FLUTE DRILL



■ CR-APSD

cutting number	2T	3T	4	flute dia	flute pitch dia	DT	DT
right hand							
2T-100T100	0.10	0.1	0.1	0	—	10	100



4-FLUTE DRILL

■ CR-APSD

cutting number	2T	3T	4	flute dia	flute pitch dia	DT	DT
right hand							
2T-100T100	0.10	0.1	0.1	0	—	10	100
2T-100T100	0.10	0.1	0.1	0	—	10	100



WIDIA
Lathe Threading



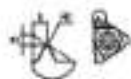
WIDIA

catalogue number	60	60	60	60	60	60	60
right hand							
WIDIA	0.11	0.1	0.1	0	0	0	0



WIDIA

catalogue number	60	60	60	60	60	60	60
right hand							
WIDIA	0.11	0.1	0.1	0	0	0	0
WIDIA	0.11	0.1	0.1	0	0	0	0
left hand							
WIDIA	0.11	0.1	0.1	0	0	0	0



* Not checked
... alternative choice



WIDIA 40

collocation number	20	25	3	thread size	thread pitch in mm	20	25
right hand							
201000	0,75	0,8	1,0	8	—	8	—
202000	0,75	0,8	1,0	8	—	8	—
401000	0,80	1,0	1,2	8	—	8	—
402000	0,80	0,8	1,2	8	—	8	—
left hand							
301000	0,75	0,8	1,0	8	—	8	—


 *For details
 visit www.widia.com


WCLM-TH

colleges/universities	CT	C	Insert size	Insert pitch size	TT	TT
light tool						
WCLM-TH	1.2	1.2	2	1.2	—	—
WCLM-TH	1.2	1.2	3	1.2	—	—
WCLM-TH	1.2	1.2	4	1.2	—	—
WCLM-TH	1.2	1.2	5	1.2	—	—
WCLM-TH	1.2	1.2	6	1.2	—	—
WCLM-TH	1.2	1.2	7	1.2	—	—
WCLM-TH	1.2	1.2	8	1.2	—	—
WCLM-TH	1.2	1.2	9	1.2	—	—
WCLM-TH	1.2	1.2	10	1.2	—	—
WCLM-TH	1.2	1.2	11	1.2	—	—
WCLM-TH	1.2	1.2	12	1.2	—	—
WCLM-TH	1.2	1.2	13	1.2	—	—
WCLM-TH	1.2	1.2	14	1.2	—	—
WCLM-TH	1.2	1.2	15	1.2	—	—
WCLM-TH	1.2	1.2	16	1.2	—	—
WCLM-TH	1.2	1.2	17	1.2	—	—
WCLM-TH	1.2	1.2	18	1.2	—	—
WCLM-TH	1.2	1.2	19	1.2	—	—
WCLM-TH	1.2	1.2	20	1.2	—	—
WCLM-TH	1.2	1.2	21	1.2	—	—
WCLM-TH	1.2	1.2	22	1.2	—	—
WCLM-TH	1.2	1.2	23	1.2	—	—
WCLM-TH	1.2	1.2	24	1.2	—	—
WCLM-TH	1.2	1.2	25	1.2	—	—
WCLM-TH	1.2	1.2	26	1.2	—	—
WCLM-TH	1.2	1.2	27	1.2	—	—
WCLM-TH	1.2	1.2	28	1.2	—	—
WCLM-TH	1.2	1.2	29	1.2	—	—
WCLM-TH	1.2	1.2	30	1.2	—	—
WCLM-TH	1.2	1.2	31	1.2	—	—
WCLM-TH	1.2	1.2	32	1.2	—	—
WCLM-TH	1.2	1.2	33	1.2	—	—
WCLM-TH	1.2	1.2	34	1.2	—	—
WCLM-TH	1.2	1.2	35	1.2	—	—
WCLM-TH	1.2	1.2	36	1.2	—	—
WCLM-TH	1.2	1.2	37	1.2	—	—
WCLM-TH	1.2	1.2	38	1.2	—	—
WCLM-TH	1.2	1.2	39	1.2	—	—
WCLM-TH	1.2	1.2	40	1.2	—	—
WCLM-TH	1.2	1.2	41	1.2	—	—
WCLM-TH	1.2	1.2	42	1.2	—	—
WCLM-TH	1.2	1.2	43	1.2	—	—
WCLM-TH	1.2	1.2	44	1.2	—	—
WCLM-TH	1.2	1.2	45	1.2	—	—
WCLM-TH	1.2	1.2	46	1.2	—	—
WCLM-TH	1.2	1.2	47	1.2	—	—
WCLM-TH	1.2	1.2	48	1.2	—	—
WCLM-TH	1.2	1.2	49	1.2	—	—
WCLM-TH	1.2	1.2	50	1.2	—	—
WCLM-TH	1.2	1.2	51	1.2	—	—
WCLM-TH	1.2	1.2	52	1.2	—	—
WCLM-TH	1.2	1.2	53	1.2	—	—
WCLM-TH	1.2	1.2	54	1.2	—	—
WCLM-TH	1.2	1.2	55	1.2	—	—
WCLM-TH	1.2	1.2	56	1.2	—	—
WCLM-TH	1.2	1.2	57	1.2	—	—
WCLM-TH	1.2	1.2	58	1.2	—	—
WCLM-TH	1.2	1.2	59	1.2	—	—
WCLM-TH	1.2	1.2	60	1.2	—	—
WCLM-TH	1.2	1.2	61	1.2	—	—
WCLM-TH	1.2	1.2	62	1.2	—	—
WCLM-TH	1.2	1.2	63	1.2	—	—
WCLM-TH	1.2	1.2	64	1.2	—	—
WCLM-TH	1.2	1.2	65	1.2	—	—
WCLM-TH	1.2	1.2	66	1.2	—	—
WCLM-TH	1.2	1.2	67	1.2	—	—
WCLM-TH	1.2	1.2	68	1.2	—	—
WCLM-TH	1.2	1.2	69	1.2	—	—
WCLM-TH	1.2	1.2	70	1.2	—	—
WCLM-TH	1.2	1.2	71	1.2	—	—
WCLM-TH	1.2	1.2	72	1.2	—	—
WCLM-TH	1.2	1.2	73	1.2	—	—
WCLM-TH	1.2	1.2	74	1.2	—	—
WCLM-TH	1.2	1.2	75	1.2	—	—
WCLM-TH	1.2	1.2	76	1.2	—	—
WCLM-TH	1.2	1.2	77	1.2	—	—
WCLM-TH	1.2	1.2	78	1.2	—	—
WCLM-TH	1.2	1.2	79	1.2	—	—
WCLM-TH	1.2	1.2	80	1.2	—	—
WCLM-TH	1.2	1.2	81	1.2	—	—
WCLM-TH	1.2	1.2	82	1.2	—	—
WCLM-TH	1.2	1.2	83	1.2	—	—
WCLM-TH	1.2	1.2	84	1.2	—	—
WCLM-TH	1.2	1.2	85	1.2	—	—
WCLM-TH	1.2	1.2	86	1.2	—	—
WCLM-TH	1.2	1.2	87	1.2	—	—
WCLM-TH	1.2	1.2	88	1.2	—	—
WCLM-TH	1.2	1.2	89	1.2	—	—
WCLM-TH	1.2	1.2	90	1.2	—	—
WCLM-TH	1.2	1.2	91	1.2	—	—
WCLM-TH	1.2	1.2	92	1.2	—	—
WCLM-TH	1.2	1.2	93	1.2	—	—
WCLM-TH	1.2	1.2	94	1.2	—	—
WCLM-TH	1.2	1.2	95	1.2	—	—
WCLM-TH	1.2	1.2	96	1.2	—	—
WCLM-TH	1.2	1.2	97	1.2	—	—
WCLM-TH	1.2	1.2	98	1.2	—	—
WCLM-TH	1.2	1.2	99	1.2	—	—
WCLM-TH	1.2	1.2	100	1.2	—	—



* See also
Latheless Drilling



WDL-TR

catalogue number	12	16	insert size	insert pitch size	ISO	ISO
right hand						
300070	12	16	3	3.00	—	—
400070	12	16	4	4.00	—	—
400070	12	16	6	6.00	—	—
300070	12	16	8	8.00	—	—

Laydown Threading
Toolholder Identification System


AND

A

 Toolholder
construction

- A —
Chamfered
- B —
Without cham

L

Tool type

25

Shank Size

Dimensions

- Flank face width
• Shank height
• Shank

3

 Thread
Size

R

 Thread or
Tool

- W —
Thread profile W
- Q —
Thread profile Q

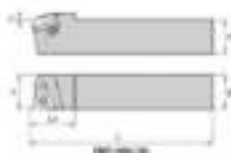
L — External Thread



Symbol	Ø	LT
1	6.35	1/8"
2	8.00	5/16"
3	10.00	3/8"
4	12.50	1/2"
5	15.88	3/4"



Image of tool head



WIDIA



order number	catalogue number	head size	D	d	L	L1	L2	code	code	code	head size	code	code
right hand													
300040	AL 020	3	6	5	15	15	15	300040	300040	300040	300040	300040	300040
300050	AL 025	3	8	6	15	15	15	300050	300050	300050	300050	300050	300050
300060	AL 030	3	10	8	15	15	15	300060	300060	300060	300060	300060	300060
300070	AL 035	3	12	10	15	15	15	300070	300070	300070	300070	300070	300070
300080	AL 040	3	14	12	15	15	15	300080	300080	300080	300080	300080	300080
300090	AL 045	3	16	14	15	15	15	300090	300090	300090	300090	300090	300090
300100	AL 050	3	18	16	15	15	15	300100	300100	300100	300100	300100	300100
300110	AL 055	3	20	18	15	15	15	300110	300110	300110	300110	300110	300110
300120	AL 060	3	22	20	15	15	15	300120	300120	300120	300120	300120	300120
300130	AL 065	3	24	22	15	15	15	300130	300130	300130	300130	300130	300130
300140	AL 070	3	26	24	15	15	15	300140	300140	300140	300140	300140	300140
300150	AL 075	3	28	26	15	15	15	300150	300150	300150	300150	300150	300150
300160	AL 080	3	30	28	15	15	15	300160	300160	300160	300160	300160	300160
300170	AL 085	3	32	30	15	15	15	300170	300170	300170	300170	300170	300170
300180	AL 090	3	34	32	15	15	15	300180	300180	300180	300180	300180	300180
300190	AL 095	3	36	34	15	15	15	300190	300190	300190	300190	300190	300190
300200	AL 100	3	38	36	15	15	15	300200	300200	300200	300200	300200	300200
300210	AL 105	3	40	38	15	15	15	300210	300210	300210	300210	300210	300210
300220	AL 110	3	42	40	15	15	15	300220	300220	300220	300220	300220	300220
300230	AL 115	3	44	42	15	15	15	300230	300230	300230	300230	300230	300230
300240	AL 120	3	46	44	15	15	15	300240	300240	300240	300240	300240	300240
300250	AL 125	3	48	46	15	15	15	300250	300250	300250	300250	300250	300250
300260	AL 130	3	50	48	15	15	15	300260	300260	300260	300260	300260	300260
300270	AL 135	3	52	50	15	15	15	300270	300270	300270	300270	300270	300270
300280	AL 140	3	54	52	15	15	15	300280	300280	300280	300280	300280	300280
300290	AL 145	3	56	54	15	15	15	300290	300290	300290	300290	300290	300290
300300	AL 150	3	58	56	15	15	15	300300	300300	300300	300300	300300	300300
300310	AL 155	3	60	58	15	15	15	300310	300310	300310	300310	300310	300310
300320	AL 160	3	62	60	15	15	15	300320	300320	300320	300320	300320	300320
300330	AL 165	3	64	62	15	15	15	300330	300330	300330	300330	300330	300330
300340	AL 170	3	66	64	15	15	15	300340	300340	300340	300340	300340	300340
300350	AL 175	3	68	66	15	15	15	300350	300350	300350	300350	300350	300350
300360	AL 180	3	70	68	15	15	15	300360	300360	300360	300360	300360	300360
300370	AL 185	3	72	70	15	15	15	300370	300370	300370	300370	300370	300370
300380	AL 190	3	74	72	15	15	15	300380	300380	300380	300380	300380	300380
300390	AL 195	3	76	74	15	15	15	300390	300390	300390	300390	300390	300390
300400	AL 200	3	78	76	15	15	15	300400	300400	300400	300400	300400	300400
300410	AL 205	3	80	78	15	15	15	300410	300410	300410	300410	300410	300410
300420	AL 210	3	82	80	15	15	15	300420	300420	300420	300420	300420	300420
300430	AL 215	3	84	82	15	15	15	300430	300430	300430	300430	300430	300430
300440	AL 220	3	86	84	15	15	15	300440	300440	300440	300440	300440	300440
300450	AL 225	3	88	86	15	15	15	300450	300450	300450	300450	300450	300450
300460	AL 230	3	90	88	15	15	15	300460	300460	300460	300460	300460	300460
300470	AL 235	3	92	90	15	15	15	300470	300470	300470	300470	300470	300470
300480	AL 240	3	94	92	15	15	15	300480	300480	300480	300480	300480	300480
300490	AL 245	3	96	94	15	15	15	300490	300490	300490	300490	300490	300490
300500	AL 250	3	98	96	15	15	15	300500	300500	300500	300500	300500	300500
300510	AL 255	3	100	98	15	15	15	300510	300510	300510	300510	300510	300510
300520	AL 260	3	102	100	15	15	15	300520	300520	300520	300520	300520	300520
300530	AL 265	3	104	102	15	15	15	300530	300530	300530	300530	300530	300530
300540	AL 270	3	106	104	15	15	15	300540	300540	300540	300540	300540	300540
300550	AL 275	3	108	106	15	15	15	300550	300550	300550	300550	300550	300550
300560	AL 280	3	110	108	15	15	15	300560	300560	300560	300560	300560	300560
300570	AL 285	3	112	110	15	15	15	300570	300570	300570	300570	300570	300570
300580	AL 290	3	114	112	15	15	15	300580	300580	300580	300580	300580	300580
300590	AL 295	3	116	114	15	15	15	300590	300590	300590	300590	300590	300590
300600	AL 300	3	118	116	15	15	15	300600	300600	300600	300600	300600	300600
300610	AL 305	3	120	118	15	15	15	300610	300610	300610	300610	300610	300610
300620	AL 310	3	122	120	15	15	15	300620	300620	300620	300620	300620	300620
300630	AL 315	3	124	122	15	15	15	300630	300630	300630	300630	300630	300630
300640	AL 320	3	126	124	15	15	15	300640	300640	300640	300640	300640	300640
300650	AL 325	3	128	126	15	15	15	300650	300650	300650	300650	300650	300650
300660	AL 330	3	130	128	15	15	15	300660	300660	300660	300660	300660	300660
300670	AL 335	3	132	130	15	15	15	300670	300670	300670	300670	300670	300670
300680	AL 340	3	134	132	15	15	15	300680	300680	300680	300680	300680	300680
300690	AL 345	3	136	134	15	15	15	300690	300690	300690	300690	300690	300690
300700	AL 350	3	138	136	15	15	15	300700	300700	300700	300700	300700	300700
300710	AL 355	3	140	138	15	15	15	300710	300710	300710	300710	300710	300710
300720	AL 360	3	142	140	15	15	15	300720	300720	300720	300720	300720	300720
300730	AL 365	3	144	142	15	15	15	300730	300730	300730	300730	300730	300730
300740	AL 370	3	146	144	15	15	15	300740	300740	300740	300740	300740	300740
300750	AL 375	3	148	146	15	15	15	300750	300750	300750	300750	300750	300750
300760	AL 380	3	150	148	15	15	15	300760	300760	300760	300760	300760	300760
300770	AL 385	3	152	150	15	15	15	300770	300770	300770	300770	300770	300770
300780	AL 390	3	154	152	15	15	15	300780	300780	300780	300780	300780	300780
300790	AL 395	3	156	154	15	15	15	300790	300790	300790	300790	300790	300790
300800	AL 400	3	158	156	15	15	15	300800	300800	300800	300800	300800	300800
300810	AL 405	3	160	158	15	15	15	300810	300810	300810	300810	300810	300810
300820	AL 410	3	162	160	15	15	15	300820	300820	300820	300820	300820	300820
300830	AL 415	3	164	162	15	15	15	300830	300830	300830	300830	300830	300830
300840	AL 420	3	166	164	15	15	15	300840	300840	300840	300840	300840	300840
300850	AL 425	3	168	166	15	15	15	300850	300850	300850	300850	300850	300850
300860	AL 430	3	170	168	15	15	15	300860	300860	300860	300860	300860	300860
300870	AL 435	3	172	170	15	15	15	300870	300870	300870	300870	300870	300870
300880	AL 440	3	174	172	15	15	15	300880	300880	300880	300880	300880	300880
300890	AL 445	3	176	174	15	15	15	300890	300890	300890	300890	300890	300890
300900	AL 450	3	178	176	15	15	15	300900	300900	300900	300900	300900	300900
300910	AL 455	3	180	178	15	15	15	300910	300910	300910	300910	300910	300910
300920	AL 460	3	182	180	15	15	15	300920	300920	300920	300920	300920	300920
300930	AL 465	3	184	182	15	15	15	300930	300930	300930	300930	300930	300930
300940	AL 470	3	186	184	15	15	15	300940	300940	300940	300940	300940	300940
300950	AL 475	3	188	186	15	15	15	300950	300950	300950	300950	300950	

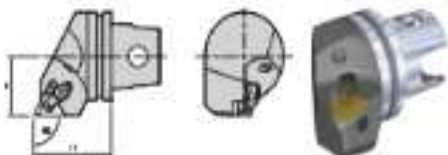


W1.5C-N 90° • Internal Only



		D1		D		D max		grain size µm	insert width mm	width mm	length mm	weight kg	DIN
order number	catalogue number	mm	in	mm	in	mm	in						
right hand													
300000	WAM15C120-040	40	1.575	12	0.472	14	0.551	1.1 µm	12.00	14.00	120.00	0.12	21
300004	WAM15C120-050	40	1.575	12	0.472	14	0.551	1.1 µm	12.00	14.00	150.00	0.15	21
300008	WAM15C120-070	40	1.575	12	0.472	14	0.551	1.1 µm	12.00	14.00	210.00	0.21	21
left hand													
300001	WAM15C120-040	40	1.575	12	0.472	14	0.551	1.1 µm	12.00	14.00	120.00	0.12	21
300005	WAM15C120-050	40	1.575	12	0.472	14	0.551	1.1 µm	12.00	14.00	150.00	0.15	21
300009	WAM15C120-070	40	1.575	12	0.472	14	0.551	1.1 µm	12.00	14.00	210.00	0.21	21

NOTE: Coating tools are supplied with insert cover anti-chip assembly. However, tools are designed to use either the insert cover or the chip assembly and both.



LESS 90°

The good way

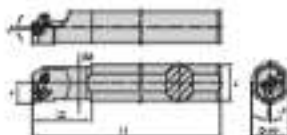


												
order number	catalogue number	D		F		pitch thread	thread series	size	size series	clamp assembly	kg	No.
		mm	in	mm	in							
right hand												
303827	9940715.00416	40	1.575	31	1.220	1.7500	DM40	DM75.3	DM70	DMC3	0.8	40
303828	9940715.00402	40	1.575	31	1.220	1.5000	DM40	DM70.4	DM70	DMC4	0.8	40
303829	9940715.00307	40	1.575	31	1.220	1.5000	DM40T	DM70.3	DM70	DMC3	0.8	40
left hand												
303830	9940715.00318	40	1.575	31	1.220	1.7500	DM40T	DM70	DM70	DMC3	0.8	40
303831	9940715.00328	40	1.575	31	1.220	1.5000	DM40T	DM70	DM70	DMC4	0.8	40
303832	9940715.00327	40	1.575	31	1.220	1.5000	DM40T	DM70	DM70	DMC3	0.8	40

NOTE: Tapping tools are supplied with steel holder and clamp assembly. However, tool are designed to cut either the steel work or the clamp assembly, not both.

Laydown Threading
Boring Bar Identification System

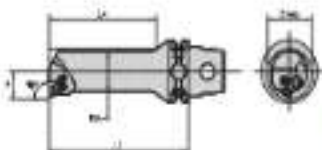

A	VR		20	3	R															
State Requirement	Tool type	Control Capability	Break Head Threads	Insert Size	Head of Tool															
A --- Thrust required B --- No other required D --- Minimum force		C --- Advantage	20 --- Advantage 20 --- Advantage 20 --- Advantage		R --- Thrust required 2 R --- Thrust required 1															
WD --- Interchangeable head 			 <table border="1"> <thead> <tr> <th>Symbol</th> <th>4</th> <th>1/4</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.50</td> <td>10</td> </tr> <tr> <td>2</td> <td>0.50</td> <td>10</td> </tr> <tr> <td>3</td> <td>10</td> <td>10</td> </tr> <tr> <td>4</td> <td>0.50</td> <td>10</td> </tr> </tbody> </table>			Symbol	4	1/4	1	0.50	10	2	0.50	10	3	10	10	4	0.50	10
Symbol	4	1/4																		
1	0.50	10																		
2	0.50	10																		
3	10	10																		
4	0.50	10																		



WIDIA

order number	catalogue number	thread size	D	D (mm)	d	d (mm)	L	L (mm)	α°	α°	tool	tool	tool
right hand													
left hand													
metric	WIDIA 100		1	10	14	16	1	16	10	10.5	WIDIA 100	WIDIA 100	10
metric	WIDIA 100		1	10	14	16	1	16	10	10.5	WIDIA 100	WIDIA 100	10

WIDIA 100 series lathe tool bits are used for automatic lathe work on steel and stainless steel. The main dimensions correspond to the standard lathe tool bits. The tool bits are used for turning and facing. An internal thread can also be used for internal threads in the same way as external threads. Please use correct thread. The lathe tool bits are used for turning and facing. The tool bits are used for turning and facing. The tool bits are used for turning and facing.



1.752 16°

order number	catalogue number	D max		D1		F		L1		L2		weight kg	kg	kg
		mm	in	mm	in	mm	in	mm	in	mm	in			
right hand														
100000	KM40T01000.000-1	10	0.4	10	0.4	7	0.28	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01001.000-1	10	0.4	10	0.4	8	0.31	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01002.000-1	10	0.4	10	0.4	11	0.43	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01003.000-1	10	0.4	10	0.4	12	0.47	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01004.000-1	10	0.4	10	0.4	13	0.51	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01005.000-1	10	0.4	10	0.4	14	0.55	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01006.000-1	10	0.4	10	0.4	15	0.59	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01007.000-1	10	0.4	10	0.4	16	0.63	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01008.000-1	10	0.4	10	0.4	17	0.67	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01009.000-1	10	0.4	10	0.4	18	0.71	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01010.000-1	10	0.4	10	0.4	19	0.75	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01011.000-1	10	0.4	10	0.4	20	0.79	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01012.000-1	10	0.4	10	0.4	21	0.83	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01013.000-1	10	0.4	10	0.4	22	0.87	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01014.000-1	10	0.4	10	0.4	23	0.91	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01015.000-1	10	0.4	10	0.4	24	0.95	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01016.000-1	10	0.4	10	0.4	25	0.99	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01017.000-1	10	0.4	10	0.4	26	1.03	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01018.000-1	10	0.4	10	0.4	27	1.07	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01019.000-1	10	0.4	10	0.4	28	1.11	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01020.000-1	10	0.4	10	0.4	29	1.15	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01021.000-1	10	0.4	10	0.4	30	1.19	10	0.39	10	0.39	1.10	0.00	0.00
left hand														
100000	KM40T01022.000-1	10	0.4	10	0.4	7	0.28	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01023.000-1	10	0.4	10	0.4	8	0.31	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01024.000-1	10	0.4	10	0.4	11	0.43	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01025.000-1	10	0.4	10	0.4	12	0.47	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01026.000-1	10	0.4	10	0.4	13	0.51	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01027.000-1	10	0.4	10	0.4	14	0.55	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01028.000-1	10	0.4	10	0.4	15	0.59	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01029.000-1	10	0.4	10	0.4	16	0.63	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01030.000-1	10	0.4	10	0.4	17	0.67	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01031.000-1	10	0.4	10	0.4	18	0.71	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01032.000-1	10	0.4	10	0.4	19	0.75	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01033.000-1	10	0.4	10	0.4	20	0.79	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01034.000-1	10	0.4	10	0.4	21	0.83	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01035.000-1	10	0.4	10	0.4	22	0.87	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01036.000-1	10	0.4	10	0.4	23	0.91	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01037.000-1	10	0.4	10	0.4	24	0.95	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01038.000-1	10	0.4	10	0.4	25	0.99	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01039.000-1	10	0.4	10	0.4	26	1.03	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01040.000-1	10	0.4	10	0.4	27	1.07	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01041.000-1	10	0.4	10	0.4	28	1.11	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01042.000-1	10	0.4	10	0.4	29	1.15	10	0.39	10	0.39	1.10	0.00	0.00
100000	KM40T01043.000-1	10	0.4	10	0.4	30	1.19	10	0.39	10	0.39	1.10	0.00	0.00

(continued)

3.1.4" – continued

Spare Parts

				
catalogue number	tool code	shape	shape code	shape drawing
right hand				
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
left hand				
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—
KW40101001.5A.010	00007	—	—	—

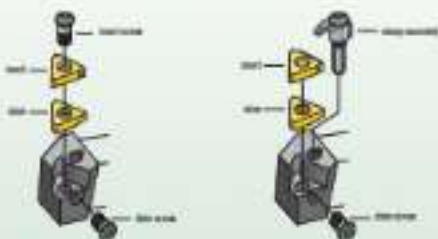
0100: Spare parts without a suffix are designed with a 1/2" to 1/4" length.

Cutting tools are supplied with sharp inserts and sharp inserts. All inserts are designed to use within the insert holder in the cutting machine and tool.

Laydown Threading Toolholder

In all cases, the proper chip selection is important.

WIDIA™ toolholders are supplied with a default 1/2° lead angle. Change the inner face thread to a new face 1° (different) 1° version. Details on proper chip selection, see pages 71 and 72.



				
Insert size and shape	Insert code	Size	Chip size and width	Chip geometry
0.1	0.1001	0.1001	0.1001	0.1001
0.1	0.1001	0.1001	0.1001	0.1001
0.1	0.1001	0.1001	0.1001	0.1001
0.1	0.1001	0.1001	0.1001	0.1001
Laydown Threading toolholder				
0.1	0.1001	—	—	—
0.1	0.1001	—	—	—
0.1	0.1001	0.1001	0.1001	0.1001
0.1	0.1001	0.1001	0.1001	0.1001
0.1	0.1001	0.1001	0.1001	0.1001
0.1	0.1001	0.1001	0.1001	0.1001

SM

Size

—

Y

Y — Laydown
clamping force

E

E — Internal
1 — External

3

3 — 1/2°

—

2N

2N — Size Angle

0.1	0.1001
0.1	0.1001
—	—
0.1	0.1001
0.1	0.1001
0.1	0.1001

nominal angle		1.2°	1.5°	1.7°	2°	2.5°	3°
nominal size (D)		screw cutting code					
inner	M 1.6x0.35	1.6x1.25	1.6x1.25	1.6x1.25	1.6x1.25	1.6x1.25	1.6x1.25
	M 1.6x0.5	1.6x1.25	1.6x1.25	1.6x1.25	1.6x1.25	1.6x1.25	1.6x1.25
outer	M 1.6x0.35	1.6x1.25	1.6x1.25	1.6x1.25	1.6x1.25	1.6x1.25	1.6x1.25
	M 1.6x0.5	1.6x1.25	1.6x1.25	1.6x1.25	1.6x1.25	1.6x1.25	1.6x1.25

Standard Size Kit

Standard size kit is available with different options than those supplied with our standard toolholders, see drawings recommended for other size for readily available in every tool shop.

nominal size	nominal size (D)	screw cutting code	nominal standard pitch
M 1.6	1.6x0.35	1.6x0.35	1.6x0.35, 1.6x0.5, 1.6x0.75, 1.6x1.0, 1.6x1.25, 1.6x1.5, 1.6x2.0
M 2.0	2.0x0.5	2.0x0.5	2.0x0.5, 2.0x0.75, 2.0x1.0, 2.0x1.25, 2.0x1.5, 2.0x2.0

The Flute Angle

Example:

$$\alpha = 45^\circ \tan \left(\frac{1}{2} \cdot \frac{1.25}{1.6} \right)$$

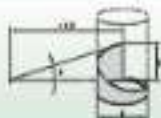
$$\alpha = 3.1^\circ \tan \left(\frac{1}{2} \cdot \frac{1.25}{1.6} \right)$$

α = flute angle

α = pitch

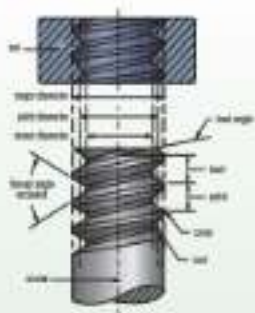
α = pitch diameter

$$\alpha = 45^\circ \tan \left(\frac{1}{2} \cdot \frac{1.25}{1.6} \right) = 3.1^\circ$$



Screw Thread Definitions

- Major diameter** — The largest diameter of a straight screw thread. This applies to both internal and external threads.
- Minor diameter** — On a straight thread, it is the diameter which passes through the thread profile at each point which makes the thread width of the given segment to one half of the basic pitch. On a "double thread", the distance of the pitch diameter with the other thread not given is equal.
- Thread angle (included)** — The included angle between the external flanks of two thread forms.
- Minor diameter** — The smallest diameter of a straight screw thread. This applies to both internal and external threads.
- Lead angle** — On a straight thread, the lead angle is the angle between the helix of the thread of the pitch diameter and a plane perpendicular to the axis.
- Lead** — The distance a screw thread advances axially in one revolution. This angle is equal to the pitch and lead are identical. This lead is equal to the pitch times the number of starts.
- Pitch** — The distance from one point on a screw thread to a corresponding point on the next thread measured parallel to the thread axis.
- Class** — The name, combination of two thread form designations for flanks.
- Class** — The internal or external of the thread form which gives the flanks.



NOTE: Thread per inch (TPI) and pitch:
 The number of threads per inch measured axially.
 The term pitch and TPI are often used interchangeably. TPI = 1/pitch

ISO-M (Metric) and UN (Unified National)



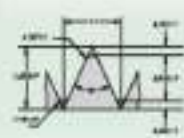
Use for standard to nonstandard threads

UNF (Unified National Fine)



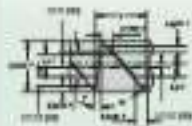
Use for standard and fine threads

Whitworth (BSF)



Use for high accuracy drawing of fine, wide and small fine threads (1:4)

American Bulkhead



Use for high accuracy drawing

BSF (American Bulkhead Pipe Thread)



Use for high accuracy drawing

BSF (British Standard Pipe Thread)



Use for threads in steel, gal. and stainless

29 UNF-2B



Use for standard drawing of standard threads (1:4)

ASME



A = 0.0001"
B = 0.0001" + 0.0001"
C = 0.0001" + 0.0001" (optional)
Use: single thread in steel or stainless steel or other nonferrous metals

ASME, Interrupted (Stub)



A = 0.0001"
B = 0.0001" + 0.0001"
C = 0.0001" + 0.0001" (optional)
Use: standard drawing of stubs

BSF (Coarse and Fine) Thread Form



NOTE: Tap and die suggested

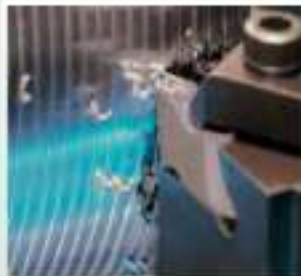
problem	cause	possible solution
Microchips look black 	• Cool • Dry fluid • Clean • Increase flow • Increase oil level	• Overheated back plate • Overfilled back plate • Increase coolant concentration • Increase speed • Check whether 7" bore size • Check pressure • Check for correct oil level (7 system) • Calculate back clearance
cracks 	• Dry spots • Heat treatment • Increase oil level • Oil circulation	• Overheated back plate • Remove hot working • Check for workpiece deformation • Check heat treatment • Refill hot circulating coolant over workpiece position • Adapt number of passes - lower coolant concentration
rolling edge 	• Speed too low • Insufficient coolant • Chip load	• Increase speed • Increase coolant concentration and/or flow • Adapt feed rate • Increase depth of coolant zone
overheated 	• Wrong grade • Speed too high • Inappropriate chip load • Insufficient coolant	• Overheated back plate • Increase slow coolant grade (eg. 70000) • Reduce speed • Increase coolant flow
chipping 	• Increase speed • Chip load • Wrong grade • Incorrect speed • Feed speed	• Overheated back plate • Increase or decrease coolant flow • Increase spring pressure • Change grade (eg. 70000) • Increase coolant chip load to cutting edge • Increase coolant chip load to cutting edge • Increase hot working • Check for workpiece deformation - increase workpiece stiffness • Check for possible hot deformation • Calculate back clearance • Increase coolant flow
cracks work 	• Coarse chip load • Cool too quickly • Wrong grade • Multiple feed	• Overheated back plate • Increase chip load • Increase coolant chip load • Change grade (eg. 70000)
feed error 	• Increase speed • Wrong grade • Insufficient coolant • Oil circulation • Too little back clearance • Inappropriate chip load	• Increase coolant flow • Increase slow coolant grade (eg. 70000) • Increase coolant flow • Check the coolant supply to the tool (the coolant is directed to the rear of the tool for grinding operation) • Calculate back clearance and change when a minimum clearance is given back • Check work cutting feed, increase coolant chip load

problem	possible causes									
	runout on workpiece	runout on workpiece	runout on workpiece	runout on workpiece	runout on workpiece	runout on workpiece	runout on workpiece	runout on workpiece	runout on workpiece	runout on workpiece
chatter	•		•				•	•		•
bar chatter	•						•			•
overheating		•	•	•		•	•			•
chipped leading edge			•	•	•					
chipped cutting edge				•				•		
broken nose (2nd pass)	•								•	•
broken nose (after 3rd pass)			•	•				•		•
built-up on cutting edge	•		•			•	•			•
corrosion coating								•		
cutting fluid									•	
poor chip evacuation								•		•

WIDIA™ insert technology brings chip control to your finishing operations with the "Top Guard™" platform. The proprietary WIDIA recessed chip groove, when used according to our recommendations, controls the chip in each revolution. The positionable design isolates cutting pressure, allowing built-in shock absorbing load capacity that provides better chip life. Long, strong chips no longer tear the workpiece surface finish. The change in operation when turning long chips from the workpiece and chip is observed. All of these benefits combine to improve the productivity of your finishing operations.

The Last Pass

Good CNC controls require the last pass to be at a 1° insert angle because the chip will not break on the last pass. The most common feed rates, the feed rate rate remains still, often enough about and provides an acceptable feed. For some materials, an additional 0.0010 in/rev (0.0254 mm/rev) pass may be used to improve surface finish, however, depending on the tool or component.

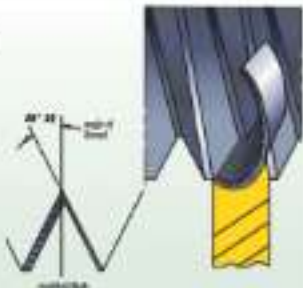


Machining Programming

Modern CNC controls allow the programmer to easily adjust insert angle, the number of passes, and depth of cut for each pass. During insert finishing, most controls allow an insert angle of 0° to 40°, although 0° to 20° is accurate. Also, it is important to maintain a minimum 0.010 in/rev (0.254 mm/rev) feed rate. In most applications, even if CNC control cycles produce very marginally acceptable results, custom written programs can better suit the requirements.

Insert Angle

In order to effectively and consistently finish the chip, it is important to use an insert angle between 10° and 20° to 30°. The feed rate chip control controls all of these angles from 0° to 30°.



Radius	Modified flank	Alternating flank	Reversed modified flank
modified flank  	modified flank  	alternating flank  	modified flank  
Advantages – • Cutting on both sides of the flank face allows all of the cutting edge to be used and produces superior chipbreaks • Good wear on the flank	Advantages – • Good side relief areas of flank face, so it is protected from chipping during in 0° feed. (Does not require chip breakers, but causes chip breakers to remove the chip under the flank relief) • This is the preferred method, especially when used with a chip control tool. • Good wear on the alternating flank relief. • Results in good tool life, with wear evenly distributed over both flanks.	Advantages – • Increased tool life because both edges are used equally NCBI: Some modified tools may require special programming techniques to achieve this method of relief.	Advantages – • Tool automatically takes on the shape of the workpiece, so it is protected from chipping under full feed. (Does not require chip breakers, but causes chip breakers to remove the chip under the flank relief) • This is the preferred method, especially when used with chip control tool. • Good wear on the alternating flank relief. • Good wear on the flank face, with wear evenly distributed over both flanks. • Good wear on the flank face, with wear evenly distributed over both flanks.
Disadvantages – • Tool clearance is shaped chip tool may be difficult to handle • The chipbreaker causes more cutting edge wear on the flank • Tool wear is increased • In the cutting edge is engaged in both of the work, causing increased tool wear on the flank	Disadvantages – • Similar disadvantages as with 0° relief, although without the wear on the flank face, so it is protected from chipping during in 0° feed.	Disadvantages – • Difficult to cut on conventional machines	Disadvantages – • Flank wear is not as good as the flank face

Partial Profile



Teeth profile with selected profile shape

- 40° to 60° without cutting edges for the tooth layout
- Reduced tooling
- Full tooling profile is a limited range
- Increased machine production
- Majorities dependent must be accordingly corrected

Full Profile



Teeth profile selected profile shape according tooth layout

- For tooling, profile should be the specified plan
- General operation
- Machining direction for construction depends on tooth layout

Multi-Tooth Profile



Multi-tooth profile generally with 2-3 teeth

- High production throughput with short process and longer tool life
- Depends on tool setup and long feed rate over through
- Minimum clearance width approximately 1.5 to 2 mm particularly feed direction table

Formula

Metric Formula		
tooth	gear	formula
mm	$\frac{1000}{\text{mm}}$	$\frac{1000}{\text{mm}} \rightarrow \text{mm}$
mm	$\frac{1000}{\text{mm}}$	$\frac{1000}{\text{mm}} \rightarrow \text{mm}$

Legend

- mm = metric unit value
- mm = metric unit value
- mm = metric unit value
- mm = metric unit value

Maximum Cutting Speeds

On other machines, cutting speed is influenced by the maximum feed speed provided or the feed rate for the machine.

Check your maximum speed with the following formula:

metric formula: maximum cutting speed (m/min) =
part diameter (mm) x 0.001 x 1000 x 1000 x 1000

Flank clearance

- angle (in degrees) between
- angle (in degrees) between
- angle (in degrees) between
- angle (in degrees) between

Flank	Angle	Clearance	Interval
10 & 12	10	1.5	0
15	15	1.5	1.5
20	20	1.5	1.5
25	25	1.5	1.5
30	30	1.5	1.5
35	35	1.5	1.5
40	40	1.5	1.5
45	45	1.5	1.5
50	50	1.5	1.5

Metric ISO, External Thread Cutting

pitch (mm)	0.5	0.75	1.0	1.25	1.5	1.75	2.0	2.5	3.0	3.5	4.0	5.0	6.0
T (mm)	0.010	0.012	0.015	0.018	0.022	0.027	0.033	0.040	0.048	0.058	0.069	0.083	0.100
R (µm)	0	0	0	0	0	0	0	0	0	0	0	0	0
width for feed (AT)													
width of groove	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1	0.004	0.005	0.007	0.007	0.009	0.011	0.013	0.016	0.019	0.023	0.027	0.033	0.040
2	0.008	0.010	0.013	0.014	0.018	0.022	0.026	0.032	0.039	0.047	0.056	0.067	0.080
3	0.012	0.015	0.019	0.021	0.026	0.032	0.038	0.046	0.055	0.066	0.078	0.093	0.110
4	0.016	0.020	0.025	0.028	0.034	0.042	0.050	0.060	0.071	0.084	0.098	0.115	0.135
5			0.030	0.035	0.042	0.050	0.060	0.071	0.084	0.098	0.115	0.135	0.158
6				0.040	0.048	0.058	0.069	0.082	0.097	0.113	0.131	0.153	0.180
7					0.050	0.060	0.072	0.086	0.101	0.118	0.137	0.160	0.188
8						0.0575	0.069	0.084	0.100	0.117	0.137	0.160	0.190
9								0.065	0.081	0.099	0.119	0.142	0.172
10									0.067	0.084	0.103	0.125	0.155
11										0.069	0.087	0.109	0.139
12											0.070	0.089	0.119
13												0.071	0.091
14													0.072
15													0.073
16													0.074
T (mm)	0.010	0.012	0.015	0.018	0.022	0.027	0.033	0.040	0.048	0.058	0.069	0.083	0.100

NOTE: Always allow 0.01 mm clearance for tool profile errors.

Metric ISO, Internal Thread Cutting

thread pitch P (mm)	0.5	0.75	1.0	1.25	1.5	1.75	2.0	2.5	3.0	3.5	4.0	5.0	6.0
T (mm)	0.010	0.012	0.015	0.018	0.022	0.027	0.033	0.040	0.048	0.058	0.069	0.083	0.100
R (µm)	0	0	0	0	0	0	0	0	0	0	0	0	0
width for feed (BT)													
width of groove	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1	0.004	0.005	0.007	0.007	0.009	0.011	0.013	0.016	0.019	0.023	0.027	0.033	0.040
2	0.008	0.010	0.013	0.014	0.018	0.022	0.026	0.032	0.039	0.047	0.056	0.067	0.080
3	0.012	0.015	0.019	0.021	0.026	0.032	0.038	0.046	0.055	0.066	0.078	0.093	0.110
4	0.016	0.020	0.025	0.028	0.034	0.042	0.050	0.060	0.071	0.084	0.098	0.115	0.135
5			0.030	0.035	0.042	0.050	0.060	0.071	0.084	0.098	0.115	0.135	0.158
6				0.040	0.048	0.058	0.069	0.082	0.097	0.113	0.131	0.153	0.180
7					0.050	0.060	0.072	0.086	0.101	0.118	0.137	0.160	0.188
8						0.0575	0.069	0.084	0.100	0.117	0.137	0.160	0.190
9								0.065	0.081	0.099	0.119	0.142	0.172
10									0.067	0.084	0.103	0.125	0.155
11										0.069	0.087	0.109	0.139
12											0.070	0.089	0.119
13												0.071	0.091
14													0.072
15													0.073
16													0.074
T (mm)	0.010	0.012	0.015	0.018	0.022	0.027	0.033	0.040	0.048	0.058	0.069	0.083	0.100

NOTE: Always allow 0.01 mm clearance for tool profile errors.

UN Thread, External Thread Cutting

ISO	14	16	18	20	22	24	27	30	33	36	40	45	50	55
T Ap (mm)	0.140	0.160	0.180	0.200	0.220	0.240	0.270	0.300	0.330	0.360	0.400	0.450	0.500	0.550
R Ap	0	0	0	0	0	0	0	0	0	0	0	0	0	0
range for feed rates (G)														
ISO of process	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14
1	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
2	0.140	0.160	0.180	0.200	0.220	0.240	0.270	0.300	0.330	0.360	0.400	0.450	0.500	0.550
3	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
4	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
5	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
6	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
7		0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
8			0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
9				0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
10					0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11						0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
12							0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
13								0.10	0.10	0.10	0.10	0.10	0.10	0.10
14									0.10	0.10	0.10	0.10	0.10	0.10
15										0.10	0.10	0.10	0.10	0.10
T Ap (mm)	0.140	0.160	0.180	0.200	0.220	0.240	0.270	0.300	0.330	0.360	0.400	0.450	0.500	0.550

ISO: Range above 0.05 is recommended for all processes.

UN Thread, Internal Thread Cutting

ISO	14	16	18	20	22	24	27	30	33	36	40	45	50	55
T Ap (mm)	0.140	0.160	0.180	0.200	0.220	0.240	0.270	0.300	0.330	0.360	0.400	0.450	0.500	0.550
R Ap	0	0	0	0	0	0	0	0	0	0	0	0	0	0
range for feed rates (G)														
ISO of process	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14
1	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
2	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
3	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
4	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
5	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
6		0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
7			0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
8				0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
9					0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
10						0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
11							0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
12								0.10	0.10	0.10	0.10	0.10	0.10	0.10
13									0.10	0.10	0.10	0.10	0.10	0.10
14										0.10	0.10	0.10	0.10	0.10
15											0.10	0.10	0.10	0.10
T Ap (mm)	0.140	0.160	0.180	0.200	0.220	0.240	0.270	0.300	0.330	0.360	0.400	0.450	0.500	0.550

ISO: Range above 0.05 is recommended for all processes.

**NPT Thread, External, and
Internal Machining**

inch	1/8	1/4	3/8	1/2	3/4
T (gpm)	0.70	1.10	1.80	3.00	5.60
SAp	0	0	0	0	0
value for feed (psi)					
order of pieces	30	32	35	38	42
1	0.30	0.25	0.20	0.15	0.10
2	0.25	0.20	0.15	0.10	0.08
3	0.20	0.15	0.10	0.08	0.06
4	0.18	0.13	0.08	0.06	0.04
5	0.16	0.10	0.07	0.05	0.03
6	0.14	0.09	0.05	0.04	0.02
7		0.08	0.04	0.03	0.01
8		0.07	0.03	0.02	
9			0.02	0.01	
10			0.01	0.00	
11				0.00	
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
T (gpm)	0.70	1.10	1.80	3.00	5.60

NOTE: Recommended LPR is 0.0005 in/rev for all feed rates.

**BSPT Thread, External, and
Internal Machining**

inch	1/8	1/4	3/8	1/2
T (gpm)	0.60	0.80	1.30	1.80
SAp	0	0	0	0
value for feed (psi)				
order of pieces	30	32	35	38
1	0.30	0.25	0.20	0.15
2	0.25	0.19	0.15	0.10
3	0.20	0.15	0.10	0.08
4	0.18	0.13	0.08	0.06
5	0.16	0.10	0.07	0.05
6	0.14	0.09	0.05	0.04
7		0.08	0.04	0.03
8		0.07	0.03	0.02
9			0.02	0.01
10			0.01	0.00
11				0.00
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
T (gpm)	0.60	0.80	1.30	1.80

**Truncated Thread to DIN 803, External,
and Internal Machining**

inch	1/8	1/4	3/8	1/2	3/4
T (gpm)	0.60	0.80	1.30	1.80	2.70
SAp	0	0	0	0	0
value for feed (psi)					
order of pieces	30	32	35	38	42
1	0.30	0.25	0.20	0.15	0.10
2	0.25	0.20	0.15	0.10	0.08
3	0.20	0.15	0.10	0.08	0.06
4	0.18	0.13	0.08	0.06	0.04
5	0.16	0.10	0.07	0.05	0.03
6	0.14	0.09	0.05	0.04	0.02
7		0.08	0.04	0.03	0.01
8		0.07	0.03	0.02	
9			0.02	0.01	
10			0.01	0.00	
11				0.00	
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
T (gpm)	0.60	0.80	1.30	1.80	2.70

NOTE: Recommended LPR is 0.0005 in/rev for all feed rates.

**Flared Thread to DIN 805, External,
and Internal Machining**

inch	1/8	1/4	3/8
T (gpm)	0.60	0.80	1.30
SAp	0	0	0
value for feed (psi)			
order of pieces	30	32	35
1	0.30	0.25	0.20
2	0.25	0.19	0.15
3	0.20	0.15	0.10
4	0.18	0.13	0.08
5	0.16	0.10	0.07
6	0.14	0.09	0.05
7		0.08	0.04
8		0.07	0.03
9			0.02
10			0.01
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
T (gpm)	0.60	0.80	1.30

NOTE: Recommended LPR is 0.0005 in/rev for all feed rates.

The following chart for the tap guard provides that can be applied on internal applications using Tap Guard® Threading Inserts for G1/2" Threading and Acme Threading.



Machine-mount G1/2" Threading Inserts

Internal Threading Installation
M1.1, M1.2 G1/2" Threading Inserts

Tap	nominal thread size		minimum thread diameter (mm)	
	M1.1	M1.2	M1.1	M1.2
1/8"	M4.0 x 0.50	-	4.00	-
1/8"	M4.0 x 0.50	-	36.75	-
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25

*Threading of insertions can be cut with an M1.1 insert provided the used thread diameter is identical to the hole size with M1.2.

Internal Threading Installation

M1.1 and M1.2 G1/2" Threading Inserts

Tap	nominal thread size		minimum thread diameter (mm)	
	M1.1	M1.2	M1.1	M1.2
1/8"	M4.0 x 0.50	-	4.00	-
1/8"	M4.0 x 0.50	-	36.75	-
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25
1/8"	M4.0 x 0.50	M4.0 x 0.50	36.75	31.25

*Threading of insertions can be cut with an M1.1 insert provided the used thread diameter is identical to the hole size with M1.2.

Acme Threading Inserts

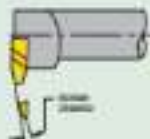
Internal Threading Installation
M4 and M4.2, 3, 4, and 5 Acme Threading Inserts

Tap	nominal thread size		minimum thread diameter (mm)	
	M4.1	M4.2	M4.1	M4.2
1/8"	4	4.200	4.00	4.100
1/8"	4	4.200	4.00	4.100
1/8"	4	4.200	4.00	4.100
1/8"	4	4.200	4.00	4.100
1/8"	4	4.200	4.00	4.100
1/8"	4	4.200	4.00	4.100
1/8"	4	4.200	4.00	4.100
1/8"	4	4.200	4.00	4.100
1/8"	4	4.200	4.00	4.100
1/8"	4	4.200	4.00	4.100
1/8"	4	4.200	4.00	4.100
1/8"	4	4.200	4.00	4.100

*Threading of insertions can be cut with an M4.1 insert provided the used thread diameter is identical to the hole size with M4.2.

Tap Guard®

Tap Guard®



Additional insertions can be cut with an M4.1 insert provided the used thread diameter is identical to the hole size with M4.2.

60° V-Thread Crest Turning Application Data



WTC, standard tool

for P + M and A

WTC, special tool

for P + M and A

WTC, WTC inserts automatically control tool to create chamfers.
 Therefore, in setting up, finishing operations with WTC inserts,
 check the D.C.T. in D.T. at the thread crest for correct dimensions.

60° V-Thread Crest Turning Application Data

Insert catalogue number	max. cutting speed (m/min)	Recommended per ISO 6503/4 (m/min)
WTC 204010 02	6,000 (2,000)	6,000 (2,000)
WTC 204010 03	6,000 (2,000)	6,000 (2,000)

1/2" Thread note for catalogues

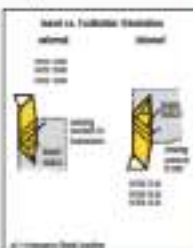
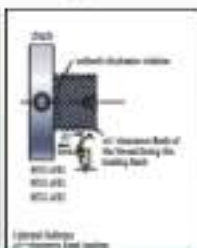
The catalogue thread value (thread form ISO metric) is defined by the standard
 thread only. To achieve the corresponding thread form, choose and insert
 the width of the thread (D.D.T.). For more the thread depends on the
 size of the thread and the D.D.T. and the D.D.T. and the D.D.T. for the thread 1/2"
 thread other thread values.

60° V-Thread Application Data

thread description	Insert	D (mm)	E (mm)	recommended TMT		recommended TMT	
				external	internal	external	internal
	W1-1	1.00	1.11	-	14-15	-	1.20-1.25
	W1-2	16.00	1.00	15-16	16-17	1.20-1.25	1.25-1.30
	W1-3	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-4	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-5	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-6	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-7	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-8	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-9	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-10	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-11	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-12	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-13	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-14	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-15	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-16	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-17	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-18	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-19	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-20	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-21	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-22	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-23	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-24	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-25	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-26	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-27	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-28	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-29	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30
	W1-30	16.00	1.00	16-17	16-17	1.20-1.25	1.25-1.30

Based on maximum insert width and maximum thread V-Thread pitch diameter

American Drillream (45° Chatterless Flank Loading): NTD-3 Inserts • FULL type



Reference Dimensions

Shed Angle vs. Chip Load: 45° Chatterless Flank Loading



NTD-3 Insert

Insert	4 inch	1/2 inch	1/4 inch	1/8 inch	1/16 inch
NTD-3	171	221	234	234	234

NTD-3 Insert: 1/2 inch diameter and 1/2 inch length is suggested.

Internal Threading Limitations

Internal Threading Limitations NTD-3 Insert: 1/2 inch diameter		
Tap	Internal Thread Size	Internal Thread Diameter (inch)
1/8	1/8	1.00
1/4	1/4	1.00
1/2	1/2	1.00
3/4	3/4	1.00
1	1	1.00

Internal Threading Limitations NTD-3 Insert: 1/2 inch diameter		
Tap	Internal Thread Size	Internal Thread Diameter (inch)
1/8	1/8	1.00
1/4	1/4	1.00
1/2	1/2	1.00
3/4	3/4	1.00
1	1	1.00
1 1/4	1 1/4	1.00
1 1/2	1 1/2	1.00
1 3/4	1 3/4	1.00
2	2	1.00

NTD-3 Insert

Laydown Threading System



EXTREME CHALLENGES.
EXTREME RESULTS.

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 reliably leading thread quality
- Ideal choice for high built-in-chip threads and single point threading in small diameter bores

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

WIDIA

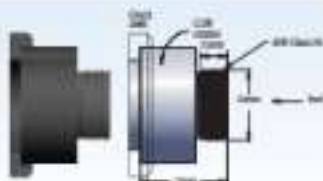
Required Information

From Part Drawing

- material: 1.4571, 1.4571-2
- thread form: G7/8
- tolerance: class 1H
- operation: external threading
- part function: screw in front flange

From Machine Setup Data

- tooling: screw in clamp
- spindle rotation: anti-clockwise
- feed: 0.0661 mm/rev



Steps for a Successful Threading Operation

Step 1 •

External Threading Method

Need to Know

- Operation (external)
- Spindle rotation (G7/8)
- Anti-clockwise thread
- Feed direction (screw clamp)
- High feed feedrate
- High feed feedrate (G7/8)
- Constant feed feedrate



Step 2 •

Select Insert



Need to Know

- Thread form (G7/8) from plan
- Axial clearance (right hand - 1%)

Choose the High-Performance Solution

catalogue number	insert size	TM002
2000000	0	+

High-Performance Solutions

- W777: Use insert with longest feed rate available
- Insert: 2000000
 - Grade: TM002
 - Grade: 1000000

Step 3 •

Select the Grade and Speed

Need to Know

- Workpiece material (1.4571, 1.4571-2)
- Operation (external)

Optimal Grade and Speed Calculation Guidelines

Threading operation	Optimal speed
external	perforated and high performance
	TM002
	1000000

Step 4 •

Select Toolholder

Need to Know

- External or internal operation (external)
- V-chip diameter to determine minimum bore diameter (G7/8)
- Easy threading - production, turning, etc. (external)
- Axial clearance (right hand)
- Insert size (G7/8)



Options

catalogue number	insert size	size
AL 0000	2	2000000

Step 5 •

Select G-code

Need to Know

- Thread form - G7/8 or plan G7/8
- Feed direction (internal)
- Feed rate (external)
- Use operation Threading (G7/8) with selection input

Optimal TM 002 is used

W777: For the application, the standard item number should be replaced with the recommended value TM 002.

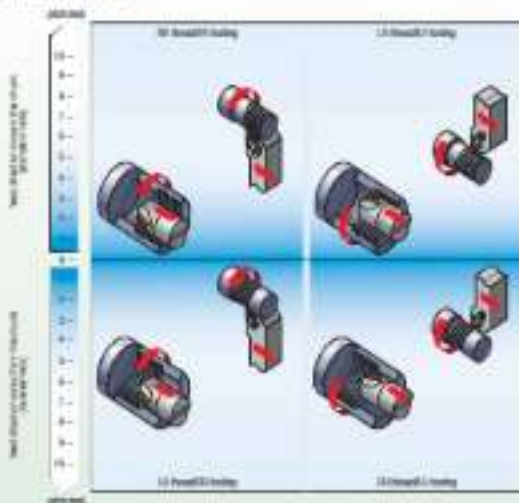
Laydown Threading Grain Selection Guidelines

It is essential to select the correct grit to ensure finish quality and tooling life. These guidelines are essential:

- P100
- P150 (standard)
- Resin or duplex
- T tool (duplex)

NOTE: When supporting surface is free cutting, the grits chosen will usually produce low surface stresses and high life.

Laydown Selection Chart



NOTE: For each laydown, use the maximum grit size for the grit.

Diagram of Thread Lead Angle

To determine the lead angle of a given thread, use the formula:

$$\theta = \arctan \left(\frac{P}{\pi D} \right)$$

Where:

- θ = thread lead angle
- P = effective pitch diameter of thread
- D = pitch diameter
- π = 3.14159
- D = number of teeth
- π = 3.14159
- D = number of teeth
- π = 3.14159

All toolholders are designed with an inclusion angle of 1.2°. When turning standard threads with a lead angle of 1.2°, the toolholder will cut the threads of the work in the lead to the lead angle. The thread lead angle will be the same as the lead angle of the tool and given by θ .

Cutting edge length is constant in every other and round toolholders. All toolholders are supplied with a 1.2° lead angle.



