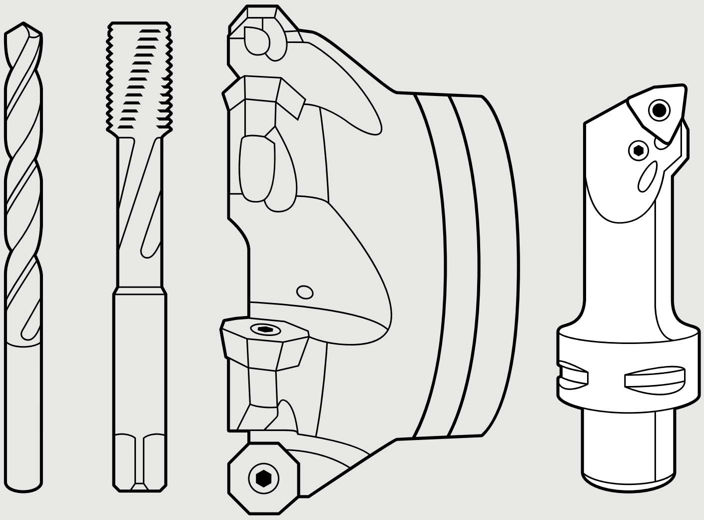
WALTER
Engineering Kompetenz

Turning, grooving,
thread turning

Technical Compendium – Turning
Edition 2023

_ METAL IS OUR WHOLE WORLD

Technical Compendium
Turning



Technical Compendium – Turning

ISO turning

General information

Application information

Assembly parts and accessories

Designation key

Technical Compendium – Turning

Grooving

General information

Application information

Assembly parts and accessories

Designation key

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Thread turning

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General

Technologies at Walter.

Accure·tec®	The patented Walter Accure·tec® technology ensures maximum vibration damping on boring bars for turning and adaptors for milling. Ideal for turning, milling and drilling operations involving extended tool applications.
Krato·tec™	Krato·tec™ is a unique Walter coating technology for solid carbide tools. The core of this consists of an extraordinarily fracture-resistant AlTiN multi-layer coating with a textured top layer. The special layer architecture is highly wear- and adhesion-resistant, even at high cutting speeds, and ensures the tools have universal application.
Tiger·tec® Gold	Tiger·tec® Gold, the new Walter generation platform for unique indexable insert coatings, enables maximum tool life and process reliability. The new grades are based on PVD, CVD or ULP technology, depending on the application. Unique coating properties, protected by multiple patents, guarantee the best protection against tool life-limiting types of wear and ensure outstanding performance.
Tiger·tec® Silver	With Tiger·tec® Silver, Walter is offering a world first in coating technology for indexable inserts. The special aluminium oxide layer with optimised microstructure reduces wear during turning, milling and drilling operations, and increases toughness and temperature resistance for significantly higher cutting data.
Walter BLAXX	Walter BLAXX is the benchmark for a new generation of milling cutters: The milling bodies are extremely robust thanks to their special surface treatment. The milling systems, which are mainly positioned tangentially, are equipped with Tiger·tec® indexable inserts. Tools with the “Walter BLAXX” designation combine high wear resistance with unbeatable performance data.
Walter Green	Walter Green: Sustainability and responsible use of resources are central components of our company principles. We use our “Walter Green” seal to show how we implement these principles – such as by offsetting our CO_2 emissions with environmental conservation projects.
Walter Xpress	Walter Xpress is the rapid ordering and delivery service offered by Walter Multiply for high-quality special tools. It is available for around 10,000 tool varieties, with a maximum delivery time of two to four weeks from the order date. The ordering process is clearly structured and guarantees absolute planning security. Quotations for all enquiries are calculated and provided within 24 hours.
Walter Precision XT	Precision boring tools are always used to finish an existing bore or to improve the precision of existing bores, for instance by correcting their position, narrowing the hole tolerance, or enhancing the surface quality. Precision boring is typically performed using a depth of cut < 0.5 mm (0.02 inches).
Walter Boring XT	Tools for rough boring are used to expand existing bores. Material removal is a key element of this process. The bore to be enlarged is machined in advance or created using casting or forging processes. The rough boring tools themselves can also be used for radial offsetting and multi-edge boring.
XD Technology	Walter Titex solid carbide drilling and reaming tools stand for precision, high performance and cost-efficiency when drilling in practically any material. Walter Titex XD Technology offers the greatest precision and cost-efficiency in deep-hole drilling operations up to 70 × D_c without pecking.

Xill·tec®	With Xill·tec®, the solid carbide milling cutters from the MC230 Advance product line, Walter offers a uniquely wide range, with different dimensions, numbers of teeth and shank versions. This means that users are well-equipped for all conceivable milling operations and ISO materials. Universal application – with excellent quality.
Xtra·tec®	Xtra·tec® indexable insert milling cutters and drills guarantee extremely soft cutting action and optimal surface quality on almost all materials. Indexable inserts with highly positive geometries and the Tiger·tec® coating have a particularly beneficial hardness/toughness ratio. For maximum productivity and process reliability.
Xtra·tec®XT	Xtra·tec® XT is the latest generation of Walter milling tools. As the "Xtended" Xtra·tec® technology, it offers a completely new perspective on productivity and process reliability. It can cover nearly all milling operations in every common material group: More reliable, productive, cost-efficient than ever before – all while compensating for the CO_2 emissions through Walter Green.
X·treme Evo	For Walter, the X·treme Evo DC260 and DC160 Advance solid carbide drills as well as the X·treme Evo Plus DC180 Supreme and X·treme Evo 3 DC183 Supreme are the embodiment of the "next generation of drilling", offering versatility for a wide range of materials and machine concepts – with outstanding tool life, productivity and process reliability.
Walter Capto™	Walter Capto™ is a modular tool adaption system. It is suitable for all turning, milling, drilling and threading operations. Its ISO-standardised polygon taper absorbs torsional moments and bending moments extremely well and ensures optimal repeat accuracy.
ConeFit	Walter ConeFit is an extremely flexible solid carbide milling system with a wide range of high-performance exchangeable heads and shank variants. Its conical thread can self-centre, thereby guaranteeing maximum stability and concentricity.
ScrewFit	Walter ScrewFit users benefit from maximum flexibility. Its modular interface is suitable for a wide variety of boring bars and adaptors and a wide range of tool diameters and lengths for milling and drilling.
QuadFit	The precision-ground QuadFit interface with taper and support face characterises the precision of the vibration-damped boring bars for turning and thread turning with Walter Accure·tec® technology. The exchangeable head system, which can be rotated by 180°, makes it possible to rapidly replace tools with high indexing accuracy.
	In turning and grooving operations, the Walter precision cooling system provides cooling at the centre of the chip formation. Its dual coolant jets are directed precisely onto the flank and rake faces. In drilling operations, the coolant jets exit close to the cutting edge. This system provides significantly increased tool life, improved chip breaking and chip removal, greater efficiency and higher quality.
Flash	"Flash" refers to specialised solid carbide milling cutters for high-feed milling. Their end-face geometry reduces the chip thickness "h" and therefore enables an extremely high feed per tooth. Forces that occur are diverted axially towards the centre of the tool, which helps to stabilise the machining process.
SmartLock	On Walter turning toolholders with "SmartLock", the clamping screw can be operated from the side of the tool. This makes it possible to index the inserts **in** the machine quickly and easily. Indexing times are reduced as a result. Ideal for use on CNC lathe and multi-spindle machines.

Walter tools for turning

Walter offers a complete range of tools for turning, grooving and thread machining.
All tools are available with standard ISO square shanks and boring bars, and with Walter Capto^{TM} interface C3–C8 in accordance with ISO 26623 for maximum flexibility, stability and indexing accuracy on any lathe.

1 **Walter NTS boring bar – Internal thread turning**
- Standard ISO and Walter Capto^{TM} boring bars
- Three-edged indexable inserts for all of the most popular threads such as ISO metric, Whitworth, American UN, etc.

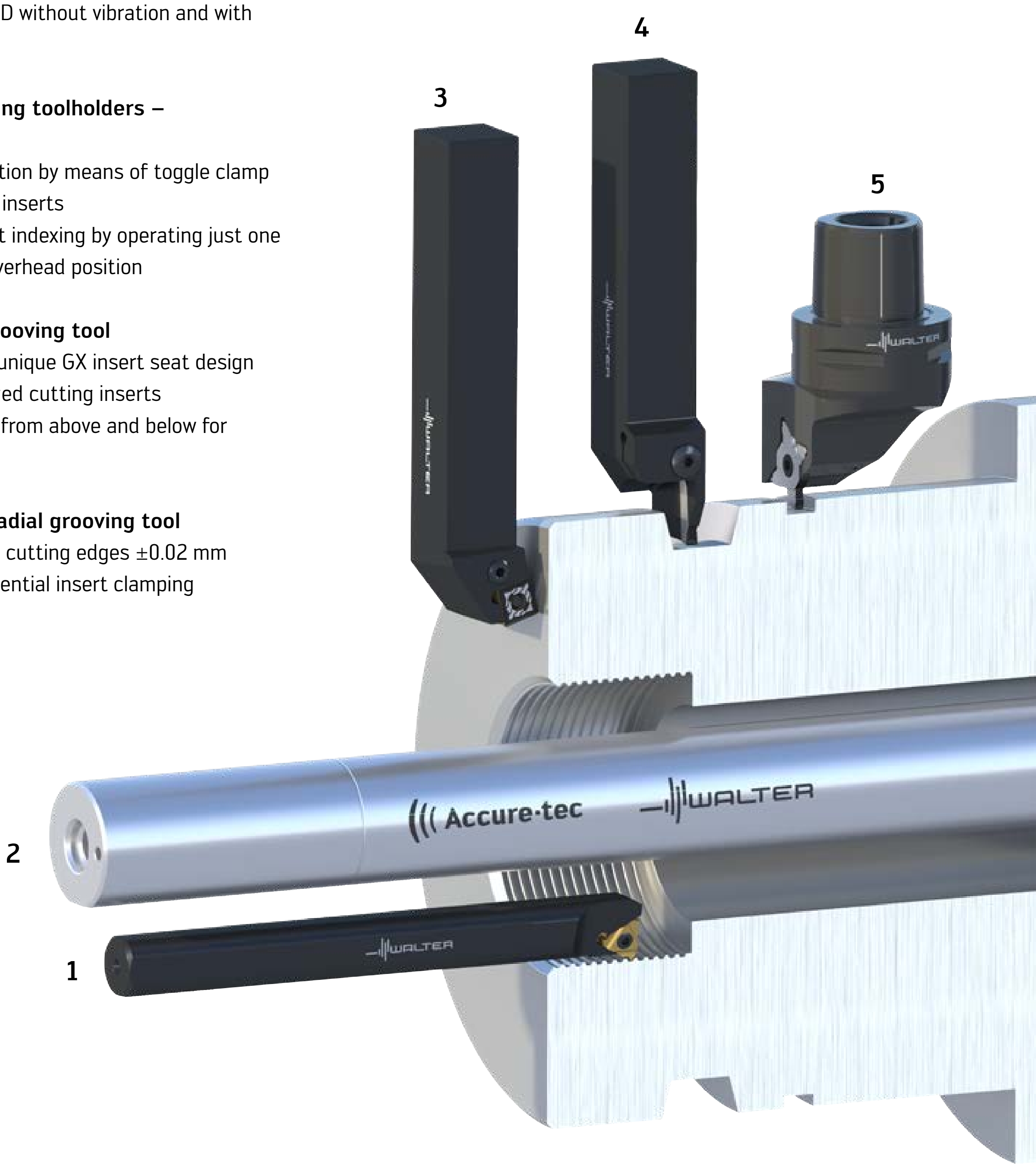
2 **Accure·tec® A3000/A3001 vibration-damped boring bars**
- Accure·tec® boring bars with patented vibration-damping technology
- Bore machining up to 10 × D without vibration and with optimum surface quality

3 **Walter Turn external turning toolholders – Toggle clamp**
- Unobstructed chip evacuation by means of toggle clamp for negative ISO indexable inserts
- Easy handling during insert indexing by operating just one screw in the normal and overhead position

4 **Walter Cut G1011 radial grooving tool**
- Maximum stability due to unique GX insert seat design for single- and double-edged cutting inserts
- Access to clamping screw from above and below for easy tool handling

5 **Walter Capto™ G3011-P radial grooving tool**
- Four precision-ground MX cutting edges ±0.02 mm
- Stable, self-aligning, tangential insert clamping

6 **Walter Cut G2042 deep parting blade**
- Stable self-clamping system for SX cutting inserts using top clamp and optimised insert seat
- Cost-effective, single-edged parting-off solution for a cutting depth of up to 100 mm



7 Walter Turn external turning toolholders – Precision cooling

- Walter precision cooling on the rake face and flank face increases tool life by 30–150 %
- Stable insert clamping due to the clamp which ensures maximum process reliability

8 Walter NTS shank tool – External thread turning

- Indexable inserts for all of the most popular threads such as ISO metric, Whitworth, American UN, etc.
- Three-edged indexable inserts in full profile and partial profile versions

9 Walter Cut – G1111 axial grooving tool

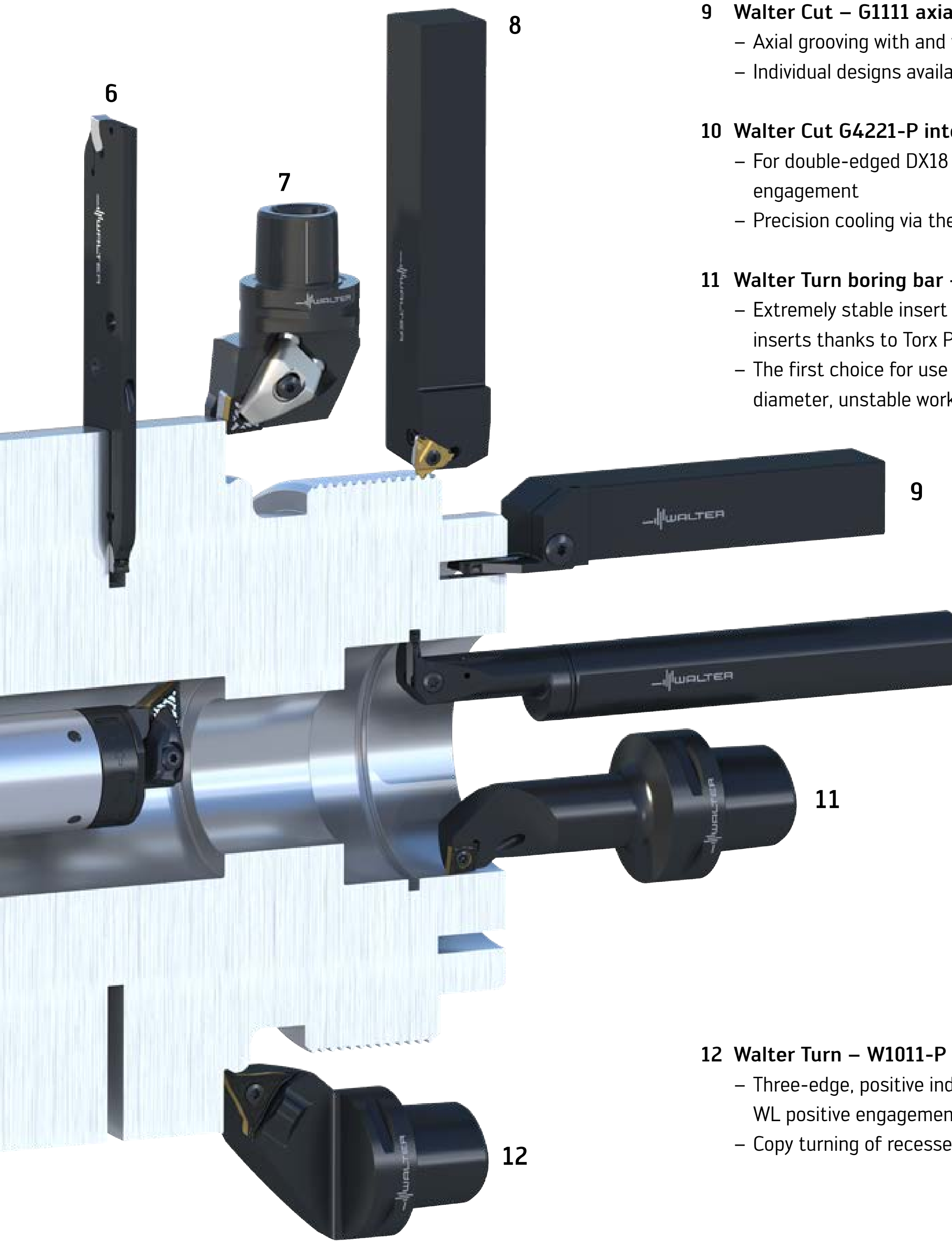
- Axial grooving with and without precision cooling
- Individual designs available via Walter Xpress

10 Walter Cut G4221-P internal grooving tool

- For double-edged DX18 cutting inserts with positive engagement
- Precision cooling via the top clamp

11 Walter Turn boring bar – Screw clamping

- Extremely stable insert clamping for positive ISO indexable inserts thanks to Torx Plus screw clamping
- The first choice for use with low cutting pressures or small diameter, unstable workpieces

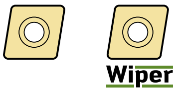
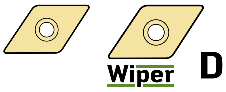
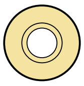
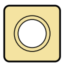
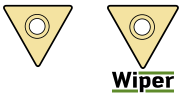
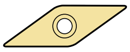
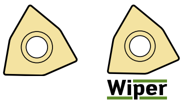


12 Walter Turn – W1011-P copy turning system

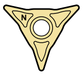
- Three-edge, positive indexable inserts with stable WL positive engagement
- Copy turning of recesses up to 50°

Product range overview of indexable inserts and cutting tool materials: ISO turning – Carbide

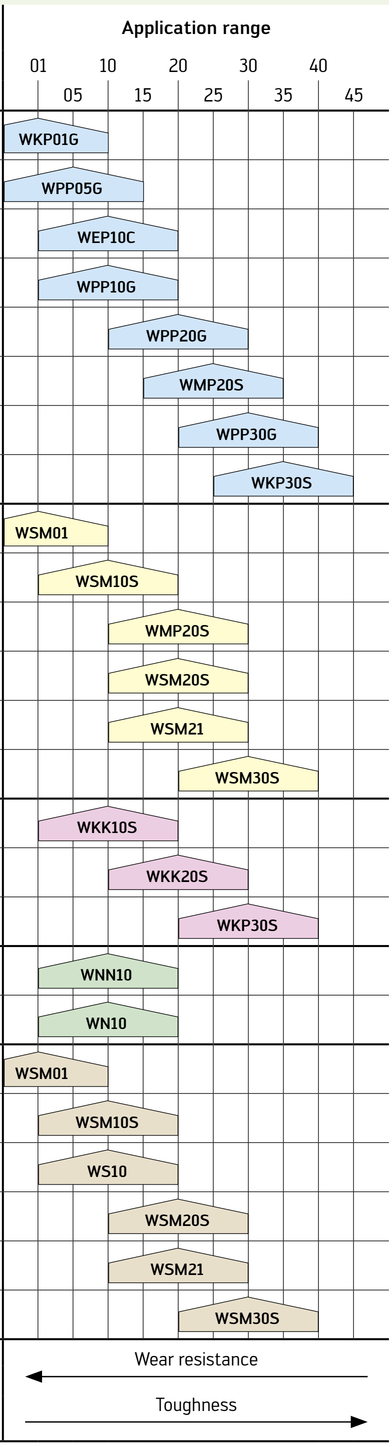
ISO indexable inserts

Insert shape		Description
	**C**	Negative basic shape Positive basic shape 7° Positive basic shape 11°
	**D**	Negative basic shape Positive basic shape 7° Positive basic shape 11°
	**R**	Negative basic shape Positive basic shape 7°
	**S**	Negative basic shape Positive basic shape 7° Positive basic shape 11°
	**T**	Negative basic shape Positive basic shape 7° Positive basic shape 11°
	**V**	Negative basic shape Positive basic shape 5°/7°
	**W**	Negative basic shape Positive basic shape 7°

System inserts

Insert shape		Description
	**WL**	WL copy turning inserts, three-edge

Cutting tool materials: Carbide

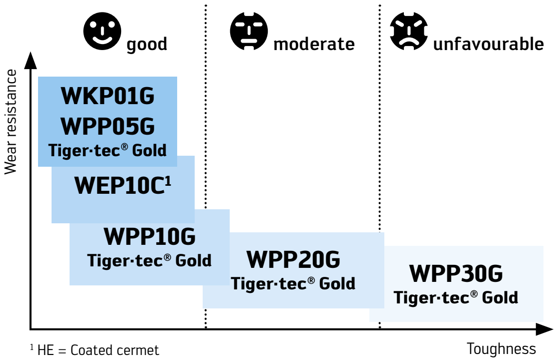


Application	Coating	Application range
ISO P	CVD	WKP01G
	CVD	WPP05G
	PVD*	WEP10C
	CVD	WPP10G
	CVD	WPP20G
	CVD	WMP20S
	CVD	WPP30G
	CVD	WKP30S
ISO M	PVD	WSM01
	PVD	WSM10S
	CVD	WMP20S
	PVD	WSM20S
	PVD	WSM21
	PVD	WSM30S
ISO K	CVD	WKK10S
	CVD	WKK20S
	CVD	WKP30S
ISO N	PVD	WNN10
	—	WN10
ISO S	PVD	WSM01
	PVD	WSM10S
	—	WS10
	PVD	WSM20S
	PVD	WSM21
	PVD	WSM30S

* Cermet

Product range overview of indexable inserts for ISO turning: Carbide – Grades and Geometries

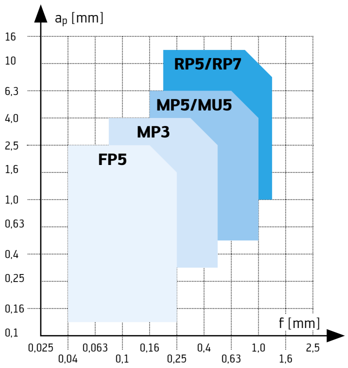
Steel ISO P



¹ HE = Coated cermet

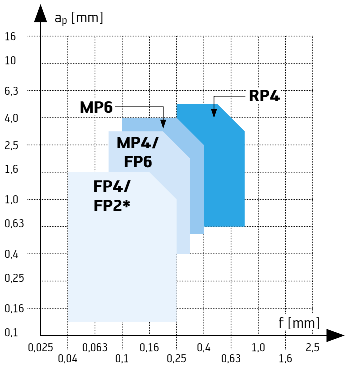
Negative basic shape

double-sided

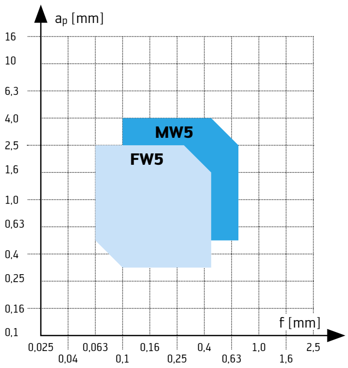


MP5: For universal machining
MU5: Easy-cutting – for ISO P and ISO M
RP5: For universal machining
RP7: For interrupted cuts, cast skin/forged skin

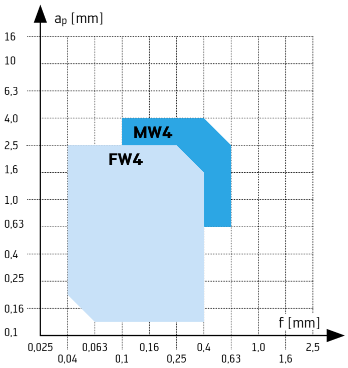
Positive basic shape



Wiper

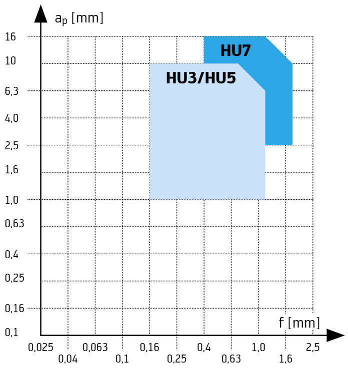


Wiper



Negative basic shape

single-sided

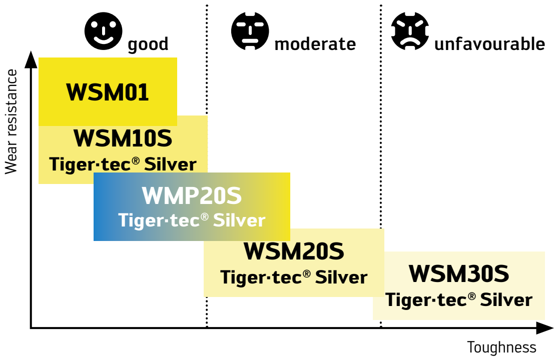


HU3: For universal machining
HU5: Easy-cutting

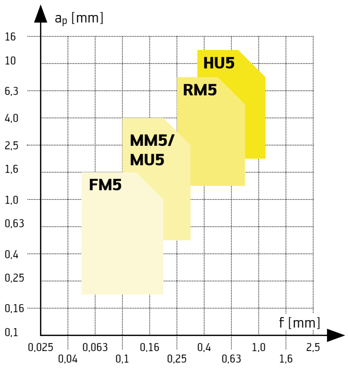
WALTER SELECT Optimum indexable insert for → Good = ☺ → Moderate = 😐 → Poor = ☹ machining conditions

Product range overview of indexable inserts for ISO turning: Carbide – Grades and Geometries (continued)

Stainless steel ISO M

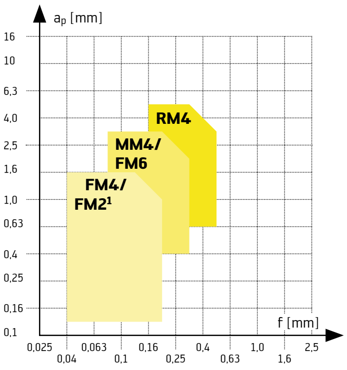


Negative basic shape



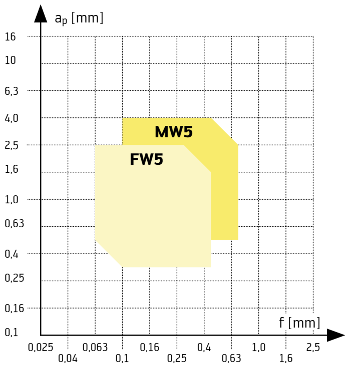
MM5: For universal machining
MU5: Easy-cutting – for ISO P and ISO M
HU5: Stable, single-sided indexable insert

Positive basic shape

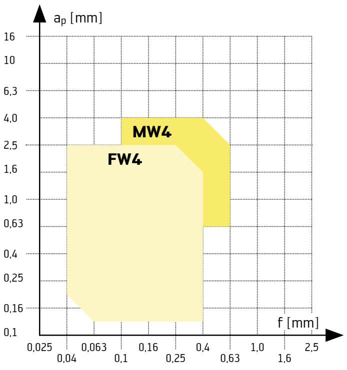


MM4: For universal machining, copy turning
FM6: For semi-finishing operations
[1] Fully ground circumference

Wiper

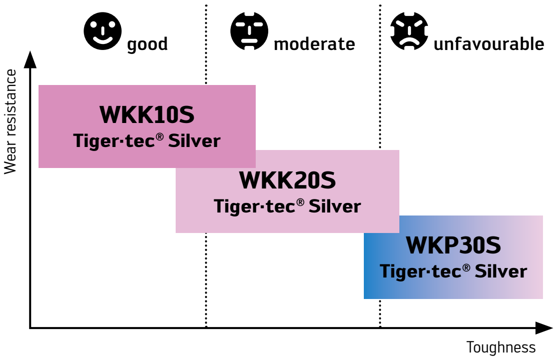


Wiper

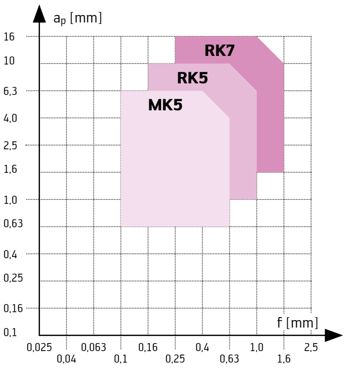


Product range overview of indexable inserts for ISO turning: Carbide – Grades and Geometries (continued)

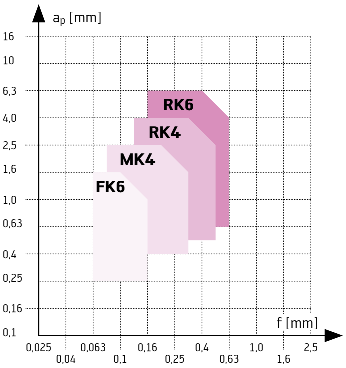
Cast iron ISO K



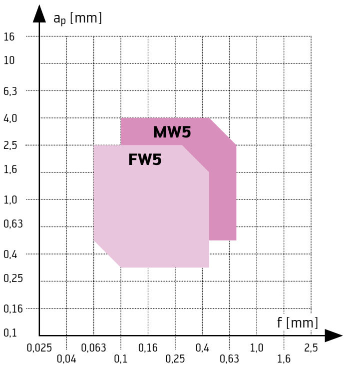
Negative basic shape



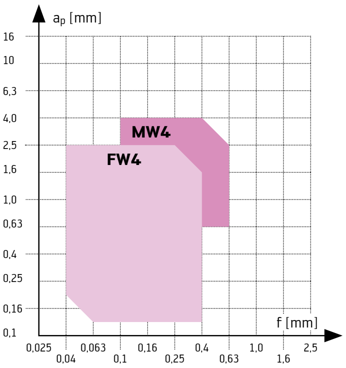
Positive basic shape



Wiper

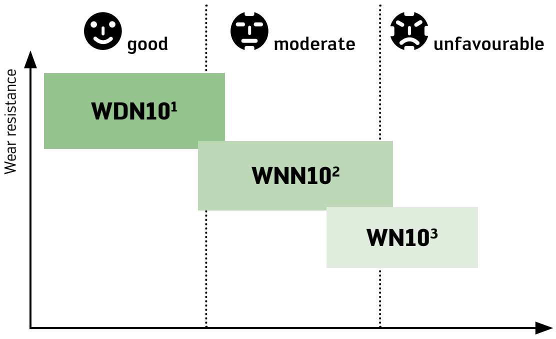


Wiper



Product range overview of indexable inserts for ISO turning: Carbide – Grades and Geometries (continued)

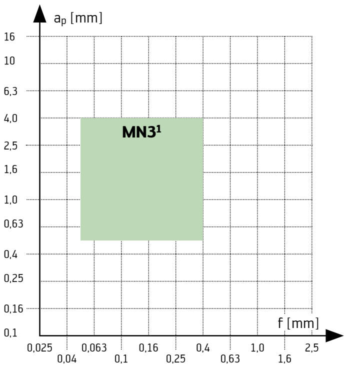
NF metals ISO N



[1] DP = Polycrystalline diamond (PCD)
[2] HC = Coated carbide (PVD – HIPIMS)
[3] HW = Uncoated carbide

Negative basic shape

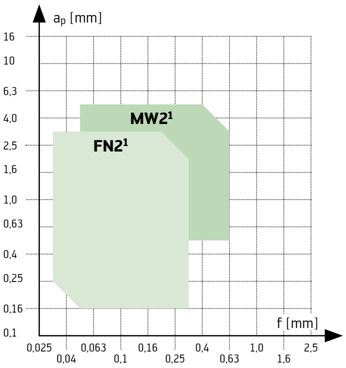
Carbide



[1] Fully ground circumference, polished

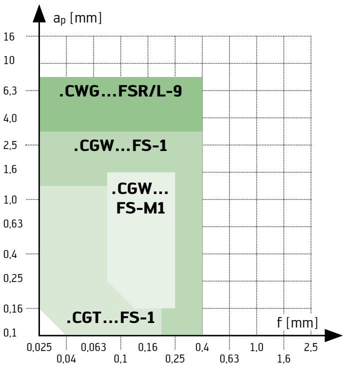
Positive basic shape

Carbide



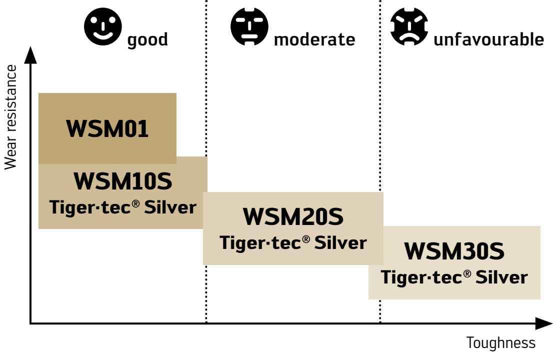
[1] Fully ground circumference, polished

PCD



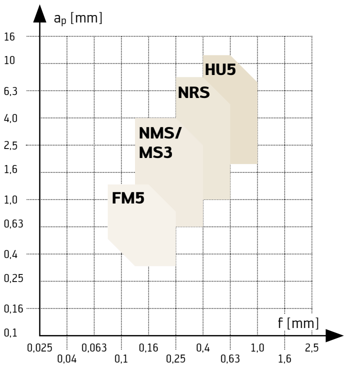
Product range overview of indexable inserts for ISO turning: Carbide – Grades and Geometries (continued)

High-temperature alloys and titanium alloys ISO S



Negative basic shape

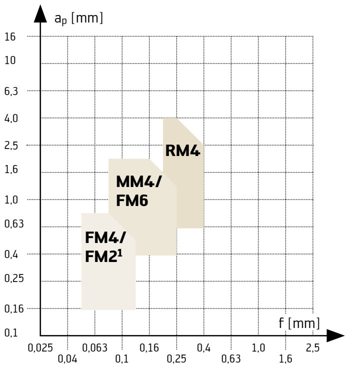
Ni, Co and Fe-based alloys



NMS: For universal machining
MS3: For low cutting pressure

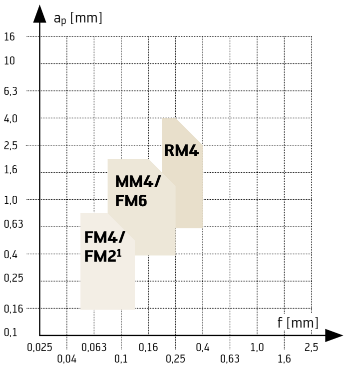
Positive basic shape

Ni, Co, Fe and titanium-based alloys



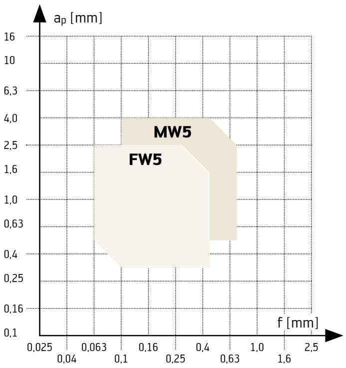
MM4: For universal machining, copy turning
FM6: For semi-finishing operations
¹ Fully ground circumference

Titanium-based alloys

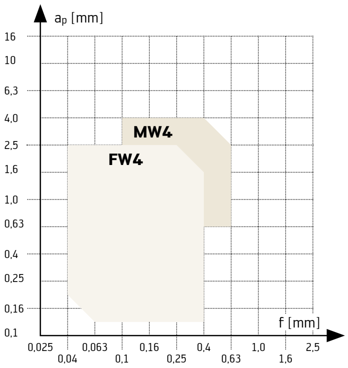


¹ Fully ground circumference

Wiper

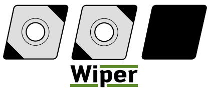
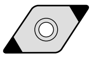
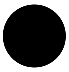
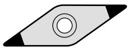
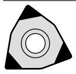


Wiper

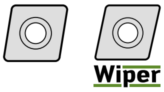
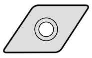
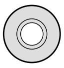
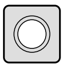
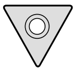
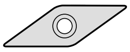
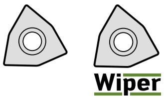


Product range overview of indexable inserts and cutting tool materials: ISO turning – CBN/PCD/ceramic

CBN indexable inserts

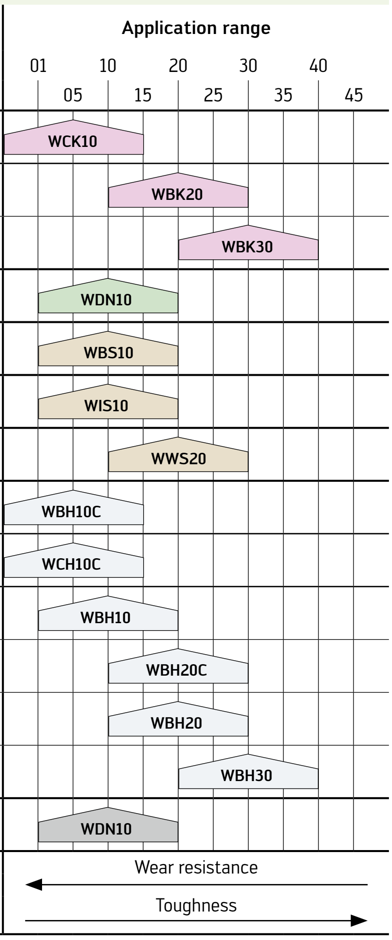
Insert shape		Description
 Wiper	**C**	Negative basic shape Positive basic shape 7°
	**D**	Negative basic shape Positive basic shape 7°
	**R**	Negative basic shape
	**S**	Negative basic shape
	**T**	Negative basic shape Positive basic shape 7°
	**V**	Negative basic shape Positive basic shape 5°
	**W**	Negative basic shape

Ceramic indexable inserts

Insert shape		Description
 Wiper	**C**	Negative basic shape
	**D**	Negative basic shape
	**R**	Negative basic shape Positive basic shape 11°
	**S**	Negative basic shape
	**T**	Negative basic shape
	**V**	Negative basic shape
 Wiper	**W**	Negative basic shape

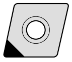
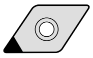
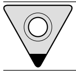
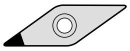
Cutting tool materials: CBN, PCD, ceramic

Application	Cutting tool material	Application range
ISO K	Si_3N_4*	WCK10
	CBN	WBK20
	CBN	WBK30
ISO N	PCD	WDN10
ISO S	CBN	WBS10
	SiAlON*	WIS10
	Whisker*	WWS20
ISO H	CBN	WBH10C
	AL_2O_3-TiC*	WCH10C
	CBN	WBH10
	CBN	WBH20C
	CBN	WBH20
	CBN	WBH30
ISO O	PCD	WDN10



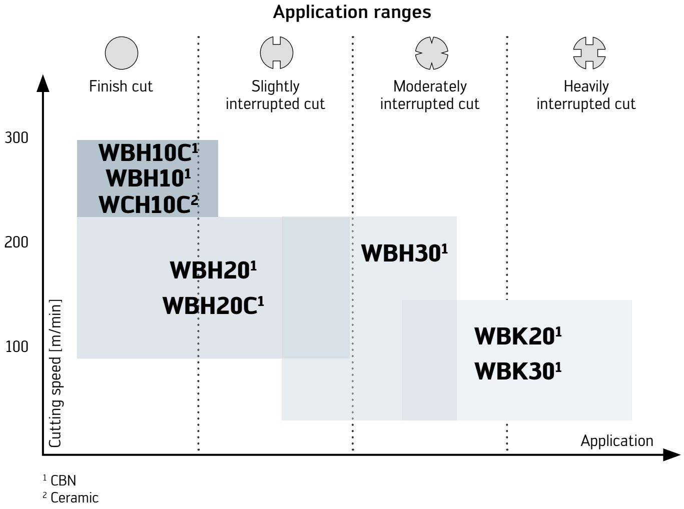
* Ceramic

PCD indexable inserts

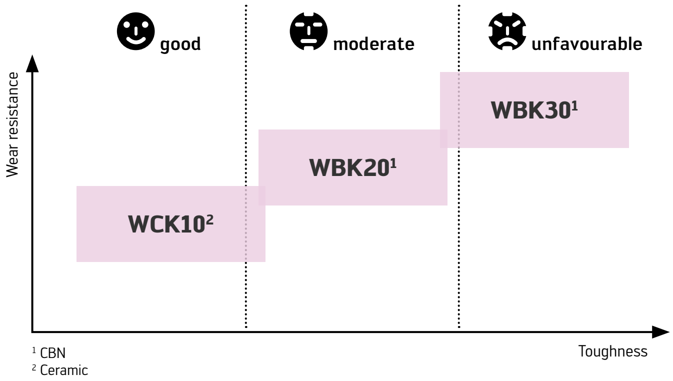
Insert shape		Description
	**C**	Positive basic shape 7° Positive basic shape 11°
	**D**	Positive basic shape 7° Positive basic shape 11°
	**S**	Positive basic shape 7°
	**T**	Positive basic shape 7° Positive basic shape 11°
	**V**	Positive basic shape 7°

Product range overview of indexable inserts and cutting tool materials: ISO turning – CBN/PCD/ceramic (continued)

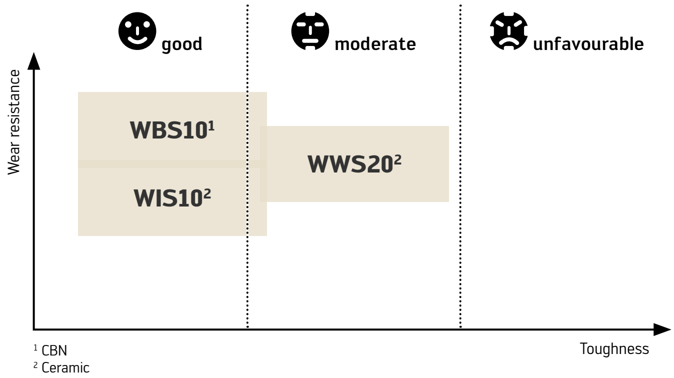
Hard materials – ISO H



Cast iron – ISO K



High-temperature alloys – ISO S



Cutting data for turning inserts – Negative basic shape Carbide grades

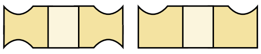
= Cutting data for wet machining
= Dry machining is possible

Material group	Overview of the main material groups and code letters			Brinell hardness HB	Tensile strength R_m N/mm²	Machining group [1]			Cutting material grades Starting values for cutting speed v_c [m/min] HE WEP10C f [mm/rev]		
									0,10	0,20	0,30
P	Non-alloyed steel	C ≤ 0,25 %	Annealed	125	430	P1	●●	●	490	440	400
		C > 0,25… ≤ 0,55 %	Annealed	190	640	P2	●●	●	390	360	320
		C > 0,25… ≤ 0,55 %	Heat-treated	210	710	P3	●●	●	290	260	250
		C > 0,55 %	Annealed	190	640	P4	●●	●	350	330	310
		C > 0,55 %	Heat-treated	300	1010	P5	●●	●	220	180	150
		Free-machining steel (short-chipping)	Annealed	220	750	P6	●●	●	450	420	400
	Low-alloy steel	Annealed		175	590	P7	●●	●	360	330	320
		Heat-treated		285	960	P8	●●	●	200	170	160
		Heat-treated		380	1280	P9	●●	●	120	100	90
		Heat-treated		430	1480	P10	●●	●			
	High-alloy steel and high-alloy tool steel	Annealed		200	680	P11	●●	●	340	310	300
		Hardened and tempered		300	1010	P12	●●	●	200	180	160
		Hardened and tempered		380	1280	P13	●●	●	70	60	
	Stainless steel	Ferritic/martensitic, annealed		200	680	P14	●●	●	280	250	230
		Martensitic, heat-treated		330	1110	P15	●●	●	120	100	90
M	Stainless steel	Austenitic, quench hardened		200	680	M1	●●	●	210	190	160
		Austenitic, precipitation hardened (PH)		300	1010	M2	●●	●	150	130	110
		Austenitic/ferritic, duplex		230	780	M3	●●	●	160	140	110
K	Malleable cast iron	Ferritic		200	400	K1	●●	●	220	200	180
		Pearlitic		260	700	K2	●●	●	190	170	150
	Grey cast iron	Low strength		180	200	K3	●●	●	420	390	360
		High strength/austenitic		245	350	K4	●●	●	220	200	180
	Cast iron with spheroidal graphite	Ferritic		155	400	K5	●●	●	240	220	200
		Pearlitic		265	700	K6	●●	●	170	140	130
	CGI			230	400	K7	●●	●	220	180	170
N	Wrought aluminium alloys	Not hardenable		30	–	N1					
		Hardenable, hardened		100	340	N2					
	Cast aluminium alloys	≤ 12% Si, not hardenable		75	260	N3					
		≤ 12% Si, hardenable, hardened		90	310	N4					
		> 12% Si, not hardenable		130	450	N5					
	Magnesium-based alloys			70	250	N6					
	Copper and copper alloys (bronze/brass)	Non-alloyed, electrolytic copper		100	340	N7					
		Brass, bronze, red brass		90	310	N8					
		Copper alloys, short-chipping		110	380	N9					
		High tensile, Ampco		300	1010	N10					
S	Heat-resistant alloys	Fe-based	Annealed	200	680	S1	●●	●			
			Hardened	280	940	S2	●●	●			
		Ni- or Co-based	Annealed	250	840	S3	●●	●			
			Hardened	350	1180	S4	●●	●			
			Cast	320	1080	S5	●●	●			
	Titanium alloys	Pure titanium		200	680	S6	●●	●			
		α and β alloys, hardened		375	1260	S7	●●	●			
		β alloys		410	1400	S8	●●	●			
	Tungsten alloys			300	1010	S9					
	Molybdenum alloys			300	1010	S10					
H	Hardened steel	Hardened and tempered		50 HRC		H1	●●	●			
		Hardened and tempered		55 HRC		H2	●●	●			
		Hardened and tempered		60 HRC		H3	●●	●			
	Hardened cast iron	Hardened and tempered		55 HRC		H4	●●	●			
O	Thermoplastics	Without abrasive fillers				O1					
	Thermosetting plastics	Without abrasive fillers				O2					
	Plastic, glass-fibre reinforced	GFRP				O3					
	Plastic, carbon-fibre reinforced	CFRP				O4					
	Plastic, aramid-fibre reinforced	AFRP				O5					
	Graphite (technical)			80 Shore		O6					

●● Recommended application (the specified cutting data is regarded as starting values for the recommended application)
● Possible application

Note:
If dry machining is possible, the tool life is reduced by 20–30% on average.

[1] The assignment of the machining groups can be found in the "General" section of the Technical Compendium, page F 7.



Cutting material grades																				
Starting values for cutting speed v_c [m/min]																				
HC															HW			HC		
WPP05G			WPP10G			WPP20G			WPP30G WKP30S			WSM01			WS10			WSM10S		
f [mm/rev]			f [mm/rev]			f [mm/rev]			f [mm/rev]			f [mm/rev]			f [mm/rev]			f [mm/rev]		
0,10	0,40	0,60	0,10	0,40	0,60	0,10	0,40	0,60	0,10	0,40	0,60	0,10	0,30	0,50	0,10	0,30	0,50	0,10	0,30	0,50
560	420	330	530	400	310	450	330	270	380	260	220	240	230					270	250	
440	320	250	420	300	240	350	250	190	300	200	160	190	160					210	190	
340	260	220	320	250	210	260	210	170	220	180	130	160	130					180	160	
370	260	210	350	250	200	300	210	160	250	160	130	150	130					180	160	
280	210	200	270	200	190	220	160	150	180	120	100	140	100							
510	370	290	490	350	280	410	290	220	350	230	180	210	190					240	220	
400	290	250	380	280	240	320	240	190	260	190	170	150	130					170	150	
240	190	170	230	180	160	190	140	120	150	100	80	130	80							
190	150	110	180	140	100	140	100	80	100	70	50	100	70							
130	110		120	100								80	60							
360	250	170	340	240	160	290	200	120	220	160	90	140	120					170	150	
250	150	130	240	140	120	190	120	90	120	90	70	120	90							
130	110		120	100								70	50							
290	230	210	280	220	200	230	190	150	180	150	110	200	180					200	180	150
210	150	130	200	140	120	160	110	80	120	80	70	150	120					170	120	110
									260	210	130	250	190	120				260	210	130
									160	140		150	130					160	140	
									170	150	110	160	140	100				170	150	110
320	210	160	300	200	150	270	170	130	240	160	130									
270	170	120	260	160	110	230	140	100	200	120	90									
600	400	290	570	380	280	490	350	240	490	300	210									
320	220	150	300	210	140	270	170	130	230	170	110									
340	240	180	320	230	170	290	200	150	250	180	130									
240	180	150	230	170	140	200	150	120	180	130	110									
320	200																			
												3000	2400	1800						
												900	720	360						
												960	540	360						
												600	360	240						
												720	480	320						
												480	360	300						
												340	240	160						
												100	70		90			100	65	
												80	60		70			80	55	
												80	60		70			80	55	
												70	50		60			70	45	
												60	40		50			60	35	
															200	180	140			
												70	50		90	55	45			
												50	40		55	35	30			
												50								
												40								

HC = Coated carbide
HE = Coated cermet
HW = Uncoated carbide

The specified cutting data are average standard values.
For specific applications, adjustment is recommended.

Cutting data for turning inserts – Negative basic shape Carbide grades (continued)

= Cutting data for wet machining
= Dry machining is possible

Material group	Overview of the main material groups and code letters			Brinell hardness HB	Tensile strength R_m N/mm²	Machining group [1]			Cutting material grades Starting values for cutting speed v_c [m/min] HC WMP20S f [mm/rev] 0,10	0,30	0,50
P	Non-alloyed steel	C ≤ 0,25 %	Annealed	125	430	P1	●●	●	290	200	170
		C > 0,25... ≤ 0,55 %	Annealed	190	640	P2	●●	●	230	150	120
		C > 0,25... ≤ 0,55 %	Heat-treated	210	710	P3	●●	●	170	140	110
		C > 0,55 %	Annealed	190	640	P4	●●	●	190	120	100
		C > 0,55 %	Heat-treated	300	1010	P5	●●	●	140	100	80
		Free-machining steel (short-chipping)	Annealed	220	750	P6	●●	●	270	180	140
	Low-alloy steel	Annealed		175	590	P7	●●	●	200	140	130
		Heat-treated		285	960	P8	●●	●	130	80	60
		Heat-treated		380	1280	P9	●●	●	80	60	40
		Heat-treated		430	1480	P10	●●	●			
	High-alloy steel and high-alloy tool steel	Annealed		200	680	P11	●●	●	170	120	80
		Hardened and tempered		300	1010	P12	●●	●	100	70	60
		Hardened and tempered		380	1280	P13	●●	●			
	Stainless steel	Ferritic/martensitic, annealed		200	680	P14	●●	●	210	180	150
		Martensitic, heat-treated		330	1110	P15	●●	●	140	110	100
M	Stainless steel	Austenitic, quench hardened		200	680	M1	●●	●	250	190	120
		Austenitic, precipitation hardened (PH)		300	1010	M2	●●	●	160	140	
		Austenitic/ferritic, duplex		230	780	M3	●●	●	170	150	110
K	Malleable cast iron	Ferritic		200	400	K1	●●	●			
		Pearlitic		260	700	K2	●●	●			
	Grey cast iron	Low strength		180	200	K3	●●	●			
		High strength/austenitic		245	350	K4	●●	●			
	Cast iron with spheroidal graphite	Ferritic		155	400	K5	●●	●			
		Pearlitic		265	700	K6	●●	●			
	CGI			230	400	K7	●●	●			
N	Wrought aluminium alloys	Not hardenable		30	–	N1					
		Hardenable, hardened		100	340	N2					
	Cast aluminium alloys	≤ 12% Si, not hardenable		75	260	N3					
		≤ 12% Si, hardenable, hardened		90	310	N4					
		> 12% Si, not hardenable		130	450	N5					
	Magnesium-based alloys			70	250	N6					
	Copper and copper alloys (bronze/brass)	Non-alloyed, electrolytic copper		100	340	N7					
		Brass, bronze, red brass		90	310	N8					
		Copper alloys, short-chipping		110	380	N9					
		High tensile, Ampco		300	1010	N10					
S	Heat-resistant alloys	Fe-based	Annealed	200	680	S1	●●	●	90	60	
			Hardened	280	940	S2	●●	●	70	50	
		Ni- or Co-based	Annealed	250	840	S3	●●	●	70	50	
			Hardened	350	1180	S4	●●	●	60	40	
			Cast	320	1080	S5	●●	●	50	30	
	Titanium alloys	Pure titanium		200	680	S6	●●	●			
		α and β alloys, hardened		375	1260	S7	●●	●	70	45	40
		β alloys		410	1400	S8	●●	●	40	30	25
	Tungsten alloys			300	1010	S9					
	Molybdenum alloys			300	1010	S10					
H	Hardened steel	Hardened and tempered		50 HRC	–	H1	●●	●			
		Hardened and tempered		55 HRC	–	H2	●●	●			
		Hardened and tempered		60 HRC	–	H3	●●	●			
	Hardened cast iron	Hardened and tempered		55 HRC	–	H4	●●	●			
O	Thermoplastics	Without abrasive fillers				O1					
	Thermosetting plastics	Without abrasive fillers				O2					
	Plastic, glass-fibre reinforced	GFRP				O3					
	Plastic, carbon-fibre reinforced	CFRP				O4					
	Plastic, aramid-fibre reinforced	AFRP				O5					
	Graphite (technical)			80 Shore		O6					

●● Recommended application (the specified cutting data is regarded as starting values for the recommended application)

● Possible application

Note:
If dry machining is possible, the tool life is reduced by 20–30% on average.

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[1] The assignment of the machining groups can be found in the “General” section of the Technical Compendium, page F 7.

Cutting material grades																	
Starting values for cutting speed v_c [m/min]																	
HC												HW			HC		
WSM20S			WSM30S			WKK10S			WKK20S			WN10			WNN10		
f [mm/rev]			f [mm/rev]			f [mm/rev]			f [mm/rev]			f [mm/rev]			f [mm/rev]		
0,10	0,30	0,50	0,10	0,30	0,50	0,10	0,40	0,60	0,10	0,40	0,60	0,40	0,10	0,40	0,10	0,20	0,40
230	220		220	200					530	400	310	200			230	210	
180	160		160	150					420	300	250	150			170	150	
150	130		130	110					320	250	210	140			130	120	
140	130		130	120					360	250	210	120			140	120	
						270	210	200	270	200	190	100					
200	180		180	160											180	160	
140	120		120	100					260	200	180	140			120	100	
						240	190	170	230	180	160	80					
						160	120	100	150	120	100	60					
						80	70		70	60							
130	110		110	90					270	220	170	120			130	100	
						190	150	140	170	140	130	70					
						90	80		80	70							
190	170	140	170	150	120												
140	110	100	110	100	80												
240	170	110	200	140	90							140			200	180	
140	120		110	90								90			140	120	
150	130	90	130	110	70							110			150	130	
						370	260	180	300	200	150	160			250	220	
						330	220	140	260	160	110	120			210	180	
						650	490	360	570	380	280	300			480	450	
						390	260	180	300	210	140	170			210	180	
						410	300	230	320	230	170	180			230	200	
						300	230	180	230	170	140	130			160	130	
						320	200										
													2400	1300	3000	2400	1800
													750	300	900	720	360
													800	300	960	540	360
													500	200	600	360	240
													600	270	720	480	320
													400	250	480	360	300
													280	130	340	240	160
90	60		80	50									70		80	60	
70	50		60	40									50		60	50	
70	50		60	30									50		60	50	
60	40		50	30									50		50	40	
50	30		40	20									40		40	30	
													200	140	220	200	160
70	45	40											60		70	50	
40	30	25											40		40	30	
						55											
						45											
						35											
						45											
															400	400	
															300	300	
															600	600	

HC = Coated carbide
HE = Coated cermet
HW = Uncoated carbide

The specified cutting data are average standard values.
For specific applications, adjustment is recommended.

Cutting data for turning inserts – Positive basic shape Carbide grades

🚰 = Cutting data for wet machining
🚱 = Dry machining is possible

Material group	Overview of the main material groups and code letters			Brinell hardness HB	Tensile strength R_m N/mm^2	Machining group[1]	🚰	🚱	Cutting material grades		
									Starting values for cutting speed v_c [m/min]		
									HE		
									WEP10C f [mm/rev]		
									0,10	0,20	0,30
P	Non-alloyed steel	C ≤ 0,25 %	Annealed	125	430	P1	●●	●	490	440	400
		C > 0,25… ≤ 0,55 %	Annealed	190	640	P2	●●	●	390	360	320
		C > 0,25… ≤ 0,55 %	Heat-treated	210	710	P3	●●	●	290	260	250
		C > 0,55 %	Annealed	190	640	P4	●●	●	350	330	310
		C > 0,55 %	Heat-treated	300	1010	P5	●●	●	220	180	150
		Free-machining steel (short-chipping)	Annealed	220	750	P6	●●	●	450	420	400
	Low-alloy steel	Annealed		175	590	P7	●●	●	360	330	320
		Heat-treated		285	960	P8	●●	●	200	170	160
		Heat-treated		380	1280	P9	●●	●	120	100	90
		Heat-treated		430	1480	P10	●●	●			
	High-alloy steel and high-alloy tool steel	Annealed		200	680	P11	●●	●	340	310	300
		Hardened and tempered		300	1010	P12	●●	●	200	180	160
		Hardened and tempered		380	1280	P13	●●	●	70	60	
	Stainless steel	Ferritic/martensitic, annealed		200	680	P14	●●	●	280	250	230
		Martensitic, heat-treated		330	1110	P15	●●	●	120	100	90
M	Stainless steel	Austenitic, quench hardened		200	680	M1	●●	●	210	190	160
		Austenitic, precipitation hardened (PH)		300	1010	M2	●●	●	150	130	110
		Austenitic/ferritic, duplex		230	780	M3	●●	●	160	140	110
K	Malleable cast iron	Ferritic		200	400	K1	●●	●	220	200	180
		Pearlitic		260	700	K2	●●	●	190	170	150
	Grey cast iron	Low strength		180	200	K3	●●	●	420	390	360
		High strength/austenitic		245	350	K4	●●	●	220	200	180
	Cast iron with spheroidal graphite	Ferritic		155	400	K5	●●	●	240	220	200
		Pearlitic		265	700	K6	●●	●	170	140	130
	CGI			230	400	K7	●●	●	220	180	170
N	Wrought aluminium alloys	Not hardenable		30	–	N1	●●	●			
		Hardenable, hardened		100	340	N2	●●	●			
	Cast aluminium alloys	≤ 12% Si, not hardenable		75	260	N3	●●	●			
		≤ 12% Si, hardenable, hardened		90	310	N4	●●	●			
		> 12% Si, not hardenable		130	450	N5					
	Magnesium-based alloys			70	250	N6					
	Copper and copper alloys (bronze/brass)	Non-alloyed, electrolytic copper		100	340	N7	●●	●			
		Brass, bronze, red brass		90	310	N8	●●	●			
		Copper alloys, short-chipping		110	380	N9	●●	●			
		High tensile, Ampco		300	1010	N10					
S	Heat-resistant alloys	Fe-based	Annealed	200	680	S1	●●	●			
			Hardened	280	940	S2	●●	●			
		Ni- or Co-based	Annealed	250	840	S3	●●	●			
			Hardened	350	1180	S4	●●	●			
			Cast	320	1080	S5	●●	●			
	Titanium alloys	Pure titanium		200	680	S6	●●	●			
		α and β alloys, hardened		375	1260	S7	●●	●			
		β alloys		410	1400	S8	●●	●			
	Tungsten alloys			300	1010	S9					
	Molybdenum alloys			300	1010	S10					
H	Hardened steel	Hardened and tempered		50 HRC	–	H1	●●	●			
		Hardened and tempered		55 HRC	–	H2	●●	●			
		Hardened and tempered		60 HRC	–	H3	●●	●			
	Hardened cast iron	Hardened and tempered		55 HRC	–	H4	●●	●			
O	Thermoplastics	Without abrasive fillers				O1					
	Thermosetting plastics	Without abrasive fillers				O2					
	Plastic, glass-fibre reinforced	GFRP				O3					
	Plastic, carbon-fibre reinforced	CFRP				O4					
	Plastic, aramid-fibre reinforced	AFRP				O5					
	Graphite (technical)			80 Shore		O6					

●● Recommended application (the specified cutting data is regarded as starting values for the recommended application)
● Possible application

Note:
If dry machining is possible, the tool life is reduced by 20–30% on average.

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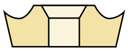
[1] The assignment of the machining groups can be found in the “General” section of the Technical Compendium, page F 7.



	Cutting material grades																				
	Starting values for cutting speed v_c [m/min]																				
	HC																				
	WKP01G			WPP10G			WPP20G			WPP30G			WSM01			WSM10S			WMP20S		
	f [mm/rev]			f [mm/rev]			f [mm/rev]			f [mm/rev]			f [mm/rev]			f [mm/rev]			f [mm/rev]		
	0,10	0,20	0,40	0,10	0,20	0,40	0,10	0,20	0,40	0,10	0,20	0,40	0,10	0,20	0,40	0,10	0,20	0,40	0,10	0,20	0,40
	560	500	420	480	430	350	400	360	290	330	300	240	210	210	200	240	230	210	250	220	160
	440	390	320	370	330	270	310	280	220	260	230	180	170	150	130	180	170	160	200	170	120
	340	300	260	280	260	220	230	210	180	200	180	150	140	120	100	160	150	130	150	130	110
	370	320	260	310	280	220	270	230	180	220	190	140	130	120	100	160	150	130	160	130	100
	280	250	210	230	220	190	190	170	150	150	140	110	120	100	70				120	100	80
	510	450	370	440	390	310	370	320	250	310	270	200	180	170	160	210	200	180	230	200	140
	400	360	290	330	300	250	280	260	210	230	210	170	130	120	100	150	140	120	170	150	120
	240	220	190	200	190	160	160	150	120	130	110	90	110	90	50				110	90	60
	190	170	150	150	130	110	120	110	90	90	70	60	90	70	50				70	60	40
	130	120	110	70	60	50							70	60	40						
	360	310	250	310	270	200	270	220	160	200	170	120	120	110	90	150	140	120	150	120	80
	250	210	150	200	180	130	170	140	100	100	90	70	100	90	70				80	70	50
	130	120	110	60	50	50							60	50	30						
	290	270	230	240	230	200	210	190	160	160	150	120	170	170	150	180	160	140	180	170	140
	210	180	150	170	160	130	140	120	90	100	90	70	130	150	120	140	130	100	120	110	80
										240	210	160	230	190	130	240	200	140	230	190	130
										140	130	120	130	120	100	140	130	110	140	130	110
										150	140	120	140	130	100	150	140	110	150	140	110
	320	270	210	270	230	170	240	210	160	210	180	140									
	270	230	170	230	190	140	210	170	120	170	150	110									
	600	520	400	490	400	350	430	350	310	420	330	280									
	320	270	220	270	230	170	240	210	150	210	180	130									
	340	300	240	290	250	200	260	230	180	220	200	150									
	240	210	180	200	180	150	180	160	130	160	140	110									
	320	260	200																		
													2720	2400	1860						
													870	690	440						
													830	650	400						
													530	420	260						
													640	520	350						
													420	370	290						
													300	250	170						
													90	70	50	80	70	40	60	40	
													70	60	40	70	50	40	60	50	30
													70	60	40	70	50	40	60	50	30
													60	50	30	60	50	30	50	40	20
													50	40	20	50	40	20	40	30	20
													60	50	30				50	50	40
													40	40	30				30	30	25
													40	40	40						
													30	30	30						

HC = Coated carbide
HE = Coated cermet
HW = Uncoated carbide

The specified cutting data are average standard values.
For specific applications, adjustment is recommended.

Cutting data for turning inserts – Positive basic shape
Carbide grades (continued)

🚰 = Cutting data for wet machining
🚰✗ = Dry machining is possible

Material group	Overview of the main material groups and code letters			Brinell hardness HB	Tensile strength R_m N/mm^2	Machining group [1]	🚰	🚰✗	Cutting material grades Starting values for cutting speed v_c [m/min] HC WSM20S f [mm/rev]		
									0,10	0,20	0,40
P	Non-alloyed steel	C ≤ 0,25 %	Annealed	125	430	P1	●●	●	200	200	190
		C > 0,25… ≤ 0,55 %	Annealed	190	640	P2	●●	●	160	150	130
		C > 0,25… ≤ 0,55 %	Heat-treated	210	710	P3	●●	●	130	120	100
		C > 0,55 %	Annealed	190	640	P4	●●	●	120	120	110
		C > 0,55 %	Heat-treated	300	1010	P5	●●	●			
		Free-machining steel (short-chipping)	Annealed	220	750	P6	●●	●	170	170	150
	Low-alloy steel	Annealed		175	590	P7	●●	●	120	110	90
		Heat-treated		285	960	P8	●●	●			
		Heat-treated		380	1280	P9	●●	●			
		Heat-treated		430	1480	P10	●●	●			
	High-alloy steel and high-alloy tool steel	Annealed		200	680	P11	●●	●	110	100	90
		Hardened and tempered		300	1010	P12	●●	●			
		Hardened and tempered		380	1280	P13	●●	●			
	Stainless steel	Ferritic/martensitic, annealed		200	680	P14	●●	●	170	160	130
		Martensitic, heat-treated		330	1110	P15	●●	●	120	110	90
M	Stainless steel	Austenitic, quench hardened		200	680	M1	●●	●	210	180	120
		Austenitic, precipitation hardened (PH)		300	1010	M2	●●	●	120	110	90
		Austenitic/ferritic, duplex		230	780	M3	●●	●	140	120	90
K	Malleable cast iron	Ferritic		200	400	K1	●●	●			
		Pearlitic		260	700	K2	●●	●			
	Grey cast iron	Low strength		180	200	K3	●●	●			
		High strength/austenitic		245	350	K4	●●	●			
	Cast iron with spheroidal graphite	Ferritic		155	400	K5	●●	●			
		Pearlitic		265	700	K6	●●	●			
	CGI			230	400	K7	●●	●			
N	Wrought aluminium alloys	Not hardenable		30	–	N1	●●	●			
		Hardenable, hardened		100	340	N2	●●	●			
	Cast aluminium alloys	≤ 12% Si, not hardenable		75	260	N3	●●	●			
		≤ 12% Si, hardenable, hardened		90	310	N4	●●	●			
		> 12% Si, not hardenable		130	450	N5					
	Magnesium-based alloys			70	250	N6					
	Copper and copper alloys (bronze/brass)	Non-alloyed, electrolytic copper		100	340	N7	●●	●			
		Brass, bronze, red brass		90	310	N8	●●	●			
		Copper alloys, short-chipping		110	380	N9	●●	●			
		High tensile, Ampco		300	1010	N10					
S	Heat-resistant alloys	Fe-based	Annealed	200	680	S1	●●	●	80	80	40
			Hardened	280	940	S2	●●	●	60	50	30
		Ni- or Co-based	Annealed	250	840	S3	●●	●	60	50	30
			Hardened	350	1180	S4	●●	●	50	40	20
			Cast	320	1080	S5	●●	●	40	30	20
	Titanium alloys	Pure titanium		200	680	S6	●●	●			
		α and β alloys, hardened		375	1260	S7	●●	●	50	50	30
		β alloys		410	1400	S8	●●	●	30	30	20
	Tungsten alloys			300	1010	S9					
	Molybdenum alloys			300	1010	S10					
H	Hardened steel	Hardened and tempered		50 HRC	–	H1	●	●●			
		Hardened and tempered		55 HRC	–	H2	●	●●			
		Hardened and tempered		60 HRC	–	H3	●	●●			
	Hardened cast iron	Hardened and tempered		55 HRC	–	H4	●	●●			
O	Thermoplastics	Without abrasive fillers				O1					
	Thermosetting plastics	Without abrasive fillers				O2					
	Plastic, glass-fibre reinforced	GFRP				O3					
	Plastic, carbon-fibre reinforced	CFRP				O4					
	Plastic, aramid-fibre reinforced	AFRP				O5					
	Graphite (technical)			80 Shore		O6					

●● Recommended application (the specified cutting data is regarded as starting values for the recommended application)
● Possible application

Note:
If dry machining is possible, the tool life is reduced by 20–30% on average.

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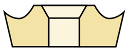
[1] The assignment of the machining groups can be found in the “General” section of the Technical Compendium, page F 7.



	Cutting material grades																	
	Starting values for cutting speed v_c [m/min]																	
	HC												HW			HC		
	WSM21			WSM30S			WKK10S			WKK20S			WN10			WNN10		
	f [mm/rev]			f [mm/rev]			f [mm/rev]			f [mm/rev]			f [mm/rev]			f [mm/rev]		
	0,10	0,20	0,40	0,10	0,20	0,40	0,10	0,20	0,40	0,10	0,20	0,40	0,10	0,20	0,40	0,10	0,20	0,40
	200	190		190	180	170				480	430	350				230	210	
	150	140		140	130	130				370	330	270				170	150	
	120	100		110	100	90				280	260	220				130	120	
	120	110		110	110	100				320	280	230				140	120	
							230	220	190	230	220	190						
	160	140		160	150	130										180	160	
	110	80		100	90	80				230	210	180				120	100	
							210	200	170	200	190	160						
							140	130	100	130	120	100						
							70	60	60	60	50	50						
				90	80	70				240	220	180				130	100	
							160	150	70	150	140	120						
							80	70	60	70	60	60						
				150	140	110												
				100	90	70												
	180	140	90	180	140	100										200	180	
	110	90		90	80	70										140	120	
	130	110	70	120	100	70										150	130	
							340	290	220	270	230	170				250	220	
							300	250	180	230	190	140				210	180	
							570	480	430	490	400	350				480	450	
							350	300	220	270	230	170				210	180	
							370	330	260	290	250	200				230	200	
							270	240	200	200	180	150				160	130	
							280	240	170									
													2400	1800	1300	3000	2400	1800
													750	600	300	900	720	360
													800	450	300	960	540	360
													500	300	200	600	360	240
													600	400	270	720	480	320
													400	300	250	480	360	300
													280	200	130	340	240	160
	70	50		70	50	30							70	50		80	60	
	50	40		50	40	20							50	50		60	50	
	50	30		50	30								50	50		60	50	
	40	30		40	30	20							50	40		50	40	
	30	20		30	20								40	30		40	30	
													200	180	140	220	200	160
													60	50		70	50	
													40	30		40	30	
							40	40	40									
							40	40	40									
							30	30	30									
							40	40	40									
																400	400	
																300	300	
																600	600	

HC = Coated carbide
HE = Coated cermet
HW = Uncoated carbide

The specified cutting data are average standard values.
For specific applications, adjustment is recommended.

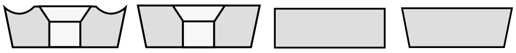
Cutting data for turning inserts – Negative and positive basic shape CBN/PCD/ceramic

🚰 = Cutting data for wet machining
🚱 = Dry machining is possible

Material group	Overview of the main material groups and code letters			Brinell hardness HB	Tensile strength R_m N/mm²	Machining group [1]	Cutting material grades				
							Starting values for cutting speed v_c [m/min]				
							CBN ISO K				
									BH WBK20 f [mm/rev]		
							🚰	🚱	0,10	0,20	0,40
P	Non-alloyed steel	C ≤ 0,25 %	Annealed	125	430	P1					
		C > 0,25… ≤ 0,55 %	Annealed	190	640	P2					
		C > 0,25… ≤ 0,55 %	Heat-treated	210	710	P3					
		C > 0,55 %	Annealed	190	640	P4					
		C > 0,55 %	Heat-treated	300	1010	P5					
		Free-machining steel (short-chipping)	Annealed	220	750	P6					
	Low-alloy steel	Annealed		175	590	P7					
		Heat-treated		285	960	P8					
		Heat-treated		380	1280	P9					
		Heat-treated		430	1480	P10					
	High-alloy steel and high-alloy tool steel	Annealed		200	680	P11					
		Hardened and tempered		300	1010	P12					
		Hardened and tempered		380	1280	P13					
	Stainless steel	Ferritic/martensitic, annealed		200	680	P14					
		Martensitic, heat-treated		330	1110	P15					
M	Stainless steel	Austenitic, quench hardened		200	680	M1					
		Austenitic, precipitation hardened (PH)		300	1010	M2					
		Austenitic/ferritic, duplex		230	780	M3					
K	Malleable cast iron	Ferritic		200	400	K1	●●	●	1500	1300	1000
		Pearlitic		260	700	K2	●●	●	1300	1100	900
	Grey cast iron	Low strength		180	200	K3	●●	●	1700	1450	1200
		High strength/austenitic		245	350	K4	●●	●	1450	1250	1050
	Cast iron with spheroidal graphite	Ferritic		155	400	K5	●●	●	400	300	200
		Pearlitic		265	700	K6	●●	●	300	200	100
	CGI			230	400	K7	●●	●	200	150	100
N	Wrought aluminium alloys	Not hardenable		30	–	N1	●●	●			
		Hardenable, hardened		100	340	N2	●●	●			
	Cast aluminium alloys	≤ 12% Si, not hardenable		75	260	N3	●●	●			
		≤ 12% Si, hardenable, hardened		90	310	N4	●●	●			
		> 12% Si, not hardenable		130	450	N5	●●	●			
	Magnesium-based alloys			70	250	N6	●●	●			
	Copper and copper alloys (bronze/brass)	Non-alloyed, electrolytic copper		100	340	N7	●●	●			
		Brass, bronze, red brass		90	310	N8	●●	●			
		Copper alloys, short-chipping		110	380	N9	●●	●			
		High tensile, Ampco		300	1010	N10	●●	●			
S	Heat-resistant alloys	Fe-based	Annealed	200	680	S1					
			Hardened	280	940	S2					
		Ni- or Co-based	Annealed	250	840	S3					
			Hardened	350	1180	S4					
			Cast	320	1080	S5					
	Titanium alloys	Pure titanium		200	680	S6	●●	●			
		α and β alloys, hardened		375	1260	S7					
		β alloys		410	1400	S8					
	Tungsten alloys			300	1010	S9	●●	●			
	Molybdenum alloys			300	1010	S10					
H	Hardened steel	Hardened and tempered		50 HRC	–	H1		●●	200		
		Hardened and tempered		55 HRC	–	H2		●●	170		
		Hardened and tempered		60 HRC	–	H3		●●	150		
	Hardened cast iron	Hardened and tempered		55 HRC	–	H4		●●	200		
O	Thermoplastics	Without abrasive fillers				O1	●●	●			
	Thermosetting plastics	Without abrasive fillers				O2	●●	●			
	Plastic, glass-fibre reinforced	GFRP				O3	●●	●			
	Plastic, carbon-fibre reinforced	CFRP				O4	●●	●			
	Plastic, aramid-fibre reinforced	AFRP				O5	●●	●			
	Graphite (technical)			80 Shore		O6	●●	●			

●● Recommended application (the specified cutting data is regarded as starting values for the recommended application)
● Possible application

[1] The assignment of the machining groups can be found in the “General” section of the Technical Compendium, page F 7.
[3] Water-miscible cooling lubricants must not be used when machining magnesium-based alloys.



Cutting material grades																			
Starting values for cutting speed v_c [m/min]																			
CBN ISO K			Ceramic ISO K			PCD ISO N					CBN ISO S			Ceramic ISO S					
BH WBK30			CN WCK10			DP WDN10					BL WBS10			CN WIS10			CR WWS20		
f [mm/rev]			f [mm/rev]			f [mm/rev]					f [mm/rev]			f [mm/rev]			f [mm/rev]		
0,10	0,20	0,40	0,10	0,40	0,60	0,10	0,20	0,40			0,05	0,15	0,20	0,10	0,20	0,30	0,10	0,20	0,30
1500	1300	1000	300	300	300				●●	●	1500	1300	1000						
1300	1100	900	250	250	250				●●	●	1300	1100	900						
1450	1200	1050	700	700	700				●●	●	1700	1450	1200						
1250	1050	900	600	600	600				●●	●	1450	1250	1050						
400	300	200							●●	●	400	300	200						
300	200	100	250	250	250				●●	●	300	200	100						
200	150	100	300	300	300				●●	●	200	150	100						
						3000	2800	2200											
						2000	1800	1400											
						2200	2000	1600											
						1800	1600	1200											
						500	450	300											
						1800	1600	1200											
						1000	900	700											
						700	650	500											
						650	550	400											
						400	300	150											
									●●	●	280	220	200	410	340	280	390	320	240
									●●	●	280	220	200	320	250	190	320	250	190
									●●	●	280	220	200	250	220	180	250	220	180
						300	220	200											
						30	25	15											
200									●●	●	200						170	150	120
170									●●	●	170						150	120	100
150									●●	●	150						130	110	90
200									●●	●	200						150	120	100
						1500	1200	800											
						1500	1200	800											
						1000	900	700											
						800	700	500											
						800	700	500											
						400	300	150											

BC = CBN-coated
BH = CBN with high CBN content
BL = CBN with low CBN content
CC = Coated ceramic

CN = Silicon nitride Si_3N_4
CR = Reinforced ceramic
DP = Polycrystalline diamond

The specified cutting data are average standard values.
For specific applications, adjustment is recommended.

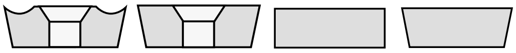
Cutting data for turning inserts – Negative and positive basic shape CBN/PCD/ceramic (continued)

🚰 = Cutting data for wet machining
🚱 = Dry machining is possible

Material group	Overview of the main material groups and code letters			Brinell hardness HB	Tensile strength R_m N/mm²	Machining group [1]	Cutting material grades				
							Starting values for cutting speed v_c [m/min]				
							CBN ISO H				
									BL WBH10 f [mm/rev]		
							🚰	🚱	0,05	0,15	0,20
P	Non-alloyed steel	C ≤ 0,25 %	Annealed	125	430	P1					
		C > 0,25… ≤ 0,55 %	Annealed	190	640	P2					
		C > 0,25… ≤ 0,55 %	Heat-treated	210	710	P3					
		C > 0,55 %	Annealed	190	640	P4					
		C > 0,55 %	Heat-treated	300	1010	P5					
		Free-machining steel (short-chipping)	Annealed	220	750	P6					
	Low-alloy steel	Annealed		175	590	P7					
		Heat-treated		285	960	P8					
		Heat-treated		380	1280	P9					
		Heat-treated		430	1480	P10					
	High-alloy steel and high-alloy tool steel	Annealed		200	680	P11					
		Hardened and tempered		300	1010	P12					
		Hardened and tempered		380	1280	P13					
	Stainless steel	Ferritic/martensitic, annealed		200	680	P14					
		Martensitic, heat-treated		330	1110	P15					
M	Stainless steel	Austenitic, quench hardened		200	680	M1					
		Austenitic, precipitation hardened (PH)		300	1010	M2					
		Austenitic/ferritic, duplex		230	780	M3					
K	Malleable cast iron	Ferritic		200	400	K1					
		Pearlitic		260	700	K2					
	Grey cast iron	Low strength		180	200	K3					
		High strength/austenitic		245	350	K4					
	Cast iron with spheroidal graphite	Ferritic		155	400	K5					
		Pearlitic		265	700	K6					
	CGI			230	400	K7					
N	Wrought aluminium alloys	Not hardenable		30	–	N1					
		Hardenable, hardened		100	340	N2					
	Cast aluminium alloys	≤ 12% Si, not hardenable		75	260	N3					
		≤ 12% Si, hardenable, hardened		90	310	N4					
		> 12% Si, not hardenable		130	450	N5					
	Magnesium-based alloys			70	250	N6					
	Copper and copper alloys (bronze/brass)	Non-alloyed, electrolytic copper		100	340	N7					
		Brass, bronze, red brass		90	310	N8					
		Copper alloys, short-chipping		110	380	N9					
		High tensile, Ampco		300	1010	N10					
S	Heat-resistant alloys	Fe-based	Annealed	200	680	S1					
			Hardened	280	940	S2					
		Ni- or Co-based	Annealed	250	840	S3					
			Hardened	350	1180	S4					
			Cast	320	1080	S5					
	Titanium alloys	Pure titanium		200	680	S6					
		α and β alloys, hardened		375	1260	S7					
		β alloys		410	1400	S8					
	Tungsten alloys			300	1010	S9					
	Molybdenum alloys			300	1010	S10					
H	Hardened steel	Hardened and tempered		50 HRC	–	H1	●●	●	300	250	220
		Hardened and tempered		55 HRC	–	H2	●●	●	280	230	200
		Hardened and tempered		60 HRC	–	H3	●●	●	250	200	180
	Hardened cast iron	Hardened and tempered		55 HRC	–	H4	●●	●	250	200	180
O	Thermoplastics	Without abrasive fillers				O1					
	Thermosetting plastics	Without abrasive fillers				O2					
	Plastic, glass-fibre reinforced	GFRP				O3					
	Plastic, carbon-fibre reinforced	CFRP				O4					
	Plastic, aramid-fibre reinforced	AFRP				O5					
	Graphite (technical)			80 Shore		O6					

●● Recommended application (the specified cutting data is regarded as starting values for the recommended application)
● Possible application

[1] The assignment of the machining groups can be found in the “General” section of the Technical Compendium, page F 7.
[3] Water-miscible cooling lubricants must not be used when machining magnesium-based alloys.



Cutting material grades																		
Starting values for cutting speed v_c [m/min]																		
CBN ISO H														Ceramic ISO H				
BC WBH10C			BL WBH20			BC WBH20C					BL WBH30					CC WCH10C		
f [mm/rev]			f [mm/rev]			f [mm/rev]					f [mm/rev]					f [mm/rev]		
0,05	0,15	0,20	0,05	0,15	0,20	0,05	0,15	0,20			0,05	0,15	0,20			0,05	0,15	0,20
300	250	220	250	200	180	300	250	220		●●	200	185	170	●●	●	300	250	220
280	230	200	220	180	150	280	230	200		●●	180	170	160	●●	●	280	230	200
250	200	180	200	150	120	250	200	180		●●	150	130	110	●●	●	250	200	180
250	200	180	200	150	120	250	200	180		●●				●●	●	250	200	180

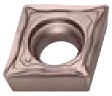
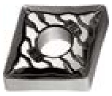
BC = CBN-coated
BH = CBN with high CBN content
BL = CBN with low CBN content
CC = Coated ceramic

CN = Silicon nitride Si_3N_4
CR = Reinforced ceramic
DP = Polycrystalline diamond

The specified cutting data are average standard values.
For specific applications, adjustment is recommended.

Cutting tool material application charts – Turning

Carbide

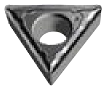
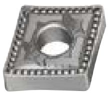
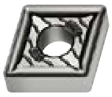
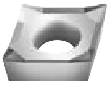
Walter grade designation	Standard designation	Material groups P Steel	M Stainless steel	K Cast iron	N NF metals	S Materials with difficult cutting properties	H Hard materials	O Other	Application range 01 05 10 15 20 25 30 35 40 45	Coating process	Coating composition	Example of indexable insert
WEP10C	HE – P 10	●●							01–20	PVD	TiCN + TiAlN	
	HE – M 10		●						05–15			
	HE – K 10			●					05–15			
WKP01G	HC – P 01	●●							–10	CVD	TiCN + Al$_2$O$_3$ (+ TiN)	
	HC – K 01			●●					–10			
WPP05G	HC – P 05	●●							–15	CVD	TiCN + Al$_2$O$_3$ (+ TiN)	
	HC – K 05			●					01–10			
WPP10G	HC – P 10	●●							01–20	CVD	TiCN + Al$_2$O$_3$ (+ TiN)	
	HC – K 20			●					15–25			
WPP20G	HC – P 20	●●							10–30	CVD	TiCN + Al$_2$O$_3$ (+ TiN)	
	HC – K 30			●					25–35			
WPP30G	HC – P 30	●●							20–40	CVD	TiCN + Al$_2$O$_3$ (+ TiN)	
	HC – M 20		●						15–25			
	HC – K 40			●					35–45			
WMP20S	HC – M 20		●●						10–30	CVD	TiCN + Al$_2$O$_3$ (+ TiCN)	
	HC – P 25	●●							15–35			
	HC – S 20					●			15–25			
WSM01	HC – M 01		●●						–10	PVD	TiAlN (HIPIMS)	
	HC – S 01					●●			–10			
	HC – P 10	●							05–15			
	HC – N 10				●				05–15			
	HC – H 20						●		15–25			
WSM10S	HC – M 10		●●						01–20	PVD	TiAlN + Al$_2$O$_3$ (Al)	
	HC – S 10					●●			01–20			
	HC – P 10	●							05–15			
WSM20S	HC – M 20		●●						10–30	PVD	TiAlN + Al$_2$O$_3$ (Al)	
	HC – S 20					●●			10–30			
	HC – P 20	●							15–25			
WSM30S	HC – M 30		●●						20–40	PVD	TiAlN + Al$_2$O$_3$ (Al)	
	HC – S 30					●●			20–40			
	HC – P 30	●							25–35			

HC = Coated carbide
HE = Coated cermet
HW = Uncoated carbide

●● Primary application
● Additional application

Cutting tool material application charts – Turning (continued)

Carbide

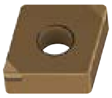
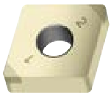
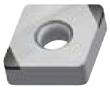
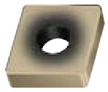
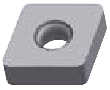
Walter grade designation	Standard designation	Material groups P Steel	M Stainless steel	K Cast iron	N NF metals	S Materials with difficult cutting properties	H Hard materials	O Other	Application range 01 05 10 15 20 25 30 35 40 45	Coating process	Coating composition	Example of indexable insert
WSM21	HC – M 20		●●						10–30 (20)	PVD	TiAlN	
	HC – S 20					●●			10–30 (20)			
	HC – P 20	●●							10–30 (20)			
WS10	HW – S 10					●●			01–20 (10)	—	—	
WKK10S	HC – K 10			●●					01–20 (10)	CVD	TiCN + Al_2O_3 (+ TiCN)	
	HC – H 30						●		25–35 (30)			
WKK20S	HC – K 20			●●					10–30 (20)	CVD	TiCN + Al_2O_3 (+ TiCN)	
	HC – P 10	●							05–15 (10)			
WKP30S	HC – K 30			●●					20–40 (30)	CVD	TiCN + Al_2O_3 (+ TiCN)	
	HC – P 35	●●							25–45 (35)			
	HC – M 30		●						30–40 (35)			
WNN10	HC – N 10				●●				01–20 (10)	PVD	TiAlN (HIPIMS)	
	HC – P 01	●							–05 (01)			
	HC – M 01		●						–05 (01)			
	HC – K 01			●					–05 (01)			
	HC – S 01					●			–05 (01)			
	HC – O 01							●	05–15 (10)			
WN10	HW – N 10				●●				01–20 (10)	—	—	
	HW – S 10					●			05–15 (10)			

HC = Coated carbide
HE = Coated cermet
HW = Uncoated carbide

●● Primary application
● Additional application

Cutting tool material application charts – Turning (continued)

CBN/cermet/PCD/ceramic

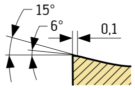
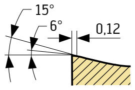
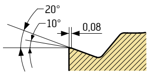
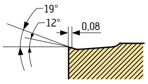
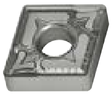
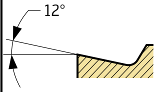
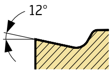
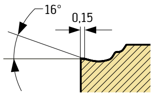
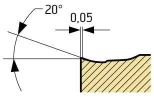
Walter grade designation	Standard designation	Material groups							Application range	Coating process	Cutting tool material	Example of indexable insert
		P Steel	M Stainless steel	K Cast iron	N NF metals	S Materials with difficult cutting properties	H Hard materials	O Other	01 05 10 15 20 25 30 35 40 45			
WBH10C	BC – H 05						●●		01–15	PVD	CBN + TiAlSiN	
WBH20C	BC – H 20						●●		10–30	PVD	CBN + TiAlN/ZrN	
WBH10	BL – H 10						●●		01–20	—	CBN	
WBH20	BL – H 20						●●		10–30	—	CBN	
WBH30	BL – H 30						●●		20–40	—	CBN	
WBS10	BH – S 10					●●			01–20	—	CBN	
WBK20	BH – K 20			●●					10–30	—	CBN	
	BH – H 30						●		25–35			
WBK30	BH – K 30			●●			●		20–40	—	CBN	
	BH – H 30						●		25–35			
WDN10	DP – N 20				●●				10–30	—	PCD	
	DP – O 20							●●	10–30			
WCH10C	CC – H 10						●●		01–20	PVD	Al_2O_3- TiC + TiN ceramic	
WCK10	CN – K 10			●●					01–15	—	Si_3N_4 ceramic	
WIS10	CN – S 10					●●			01–20	—	SiAlON ceramic	
WWS20	CR – S 20					●●			10–30	—	Whisker ceramic	
	CR – H 20						●		15–25			

BC = CBN-coated
BH = CBN with high CBN content
BL = CBN with low CBN content
CC = Coated ceramic
CN = Silicon nitride Si_3N_4
CR = Reinforced ceramic
DP = Polycrystalline diamond

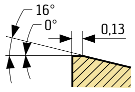
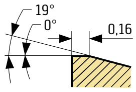
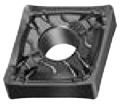
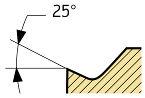
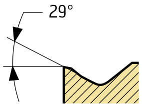
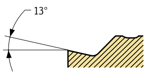
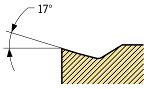
●● Primary application
● Additional application

Geometry overview for turning inserts: Negative basic shape

Finishing operation

Geometry	Remarks/application area	Material groups							Main cutting edge section	Corner radius section	a_p [mm]	f [mm]
		P	M	K	N	S	H	O				
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other				
 **Wiper**	**FW5** – Finishing with wiper technology – Double the feed rate – the same high surface quality – Reduced cutting pressure thanks to short radiused wiper cutting edge	●●	●●	●●		●					0,3–3,0	0,10–0,60
	**FM5** – Finishing stainless materials and high-temperature alloys – Finishing long-chipping steel materials – Curved cutting edge for cutting pressure reduction	●	●●			●●					0,1–1,5	0,05–0,20
	**NFT** – Finishing titanium materials – Sharp cutting edges with fully ground circumference, first choice – 100° corner with NRT roughing geometry implemented with CNMG basic shape		●		●	●●					0,1–2,0	0,05–0,20
	**FP5** – Finishing steel materials – Can also be used in semi-finishing as an alternative to MP3 – Curved cutting edge for low cutting forces	●●		●							0,1–2,5	0,04–0,25

Medium machining

Geometry	Remarks/application area	P	M	K	N	S	H	O	Main cutting edge section	Corner radius section	a_p [mm]	f [mm]
 **Wiper**	**MW5** – Medium machining with wiper technology – Double the feed rate – the same high surface quality – Maximum feeds thanks to long radiused wiper cutting edge	●●	●●	●●		●					0,8–4,0	0,15–0,75
	**MN3** – Universal indexable insert for non-ferrous metallic materials – Fully ground circumference – Polished rake face – Precision finishing on steel, stainless materials or high-temperature alloys	●	●		●●	●					0,5–4,0	0,05–0,40
	**MS3** – For unstable or thin-walled components – Low cutting forces due to sharp cutting edge design – Circumference precision-ground – Circumference precision-sintered	●	●		●	●●					0,2–3,0	0,02–0,30

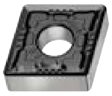
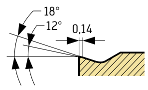
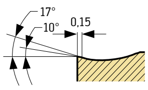
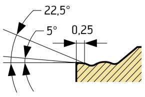
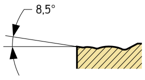
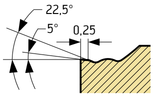
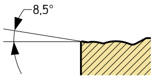
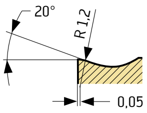
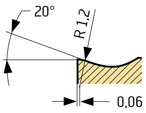
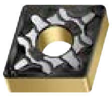
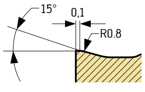
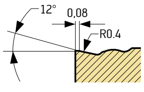
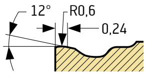
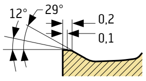
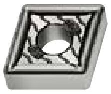
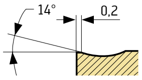
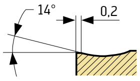
●● Primary application
● Additional application

Remark: Sectional views show CNMG120408 . . ,
CNMA120408 . . or CNGG12408 . .

Geometry overview for turning inserts: Negative basic shape

(continued)

Medium machining

		Material groups										
		P	M	K	N	S	H	O				
Geometry	Remarks/application area	Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other	Main cutting edge section	Corner radius section	a_p [mm]	f [mm]
	**NMS** – Medium machining especially for high-temperature alloys (Ni, Co and Fe-based alloys) – Sharp cutting edge formation – Alternative to NM4 stainless geometry		●			●●					0,5–4,0	0,10–0,40
	**NMT** – Medium machining of titanium materials – Low cutting forces – Machining forged parts with low material removal	●	●			●●					0,6–4,0	0,12–0,32
	**MP3** – Medium machining of long-chipping steel materials – Low cutting forces due to curved cutting edge – Machining forged parts with low material removal	●●									0,3–4,0	0,06–0,40
	**MM5** – Universal geometry for stainless materials and high-temperature alloys – Machining long-chipping steels – Extremely wide application range	●	●●			●●					0,5–4.5	0,10–0,45
	**MP5** – Universal geometry for steel materials – Reinforced chip breakers – Extremely wide application range	●●		●							0,5–8,0	0,16–0,55
	**MU5** – Universal geometry for steel and stainless materials – Low cutting forces and reduced heat generation when machining	●●	●	●		●					0,5–6,0	0,15–0,60
	**MK5** – Universal geometry for cast iron workpieces – Machining steel materials with higher strength	●		●●							0,6–8,0	0,15–0,90

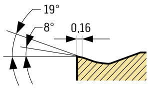
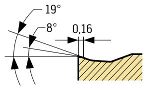
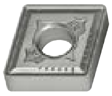
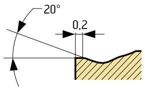
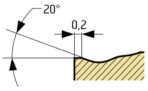
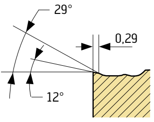
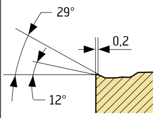
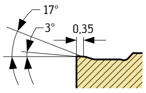
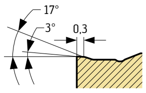
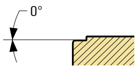
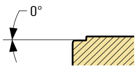
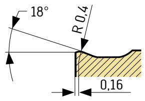
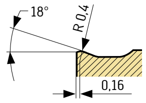
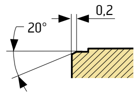
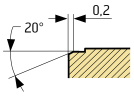
●● Primary application
● Additional application

Remark: Sectional views show CNMG120408 . . ., CNMA120408 . . or CNGG12408 . .

Geometry overview for turning inserts: Negative basic shape

(continued)

Roughing operation – Double-sided indexable inserts

Geometry	Remarks/application area	Material groups							Main cutting edge section	Corner radius section	a_p [mm]	f [mm]
		P	M	K	N	S	H	O				
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other				
	**NRS** – Roughing operations especially for high-temperature alloys (Ni-, Co- and Fe-based alloys) – Sharp cutting edge formation – Alternative to RM5 geometry		●			●●					1,0–6,0	0,15–0,70
	**NRT** – Roughing titanium materials – Stable cutting edge with protective chamfer					●●					0,8–9,0	0,18–0,80
	**RM5** – Roughing operations in stainless materials and high-temperature alloys – Extremely soft cutting action for long tool life	●	●●			●●					1,2–8,0	0,20–0,80
	**RP5** – Roughing steel materials – Stable, positive cutting edge – Open chip groove for a low cutting temperature	●●		●							0,8–12,0	0,2–1,20
	**RK5** – Universal geometry for cast iron workpieces – First choice for grey cast iron			●●			●				0,6–8,0	0,16–0,80
	**RP7** – Interrupted cuts – Cast skins/forged skins – Stable cutting edge	●●		●●							0,8–8,0	0,16–0,70
	**RK7** – Cast iron machining with hard scale – Interrupted cuts – Hard machining of steel materials			●●			●●				0,8–8,0	0,25–0,80

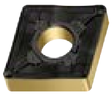
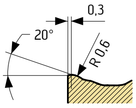
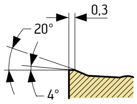
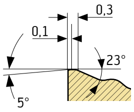
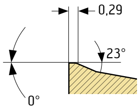
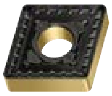
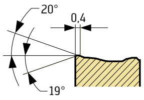
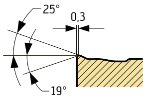
●● Primary application
● Additional application

Remark: Sectional views show CNMG120408 . . ,
CNMA120408 . . or CNGG12408 . .

Geometry overview for turning inserts: Negative basic shape

(continued)

Heavy machining

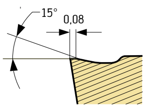
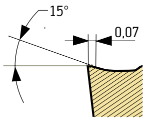
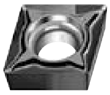
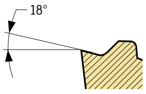
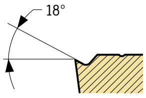
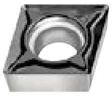
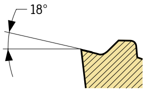
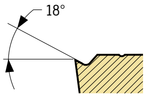
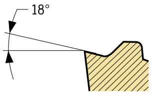
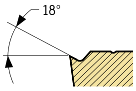
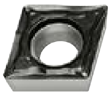
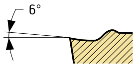
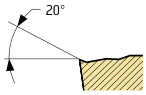
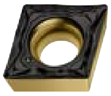
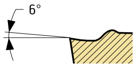
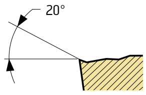
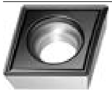
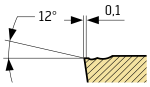
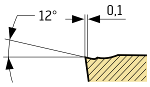
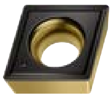
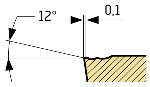
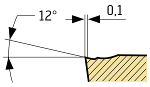
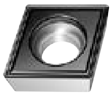
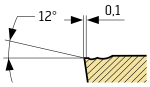
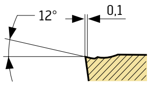
		Material groups										
		P	M	K	N	S	H	O				
Geometry	Remarks/application area	Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other	Main cutting edge section	Corner radius section	a_p [mm]	f [mm]
	**HU3** – Single-sided roughing geometry, for universal application – Curved cutting edge for low cutting forces – V chip formation for optimised chip breaking even with small depths of cut and fluctuating material removal – Reinforced double chip breaker groove on the main cutting edge	●●	●	●							0,8–12,0	0,25–1,20
	**HU5** – Single-sided roughing geometry, for universal application – Curved cutting edge and deep chip breaker groove for low cutting forces – Open chip breaker groove design for reduced heat generation	●	●●	●		●●					2,5–10,0	0,30–1,00
	**HU7** – Single-sided geometry for challenging roughing operations – Straight cutting edge with negative protective chamfer for maximum stability – Chip breaker for reduced friction	●●	●	●●							2,0–17,0	0,50–1,60

●● Primary application
● Additional application

Remark: Sectional views show SNMM190616 . .

Geometry overview for turning inserts: Positive basic shape

Finishing operation

Geometry	Remarks/application area	Material groups							Main cutting edge section	Corner radius section	a_p [mm]	f [mm]
		P	M	K	N	S	H	O				
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other				
	**FW4** – Finishing with wiper technology – Double the feed rate – the same high surface quality – Reduced cutting pressure thanks to short radiused wiper cutting edge	●●	●●	●●		●					0,1–2,5	0,03–0,50
	**FN2** – Finishing insert with fully ground circumference – Low cutting forces – Machining long, small diameter shafts with a tendency to vibrate	●●	●●	●	●●	●●		●			0,12–4,5	0,02–0,45
	**FM2** – Finishing insert with fully ground circumference – Low cutting forces – Machining long, small diameter shafts with a tendency to vibrate	●●	●●	●	●	●●					0,12–4,5	0,02–0,45
	**FP2** – Finishing insert with fully ground circumference – Long, small-diameter shafts with a tendency to vibrate – Low cutting forces	●●	●	●		●					0,12–4,5	0,02–0,45
	**FM4** – Finishing insert – Excellent chip control – Can also be used for precision boring	●	●●			●●					0,1–2,5	0,04–0,20
	**FP4** – Finishing insert – Excellent chip control – Can also be used for precision boring	●●	●	●		●					0,1–2,5	0,04–0,20
	**FM6** – Universal insert for finishing and medium machining operations – Can also be used for boring	●	●●			●					0,3–2,5	0,08–0,32
	**FP6** – Universal insert for finishing and medium machining operations – Can also be used for boring	●●	●	●		●					0,3–2,5	0,08–0,32
	**FK6** – Universal insert for finishing and medium machining operations – Can also be used for boring	●	●	●●		●					0,3–2,5	0,08–0,32

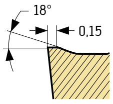
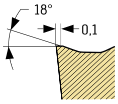
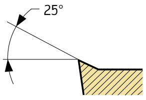
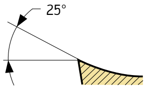
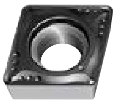
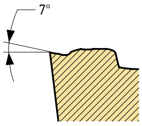
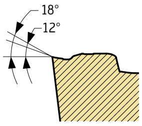
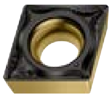
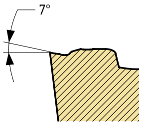
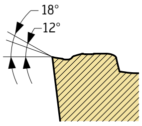
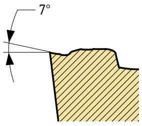
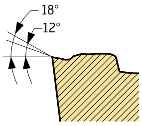
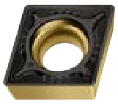
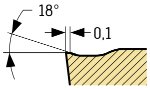
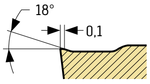
●● Primary application
● Additional application

Remark: Sectional views show CCMT09T308 . . and CCGT09T308 . .

Geometry overview for turning inserts: Positive basic shape

(continued)

Medium machining

Geometry	Remarks/application area	Material groups P Steel	 M Stainless steel	 K Cast iron	 N NF metals	 S Materials with difficult cutting properties	 H Hard materials	 O Other	Main cutting edge section	Corner radius section	a_p [mm]	f [mm]
 Wiper	**MW4** – Medium machining with wiper technology – Double the feed rate – the same high surface quality – Maximum feeds thanks to long radiused wiper cutting edge	●●	●	●●		●					0,5–4,0	0,12–0,60
	**MN2** – Universal indexable insert for non-ferrous metallic materials – Sharp cutting edge with fully ground circumference – Polished rake face – Precision finishing on steel and stainless materials	●	●		●●	●		●			0,5–6,0	0,02–0,80
	**MM4** – Machining of long-chipping materials – Can be used universally in a wide application range – Circumference precision-ground – Circumference precision-sintered – Straight cutting edge for C, S and T basic shapes, for use as a chamfer insert in boring tools	●	●●	●		●●					0,4–3,0	0,08–0,32
	**MP4** – Machining of long-chipping materials – Can be used universally in a wide application range – Circumference precision-ground – Circumference precision-sintered – Straight cutting edge for C, S and T basic shapes, for use as a chamfer insert in boring tools	●●	●	●		●					0,4–3,5	0,08–0,32
	**MK4** – Machining of fragile components, internal machining – Additional version with fully ground circumference available for maximum precision – Straight cutting edge for C, S and T basic shapes, for use as a chamfer insert in boring tools	●	●	●●		●					0,4–3,5	0,08–0,32
	**MP6** – Medium machining of steel – Positive geometry with good chip control with very stable cutting edge	●●	●	●		●					0,4–4,0	0,10–0,35

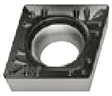
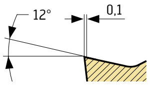
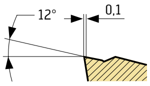
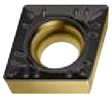
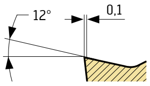
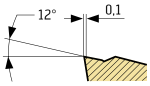
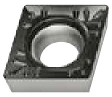
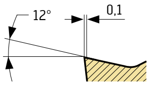
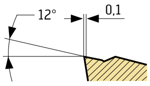
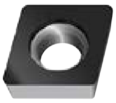
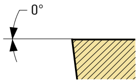
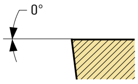
●● Primary application
● Additional application

Remark: Sectional views show CCMT09T308 . . and CCGT09T308 . .

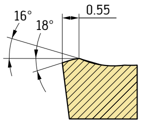
Geometry overview for turning inserts: Positive basic shape

(continued)

Roughing operation

Geometry	Remarks/application area	Material groups							Main cutting edge section	Corner radius section	a_p [mm]	f [mm]
		P	M	K	N	S	H	O				
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other				
	**RM4** – Universal geometry for roughing and medium machining operations – Extremely large chip breaking range – Maximum metal removal rate and tool life	●	●●	●		●●					0,6–5,0	0,12–0,50
	**RP4** – Universal geometry for roughing and medium machining operations – Extremely large chip breaking range – Maximum metal removal rate and tool life	●●	●	●		●					0,6–5,0	0,12–0,50
	**RK4** – First choice for grey cast iron and ductile cast iron – Universal geometry for roughing and medium machining operations – Extremely large chip breaking range	●	●	●●		●					0,6–5,0	0,12–0,50
	**RK6** – Cast iron machining with hard scale – Interrupted cuts – Stable cutting edge design			●●				●			0,2–6,0	0,12–0,50

Heavy machining

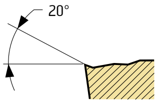
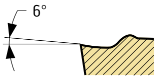
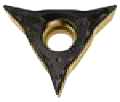
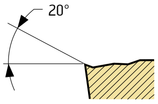
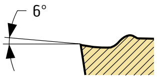
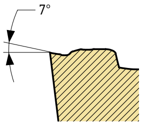
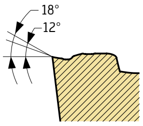
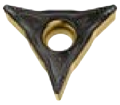
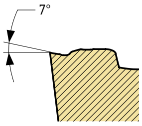
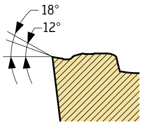
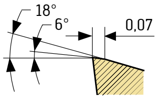
Geometry	Remarks/application area	P	M	K	N	S	H	O	Main cutting edge section	Corner radius section	a_p [mm]	f [mm]
	**HU6** – Heavy roughing – Excellent chip breaking – Machining of forged parts – For use in train wheel machining	●●	●	●●							1,0–15,0	0,12–1,7

●● Primary application
● Additional application

Remark: Sectional views show CCMT09T308 . . , CCGT09T308 . . , CCMW09T308 . . and RCMX2006 . .

Geometry overview of system inserts: WL

Finishing operations/medium machining

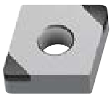
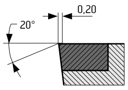
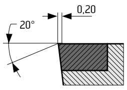
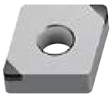
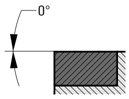
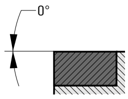
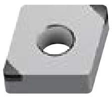
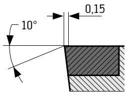
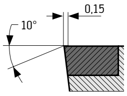
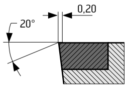
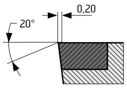
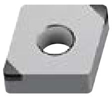
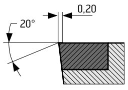
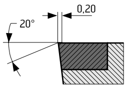
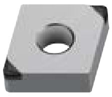
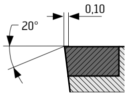
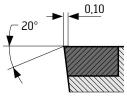
Geometry	Remarks/application area	Material groups							Main cutting edge section	Corner radius section	a_p [mm]	f [mm]
		P	M	K	N	S	H	O				
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other				
	**FM4** – Finishing geometries for minimal depths of cut – Excellent chip control – Developed for copy turning	●	●●			●●					0,1–2,0	0,05–0,25
	**FP4** – Finishing geometries for minimal depths of cut – Excellent chip control – Developed for copy turning	●●	●			●					0,1–2,0	0,05–0,25
	**MM4** – Medium machining – with a large application range – Machining for long-chipping materials – Developed for copy turning	●	●●	●		●●					0,4–2,5	0,08–0,35
	**MP4** – Medium machining – with a large application range – Machining for long-chipping materials – Developed for copy turning	●●	●	●		●					0,4–2,5	0,08–0,35
	**MU6** – Full-radius geometry for copy turning – Soft cutting action with excellent chip breaking – Chip breaking in all directions of feed	●●	●●	●●		●●	●				0,4–2,5	0,1–0,40

●● Primary application
● Additional application

Remark: Sectional views show WL25-VC0708 . . and WL25-RC0420 . .

Geometry overview for turning inserts: Negative basic shape – CBN/PCD/ceramic

CBN

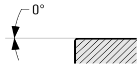
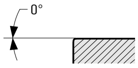
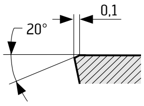
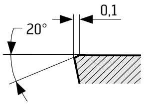
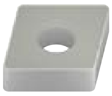
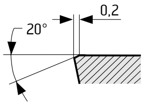
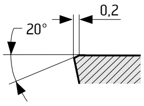
Geometry	Remarks/application area	Material groups P Steel	M Stainless steel	K Cast iron	N NF metals	S Materials with difficult cutting properties	H Hard materials	O Other	Main cutting edge section	Corner radius section	a_p [mm]	f [mm]
 **Wiper**	**CNG..TM-MW .** – CBN indexable insert with fully ground circumference to G tolerance – CBN indexable insert with chamfered cutting edge – Effective wiper geometry for the best surfaces						●●				0,1–0,5	0,05–0,30
	**CNG..EM .** – CBN indexable insert with fully ground circumference to G tolerance – Rounded cutting edge for minimum cutting forces – Machining high-temperature alloys					●●					0,1–2,0	0,05–0,20
	**CNG..TS .** – CBN indexable insert with fully ground circumference to G tolerance – Universal CBN indexable insert with chamfered cutting edge – Finishing operations in hardened steel, cast iron and sintered steel						●●				0,1–0,5	0,05–0,25
	**CNG..TM-S** – Solid CBN indexable insert with fully ground circumference to G tolerance – Universal CBN indexable insert with chamfered cutting edge – Roughing operations in hardened steel, cast iron and sintered steel			●●			●				Up to 8 mm in cast iron	0,05–0,4
	**CNG..TM .** – CBN indexable insert with fully ground circumference to G tolerance – Universal CBN indexable insert with chamfered cutting edge – Machining operations in hardened steel, cast iron and sintered steel						●●				0,1–0,5	0,05–0,25
 Chip breaker	**CNG..TM-M .** – CBN indexable insert with fully ground circumference to G tolerance – CBN indexable insert with chamfered cutting edge – Effective chip formation for hard machining						●●				0,1–0,5	0,05–0,25

●● Primary application
● Additional application

Remark: Sectional views show RNGN120700 . .
CNGA120408 . .

Geometry overview for turning inserts: Negative basic shape – CBN/PCD/ceramic (continued)

Ceramic

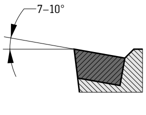
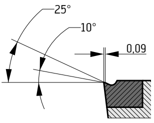
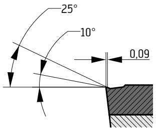
Geometry	Remarks/application area	Material groups							Main cutting edge section	Corner radius section	a_p [mm]	f [mm]
		P	M	K	N	S	H	O				
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other				
	**. . . E** – Ceramic indexable insert with fully ground circumference – Rounded cutting edge for minimum cutting forces – Machining high-temperature alloys					●●					0,1–7,5	0,1–0,5
	**. . . T01020** – Ceramic indexable insert with fully ground circumference – Chamfered cutting edge for maximum stability for medium machining to roughing operations – Machining high-temperature alloys					●●	●				0,1–5,0	0,1–0,45
	**. . . T02020** – Ceramic indexable insert with fully ground circumference – Chamfered cutting edge for maximum stability for medium machining to roughing operations – Machining cast iron			●●							0,1–6,0	0,1–0,4

●● Primary application
● Additional application

Remark: Sectional views show RNGN120700 . .
CNGA120408 . .

Geometry overview for turning inserts: Positive basic shape – CBN/PCD/ceramic

PCD

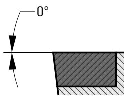
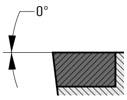
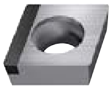
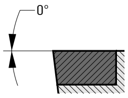
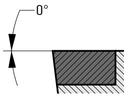
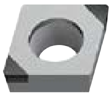
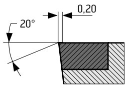
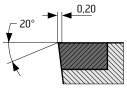
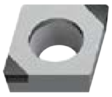
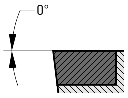
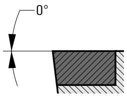
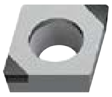
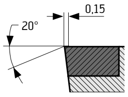
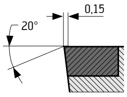
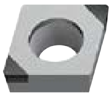
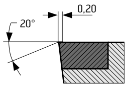
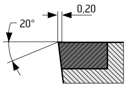
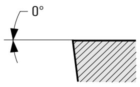
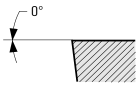
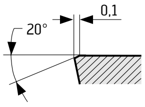
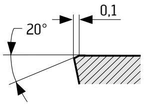
Geometry	Remarks/application area	Material groups							Main cutting edge section	Corner radius section	a_p [mm]	f [mm]
		P	M	K	N	S	H	O				
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other				
	**. CGT . . . FS .** – PCD finishing insert with fully ground circumference in G tolerance – Extremely low cutting forces due to 7°–10° rake angle – Extremely high surface quality				●●	●		●●	–		0,05–1,5	0,03–0,38
 **Chip breaker**	**. CGT . . . FS-M1** – PCD indexable insert with fully ground circumference in G tolerance – Excellent chip control due to laser-generated chip-breaker geometry – Finishing to medium machining				●●	●		●●			0,1–3,0	0,08–0,2

●● Primary application
● Additional application

Remark: Sectional views show CCGT09T304 . . ,
CCGW09T304 . . and RCGX090700 . .

Geometry overview for turning inserts: Positive basic shape – CBN/PCD/ceramic (continued)

PCD

Geometry	Remarks/application area	Material groups P Steel	 M Stainless steel	 K Cast iron	 N NF metals	 S Materials with difficult cutting properties	 H Hard materials	 O Other	Main cutting edge section	Corner radius section	a_p [mm]	f [mm]
	**. CGW . . . FS .** – PCD indexable insert with fully ground circumference in G tolerance – Universal PCD indexable insert with 0° rake angle – Maximum repeat accuracy				●●	●		●●			0,05–3,5	0,03–0,38
	**. CGW . . . FSL/R-9** – PCD indexable insert with fully ground circumference in G tolerance – Cutting edge with guide pad – Maximum depth of cut and shoulder machining				●●	●		●●			0,05–9,0	0,03–0,38
CBN												
 **Wiper**	**. CGW. . TM-MW .** – CBN indexable insert with fully ground circumference to G tolerance – Universal CBN indexable insert with chamfered cutting edge – Effective wiper geometry for the best surfaces						●●				0,1–0,5	0,05–0,30
	**. CGW. . EM .** – CBN indexable insert with fully ground circumference – Rounded cutting edge for minimum cutting forces – Machining high-temperature alloys					●●					0,1–2,0	0,05–0,20
	**. CGW. . TS .** – CBN indexable insert with fully ground circumference to G tolerance – Universal CBN indexable insert with chamfered cutting edge – Finishing operations in hardened steel						●●				0,1–0,5	0,05–0,25
	**. CGW. . TM .** – CBN indexable insert with fully ground circumference to G tolerance – Universal CBN indexable insert with chamfered cutting edge – Machining of hardened steel						●●				0,1–0,5	0,05–0,25
Ceramic												
	**. . . E** – Ceramic indexable insert with fully ground circumference – Rounded cutting edge for minimum cutting forces – Machining high-temperature alloys					●●					0,1–3,6	0,1–0,32
	**. . . T01020** – Ceramic indexable insert with fully ground circumference – Chamfered cutting edge for maximum stability for medium machining to roughing operations – Machining high-temperature alloys					●●					0,1–3,6	0,1–0,32

●● Primary application
● Additional application

Remark: Sectional views show CCGT09T304 . . ,
CCGW09T304 . . and RCGX090700 . .

Walter Turn/Walter Capto™ product description – External machining

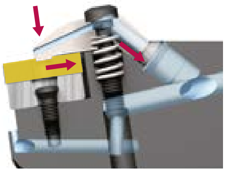
External turning toolholders for indexable inserts with negative basic shape

Walter Turn rigid clamping (D)

- The first choice for machining short-chipping material such as cast iron
- Functionality is maintained even in “dirty environments”, e.g. grey cast iron machining
- First choice for interrupted cuts thanks to stable insert clamping
- The indexable insert and shim can be replaced using the same wrench
- Reinforced clamps with carbide shoe available for longer clamp tool life

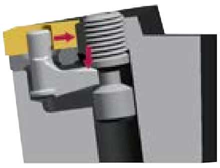
Walter Turn rigid clamping with precision cooling (D...-P)

- Coolant supplied directly through the clamp and along the flank face
- Optimum cooling increases tool life by 30–150%
- The first choice for machining stainless materials (ISO M) and high-temperature alloys (ISO S)
- Flexible coolant connection: Direct coolant transfer between shank tool and tool adaptor (A2120-P/A2121-P) or via coolant hose set with G1/8" thread (K601)
- Can be used from 10 bar up to a maximum coolant pressure of 150 bar
- Improved chip breaking, particularly at pressures over 40 bar



Walter Turn toggle clamp (P)

- Universal system enabling easy replacement of indexable inserts
- The first choice for single-sided negative indexable inserts, e.g. SNMM for heavy roughing
- Unobstructed chip evacuation and can be used as an alternative to rigid clamping

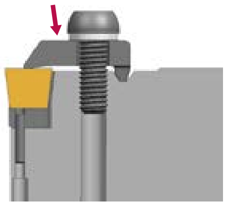


Walter Turn wedge-type clamping (M)

- For indexable inserts with negative T basic shape
- Profiling is possible up to an angle of 22° with TNMG indexable inserts
- Frequently used when shaft machining with relief grooves

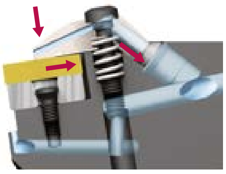
Walter Turn rigid clamping for negative ceramic indexable inserts (C)

- Special system for ceramic indexable inserts without bore
- Rigid clamping with carbide shoe for a long service life
- First choice for machining high-temperature alloys and cast iron workpieces with ceramic indexable inserts



Walter Turn rigid clamping with precision cooling (C...-P)

- For negative ceramic indexable inserts
- Coolant supplied directly through the clamp and along the flank face
- Optimum cooling increases tool life by 30–150 %
- First choice when machining high-temperature alloys
- Can be used from 10 bar up to a maximum coolant pressure of 150 bar
- Improved chip breaking, particularly at pressures over 40 bar
- Special system for ceramic indexable inserts without bore

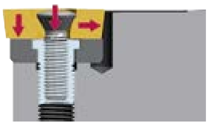


Walter Turn/Walter Capto™ product description – External machining

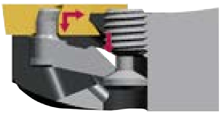
(continued)

External turning toolholders for indexable inserts with positive basic shape

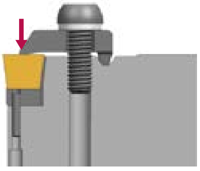
Walter Turn screw clamping (S)
- For indexable inserts with a positive basic shape with 5° and 7° clearance angle
- First choice for low cutting pressures/small-diameter shafts
- Fewer assembly parts are required
- Torx Plus screw clamping for transmitting higher tightening torques
- The indexable insert and shim can be replaced using the same wrench



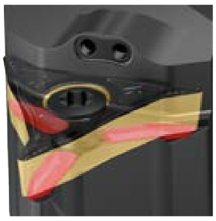
Walter Turn positive toggle clamp (P)
- For indexable inserts with a positive V/R basic shape with 5° and 7° clearance angle
- High dimensional accuracy is achieved on the component via the high pre-tension applied by the toggle with V indexable inserts
- Clamping screw cannot come undone due to round inserts twisting during machining



Walter Turn rigid clamping for positive ceramic indexable inserts (C)
- Special system for positive ceramic indexable inserts with 7° and 11° clearance angle (RC . X/RP . X)
- Very stable, prism-shaped contact surface designed to prevent twisting
- Rigid clamping for maximum clamping force and low-vibration machining of high-temperature alloys and cast iron workpieces



Walter Turn copy turning system (W1011 / W1010)
- For three-edge, positive indexable inserts with WL.. basic shape
- First choice for copy turning operations in all directions
- High flexibility as four indexable insert types fit in the same tool: WL..N.. (neutral), WL..L (left), WL..R.. (right), WL..N..-MU6 (full radius)
- Cost-effective: Lower tool costs due to three cutting edges
- High level of (dimensional) stability and indexing accuracy due to the positive-locking connection between the toolholder and indexable insert (Walter Lock positive engagement)



Walter Turn/Walter Capto™ product description – External machining

(continued)

Tool adaptors for shank tools

A2120-P VDI axial adaptor for shank tools with precision cooling
- VDI 30/40/50 interface for star turrets
- Direct coolant transfer from the adaptor to the square shank at up to 80 bar
- For universal application in normal position or in an overhead position due to double serration
- Maximum clamping force due to robust wedge-type clamping
- External coolant, option to switch on or off
- For shank sizes 20 × 20 mm and 25 × 25 mm

A2121-P VDI radial adaptor for shank tools with precision cooling
- VDI 30/40/50 interface for disc turrets
- Direct coolant transfer from the adaptor to the square shank at up to 80 bar
- For universal application in normal position or in an overhead position due to double serration
- Maximum clamping force due to robust wedge-type clamping
- External coolant, option to switch on or off
- For shank sizes 20 × 20 mm and 25 × 25 mm

C...-ASH Walter Capto™ axial adaptor for shank tools
- Walter Capto™ C5–C8 interface
- For use on turn/mill centres or machines with star turrets
- Can be used up to a coolant pressure of 80 bar
- Different versions for holding one, two or three shank tools
- Optimum power transmission via precision-ground polygon interface
- For shank sizes 20 × 20 mm/25 × 25 mm/32 × 32 mm

C...-ASHA Walter Capto™ radial adaptor for shank tools
- Walter Capto™ C5–C8 interface
- Coolant nozzle can be switched on to the left/right via a screw
- Neutral version
- For use on turn/mill centres or machines with disc turrets
- Can be used up to a coolant pressure of 80 bar
- Optimum power transmission via precision-ground polygon interface
- For shank sizes 20 × 20 mm/25 × 25 mm/32 × 32 mm

Turning system overview – Walter Turn external machining

VDI adaptors for square shanks with precision cooling

A2120-VDI-P

A2121-VDI-P

Walter Capto™ adaptors for square shanks

C…-ASHR/L
C…-ASHR/L3

C…-ASHA

Walter Capto™ turning tools

C…

Walter Capto™ 45° turning tools for turn/mill centres

C…

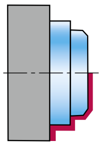
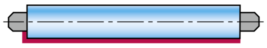
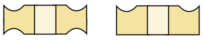
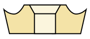
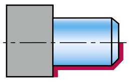
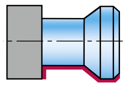
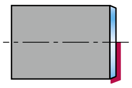
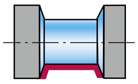
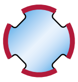
Shank tools

e.g. DLCN…-P

e.g. DLCN

◎ = Precision cooling

Walter Select – External machining: Clamping systems

Workpiece characteristics	short, stable 				long, unstable 	
Basic shape	 **Negative basic shape**				 **Positive basic shape**	
Walter Turn/Walter Capto™ holder clamping system	**Rigid clamping** 	**Rigid clamping with precision cooling (-P)** 	**Toggle clamp** 	**Wedge-type clamping** 	**Screw clamping** 	**Toggle clamp** 
Step 1: Selecting the contour to be machined						
 Longitudinal turning/facing	●●	●●	●●	●	●●	●●
 Profile turning	●●	●●	●●	●●	●●	●●
 Facing	●●	●●	●●	—	●●	●●
 Necking	●●	●●	●	—	●	●●
 Interrupted cuts	●●	●●	●	●	●●	●
Step 2: Selecting the material to be machined						
P Steel	●●	●	●●	●●	●●	●●
M Stainless steel	●	●●	●●	●●	●●	●●
K Cast iron	●●	●	●	●	●●	●
N NF metals	—	—	●	—	●●	●●
S Materials with difficult cutting properties	●●	●●	●●	●	●●	●●
H Hard materials	●●	●	●	●	●	●
O Other	—	—	●	—	●	●

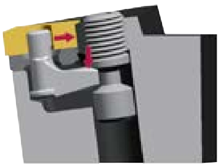
●● Primary application **● Application**

Walter Turn/Walter Capto™ product description – Internal machining

Boring bars for indexable inserts with negative basic shape

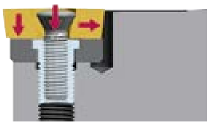
Walter Turn rigid clamping (D)
- The first choice for machining short-chipping material such as cast iron
- Functionality is maintained even in “dirty environments”, e.g. grey cast iron machining
- First choice for interrupted cuts thanks to stable insert clamping
- The indexable insert or shim can be replaced using the same wrench
- Reinforced clamps with carbide shoe available for longer clamp tool life
- Internal coolant supply on all tools

Walter Turn toggle clamp (P)
- Universal system enabling easy replacement of indexable inserts
- First choice for single-sided negative indexable inserts, e.g. CNMM
- First choice when machining small hole diameters with negative indexable inserts
- Unobstructed chip evacuation from the bore and therefore an alternative to rigid clamping
- Internal coolant supply on all tools



Boring bars for indexable inserts with positive basic shape

Walter Turn screw clamping (S)
- For indexable inserts with a positive basic shape with 5° and 7° clearance angle
- Machining of small hole diameters
- For use with low cutting pressures/long overhangs
- Few assembly parts
- Torx Plus screw clamping for transmitting higher tightening torques
- The indexable insert or shim can be replaced using the same wrench
- Unobstructed chip evacuation from the bore
- Internal coolant supply on all tools
- Versions with steel or solid carbide shank



Walter Turn positive toggle clamp (P)
- For indexable inserts with a positive V basic shape with 5° and 7° clearance angle
- High dimensional accuracy on the component due to high pre-tension applied by the toggle clamp
- For use with low cutting pressures/long overhangs
- Unobstructed chip evacuation from the bore

Walter Turn copy turning system (W1211 / W1210)
- For three-edge, positive indexable inserts with WL.. basic shape
- First choice for copy turning operations in all directions
- High flexibility as four indexable insert types fit in the same tool: WL..N.. (neutral), WL..L.. (left), WL..R.. (right), WL..N..-MU6 (full radius)
- Cost-effective: Lower tool costs due to three cutting edges
- High level of (dimensional) stability and indexing accuracy due to the positive-locking connection between the toolholder and indexable insert (Walter Lock positive engagement)

Walter Turn/Walter Capto™ product description – Internal machining

(continued)

Boring bars with QuadFit interface

Accure·tec® A3000 / A3001 with vibration damping

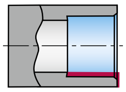
- Accure·tec® boring bars with patented vibration-damping technology for maximum precision
- Counterboring and internal profiling deep bores with high productivity for the best surface quality
- Vibration damping preset ex works
- Can be used immediately (no time lost due to tuning)
- QuadFit exchangeable heads: Quick and precise tool change (±0.002 mm)
- Lengths: 6 × D, 8 × D, 10 × D
- Boring bar diameter: 25–100 mm / 1/4"
- Interface to the machine: Cylindrical shank 25–100 mm, Walter Capto™ C4–C8, HSK-T 63–100
- Additional sizes and lengths available on request

Retaining sleeves for boring bars with full cylindrical shank

Walter Turn A2140 boring bar adaptor

- Easy handling due to automatic centre height adjustment via a spring-loaded ball/groove
- Full cylindrical shank boring bars are completely enclosed – for maximum stability
- Clamping of steel and solid carbide boring bars without clamping surface (-R)

Turning system overview – Walter Turn internal machining



Retaining sleeves for boring bars with full cylindrical shank

A2140...

Walter Capto™ adaptors for boring bars with clamping surface

C...-391.20
C...-391.27

Walter Capto™ boring bars

C...

Boring bar with full cylindrical shank (-R)

e.g. E...-SCLC...-R

Boring bar with clamping surface

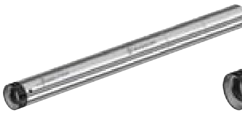
e.g. A...-DCLN

Turning system overview – Accure·tec® internal machining

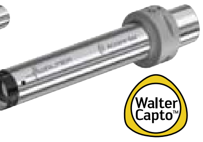
Accure·tec® A3000
Vibration-damped boring bars/adaptors –
QuadFit interface

Accure·tec® A3001
Vibration-damped boring bars/adaptors –
QuadFit Large interface

A3000...



A3000-C...



A3000-HSK-T...

A3001...

A3001-C...

A3001-HSK-T...

QuadFit Large intermediate adaptor

A2201...

QuadFit quick-change heads

Internal machining
Negative basic shape

e.g. Q40-DCLN...

Internal machining
Positive basic shape

e.g. Q40-SDXC...

Grooving
Internal machining

G4221-Q...-P

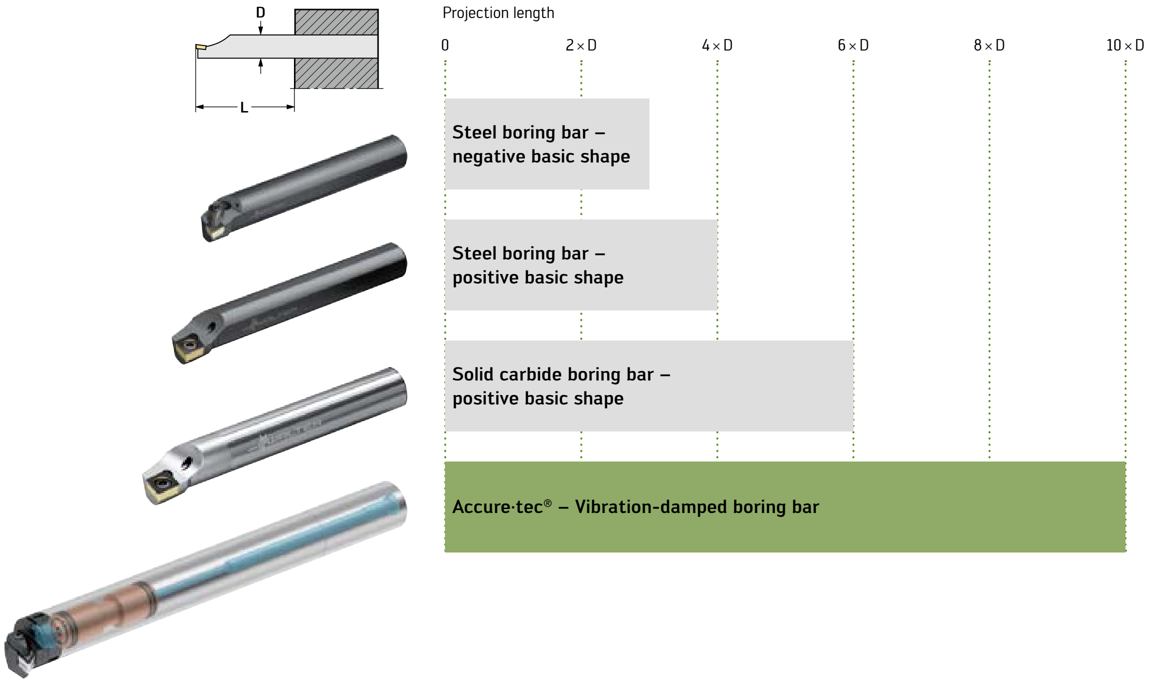
Threading
Internal machining

T1820-Q...-P

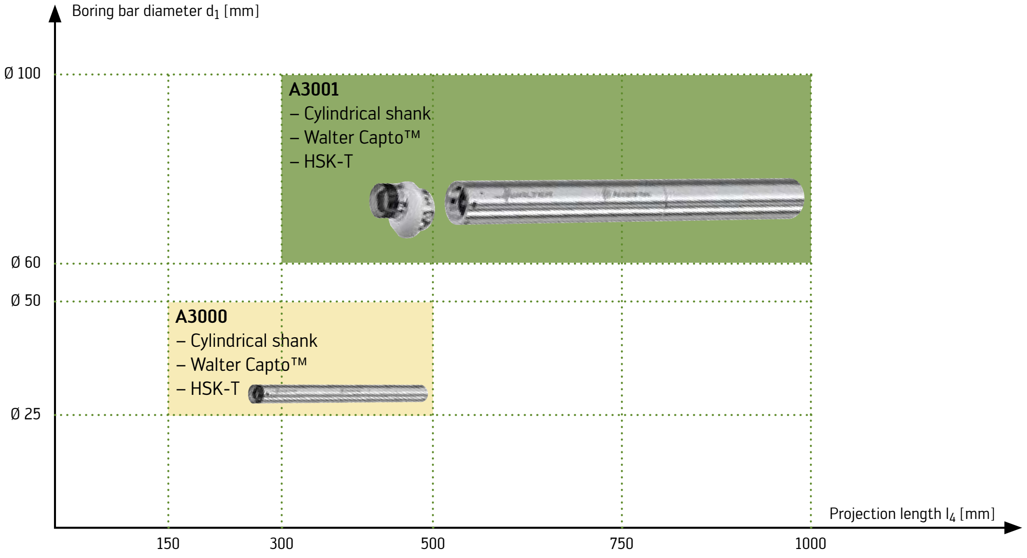
Walter Select – Internal machining: Projection lengths

Walter Turn boring bars compared to vibration-damped Accure·tec® boring bars

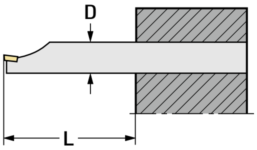
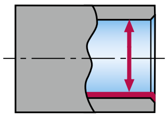
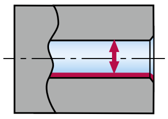
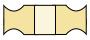
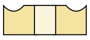
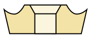
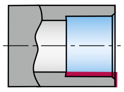
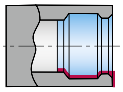
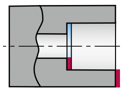
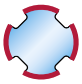
The projection lengths (L/D) given are general standard values and may be influenced by the basic shape of the indexable insert/approach angle, cutting parameters, stability of the adaptor/machine, etc.



Product range overview of Accure·tec® A3000 / A3001 vibration-damped boring bars



Walter Select – Internal machining: Clamping systems

Workpiece characteristics 	from diameters of 20 mm Steel boring bar: $L/D_{max} = 3/1$ 		from diameters of 8.5 mm Steel boring bar: $L/D_{max} = 5/1$ Solid carbide boring bar: $L/D_{max} = 8/1$ 	
Basic shape	  **Negative basic shape**		 **Positive basic shape**	
Walter Turn/Walter Capto™ holder clamping system	**Rigid clamping** 	**Toggle clamp** 	**Screw clamping** 	**Toggle clamp** 
Step 1: Selecting the contour to be machined				
 Longitudinal turning/facing	●●	●●	●●	●
 Profile turning	●●	●●	●●	●●
 Facing	●	●●	●●	●●
 Interrupted cuts	●●	●	●●	●
Step 2: Selecting the material to be machined				
P Steel	●●	●●	●●	●●
M Stainless steel	●	●●	●●	●●
K Cast iron	●●	●	●●	●
N NF metals	–	●	–	●●
S Materials with difficult cutting properties	●●	●●	●●	●●
H Hard materials	●●	●	●	●
O Other	●	●	●	●

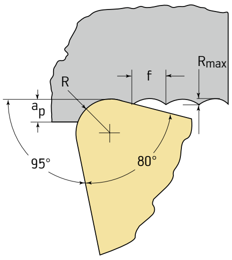
●● Primary application **● Application**

Application information:
Achievable surface quality

Achievable surface quality with standard radius

Select the largest possible corner radius permitted by the workpiece contour, system rigidity and chip control.
The larger the corner radius, the better the surface quality that can be achieved.

	R	Theoretical Ra/Rz values depending on the feed and corner radius						Feed ranges depending on the corner radius and type of machining	
Corner radius mm	Round indexable insert diameter mm	Ra/Rz in µm						Medium machining to roughing operations	Finishing operations to medium machining
		0,4/1,6	1,6/6,3	3,2/12,5	6,3/25	8/32	32/100		
		Feed f in mm						Feed f in mm	
0,2		0,05	0,08	0,13					0,04–0,15
0,4		0,07	0,11	0,17	0,22				0,07–0,22
0,8		0,10	0,15	0,24	0,30	0,38		0,25–0,60	0,10–0,30
1,2			0,19	0,29	0,37	0,47		0,35–0,85	0,20–0,40
1,6				0,34	0,43	0,54	1,08	0,40–1,00	
2,4				0,42	0,53	0,66	1,32	0,50–1,20	
	6	0,20	0,31	0,49	0,62				0,20–0,60
	8	0,23	0,36	0,56	0,72				0,23–0,70
	10	0,25	0,40	0,63	0,80	1,00			0,25–0,80
	12		0,44	0,69	0,88	1,10		0,40–0,80	
	16		0,51	0,80	1,01	1,26	2,54	0,50–1,00	
	20			0,89	1,13	1,42	2,94	0,60–1,25	
	25				1,26	1,58	3,33	0,70–1,50	

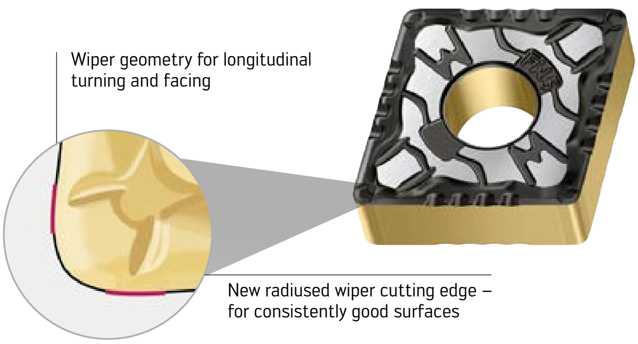


$$R_{max} = \frac{f^2}{8 \times r} \times 1000 \quad [\mu m]$$

R_{max}	Roughness profile depth	[µm]
f	Feed per revolution	[mm]
r	Corner radius of the indexable insert	[mm]

Application information for wiper indexable inserts

Wiper



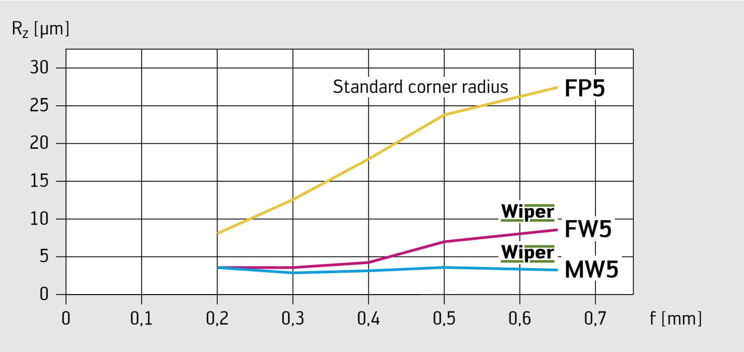
Wiper geometry for longitudinal turning and facing

New radiused wiper cutting edge – for consistently good surfaces

Application area:

- – Double the surface quality with the same feed compared to the standard corner radius
- – Same surface quality with double the feed rate compared to the standard corner radius
- – Increased productivity – the higher feeds reduce the machining time
- – Fewer tools – there is the option to combine roughing and finishing in a single operation
- – Longer tool life as the higher feed reduces the contact time with the workpiece

1. Surface quality that can be achieved with wiper indexable inserts



Material:	42CrMo4
Indexable insert:	CNMG120408-FP5 WPP20S CNMG120408-FW5 WPP20S CNMG120408-MW5 WPP20S

2. Edge formation: Comparison of wiper indexable inserts and standard indexable inserts

The specified maximum feeds [f_{max}] should not be exceeded with wiper geometries. They approximately correspond to the radiused wiper cutting edge length and depend on corner radius r.

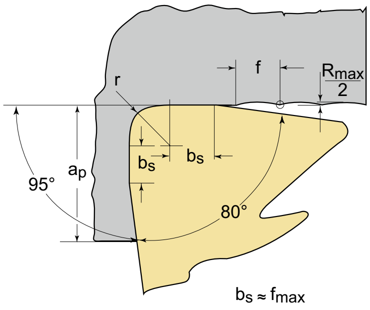
Negative basic shape

r [mm]	FW5 f_{max} [mm]	MW5 f_{max} [mm]
0,4	0,45	—
0,8	0,55	0,65
1,2	0,65	0,75

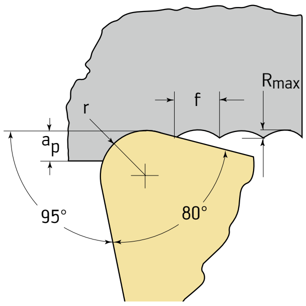
Positive basic shape

r [mm]	FW4 f_{max} [mm]	MW4 f_{max} [mm]
0,2	0,30	0,40
0,4	0,40	0,50
0,8	—	0,60

Wiper geometry:
Example CNMG120408-FW5 / CN-MG120408-MW5



Standard geometry with corner radius:
Example CNMG120408-FP5



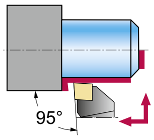
Application information for wiper indexable inserts

(continued)

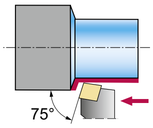
3. Turning toolholder for using wiper geometries

To achieve the wiper effect, the wiper indexable insert has to be used in a toolholder with the correct lead angle.

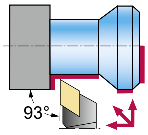
CNMG / CCMT – 80° corner



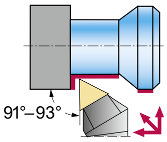
CNMG / CCMT – 100° corner



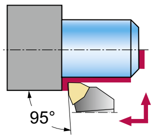
DNMG / DCMT



TNMG / TCMT



WNMG / WCMT



▬ = Wiper effect

Remarks:

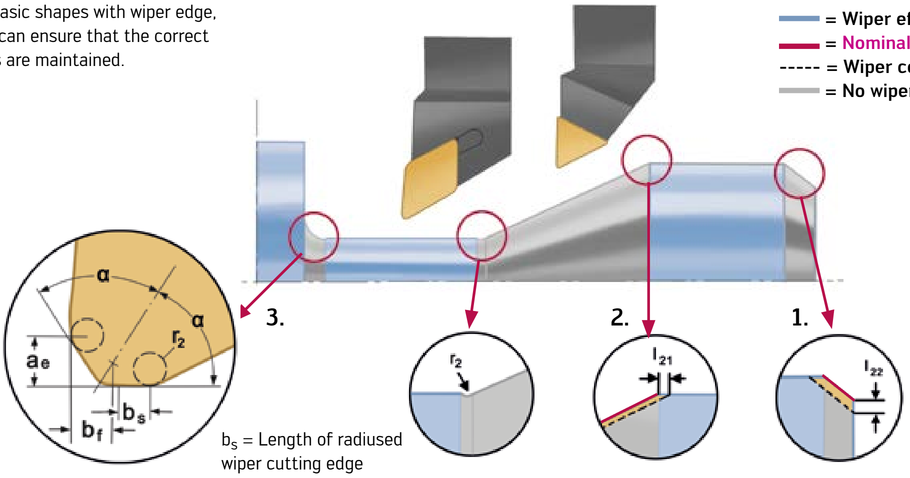
– The standard CNC range can be used with CNMG, CCMT, WNMG and WCMT indexable inserts

– The wiper effect is not achieved when profiling and turning inclined surfaces with DNMG, DCMT, TNMG and TCMT indexable inserts

– Please note that compensation is required in the area of radii/inclined surfaces; otherwise contour distortions may occur (see point 4).

4. Effects on the workpiece dimensions when machining with DNMG/DCMT and TNMG/TCMT wiper indexable inserts

When using D and T basic shapes with wiper edge, radius compensation can ensure that the correct workpiece dimensions are maintained.



▬ = Wiper effect
▬ = Nominal corner radius contour
----- = Wiper contour
▬ = No wiper effect

b_s = Length of radiused wiper cutting edge

Indexable insert designation		**Dimensions**				**Compensation dimensions**		
						1. Chamfer with 45° inclined surface	2. Profiling 27° D basic shape	3. Profiling 22° T basic shape
		r_2 [mm]	a_e [mm]	b_s [mm]	b_f [mm]	l_{22} [mm]	l_{21} [mm]	l_{21} [mm]
	DNMG110404-FW5	0,3	0,42	0,18	0,41	0,01	0,09	
	DNMG110408-FW5	0,4	0,73	0,42	0,56	0,06	0,04	
	DNMG150404-FW5	0,3	0,42	0,18	0,41	0,01	0,09	
	DNMG150408-FW5	0,4	0,73	0,42	0,56	0,06	0,04	
	DNMG150604-FW5	0,3	0,42	0,18	0,41	0,01	0,09	
	DNMG150608-FW5	0,4	0,73	0,42	0,56	0,06	0,04	
	DNMG110408-MW5	0,35	0,82	0,55	0,61	–0,01	0,24	
	DNMG110412-MW5	0,47	1,04	0,7	0,75	0,11	0,06	
	DNMG150408-MW5	0,3	0,82	0,55	0,61	–0,01	0,24	
	DNMG150412-MW5	0,47	1,04	0,7	0,75	0,11	0,06	
	DNMG150608-MW5	0,35	0,82	0,55	0,61	–0,01	0,24	
	DNMG150612-MW5	0,47	1,04	0,77	0,75	0,11	0,06	

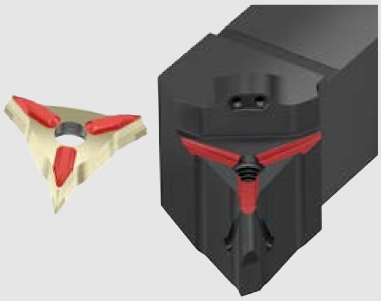
Application information for wiper indexable inserts

(continued)

Indexable insert designation		Dimensions				Compensation dimensions		
						1. Chamfer with 45° inclined surface	2. Profiling 27° D basic shape	3. Profiling 22° T basic shape
		r_2 [mm]	a_e [mm]	b_s [mm]	b_f [mm]	l_{22} [mm]	l_{21} [mm]	l_{21} [mm]
	TNMG160404-FW5	0,3	0,44	0,18	0,34	0,01		0,1
	TNMG160408-FW5	0,4	0,76	0,39	0,56	0,06		0,07
	TNMG160408-MW5	0,35	0,85	0,55	0,58	0,02		0,24
	TNMG160412-MW5	0,56	1,09	0,7	0,7	0,15		0,07
	DCMT070202-FW4	0,10	0,23	0,16	0,18	–0,02	0,10	
	DCMT070204-FW4	0,30	0,43	0,18	0,37	0,00	0,08	
	DCMT070208-FW4	0,40	0,73	0,42	0,56	0,06	0,04	
	DCMT11T302-FW4	0,10	0,23	0,16	0,18	–0,02	0,10	
	DCMT11T304-FW4	0,30	0,43	0,18	0,37	0,00	0,08	
	DCMT11T308-FW4	0,40	0,73	0,42	0,56	0,06	0,04	
	DCMT11T304-MW4	0,40	0,49	0,25	0,29	0,00	0,13	
	DCMT11T308-MW4	0,40	0,74	0,44	0,56	0,05	0,07	
	TCMT090202-FW4	0,10	0,23	0,16	0,17	–0,01		0,08
	TCMT090204-FW4	0,25	0,44	0,27	0,32	–0,01		0,12
	TCMT110204-FW4	0,25	0,44	0,27	0,32	–0,01		0,12
	TCMT110208-FW4	0,40	0,73	0,39	0,57	0,06		0,05
	TCMT16T304-FW4	0,25	0,44	0,27	0,32	–0,01		0,12
	TCMT16T308-FW4	0,40	0,73	0,39	0,57	0,06		0,05
	TCMT16T304-MW4	0,40	0,51	0,26	0,34	–0,02		0,16
	TCMT16T308-MW4	0,40	0,77	0,45	0,60	0,04		0,12

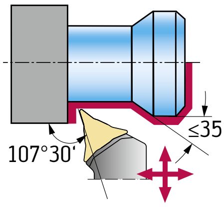
Application information:
W1011/W1010 Walter Turn copy turning system – External machining

On copy turning tools, four different indexable insert types can be fitted in the same tool.
This means that different profiling angles/approach angles can be achieved with the same tool.



1.1 Application area and profiling angle W1011

N



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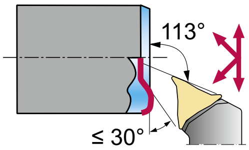
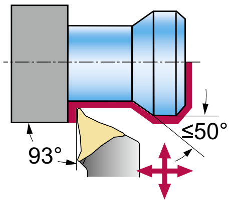
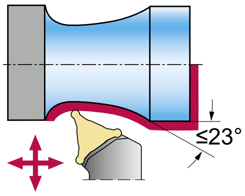


R

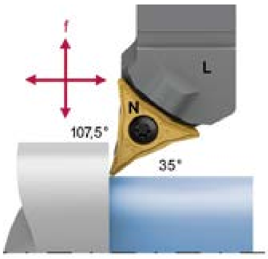


Full radius

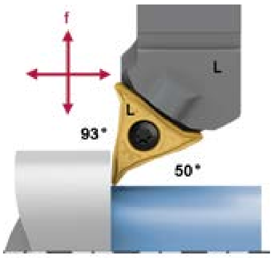


1.2 Insert options and approach angle W1011

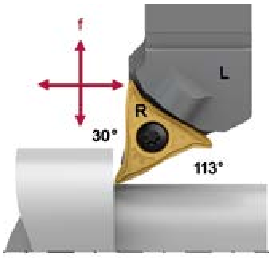
Four different indexable inserts can be fitted in the same tool.
The approach angles are formed by fitting the different indexable inserts.
The point angle of the WL25-VC... is 35°, as on a VBMT indexable insert.



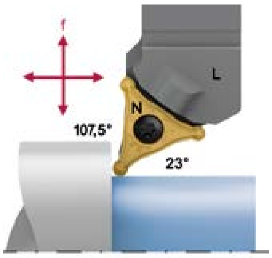
Example:
Left-hand tool:
W1011-2525**L**-WL25-P
Neutral indexable insert:
WL25-VC0708**N**-MP4 WPP20S



Example:
Left-hand tool:
W1011-2525**L**-WL25-P
Left-hand indexable insert:
WL25-VC0708**L**-MP4 WPP20S



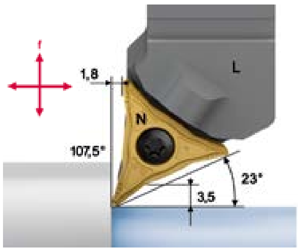
Example:
Left-hand tool:
W1011-2525**L**-WL25-P
Right-hand indexable insert:
WL25-VC0708**R**-MP4 WPP20S

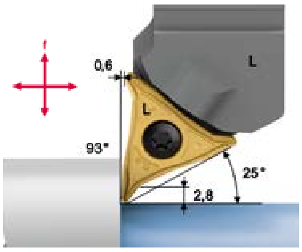


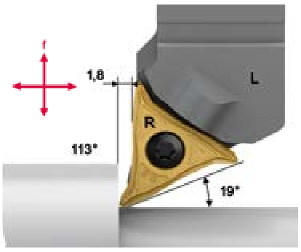
Example:
Left-hand tool:
W1011-2525**L**-WL25-P
Neutral indexable insert:
WL25-RC0420**N**-MU6 WPP20S

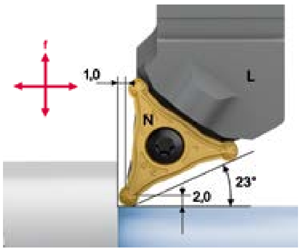
1.3 Maximum profiling capability WL25 indexable inserts W1011

Example – left-hand tool

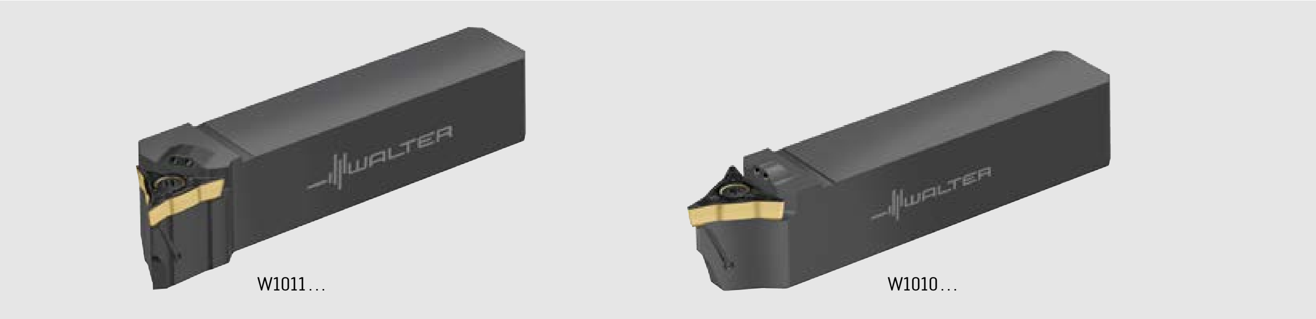






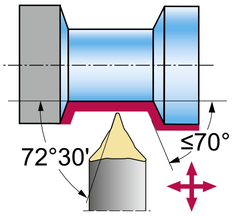


Application information: W1011/W1010 Walter Turn copy turning system – External machining (continued)

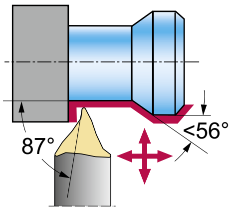


2.1 Application area and profiling angle W1010

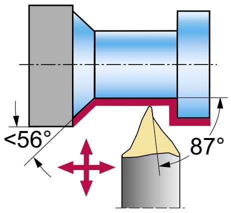
N



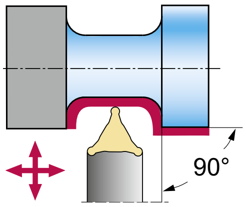
L



R

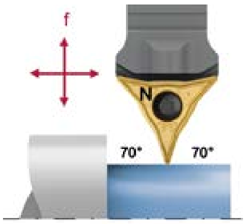


Full radius

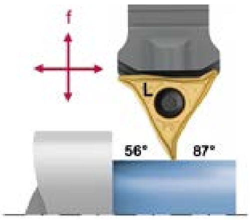


2.2 Insert options and approach angle W1010

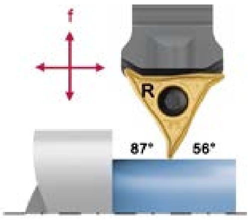
Four different indexable inserts can be fitted in the same tool.
The approach angles are formed by fitting the different indexable inserts.
The point angle of the WL25-VC… is 35°, as on a VBMT indexable insert.



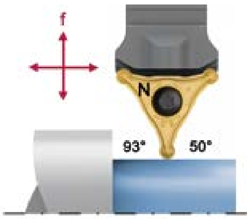
Example:
Neutral tool:
W1010-2525**N**-WL25-P
Neutral indexable insert:
WL25-VC0708**N**-MP4 WPP20S



Example:
Neutral tool:
W1010-2525**N**-WL25-P
Left-hand indexable insert:
WL25-VC0708**L**-MP4 WPP20S



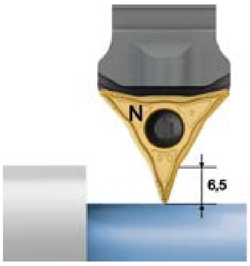
Example:
Neutral tool:
W1010-2525**N**-WL25-P
Right-hand indexable insert:
WL25-VC0708**R**-MP4 WPP20S

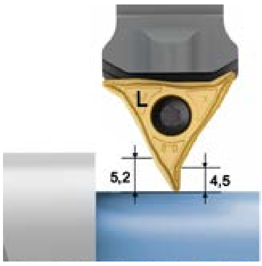


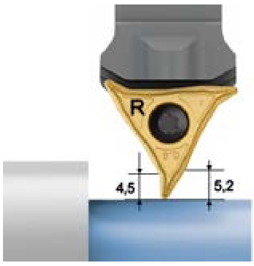
Example:
Neutral tool:
W1010-2525**N**-WL25-P
Neutral indexable insert:
WL25-RC0420**N**-MU6 WPP20S

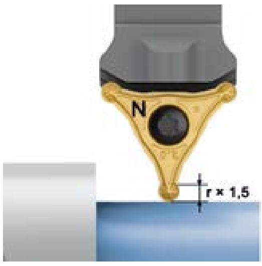
2.3 Maximum profiling capability WL25 indexable inserts W1010

Example – neutral tool







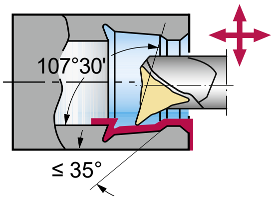


Application information:
W1211/W1210 Walter Turn copy turning system – Internal machining

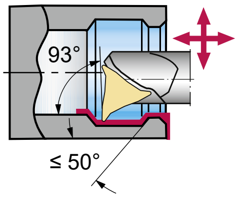
On copy turning tools, four different indexable insert types can be fitted in the same tool.
This means that different profiling angles/approach angles can be achieved with the same tool.

1.1 Application area and profiling angle W1211

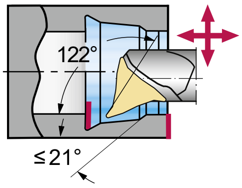
N



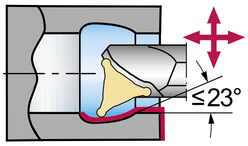
L



R

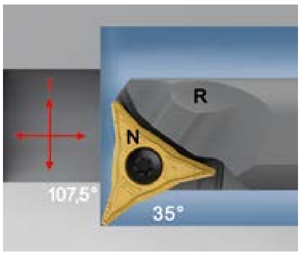


Full radius

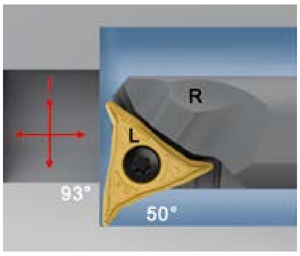


1.2 Insert options and approach angle W1211

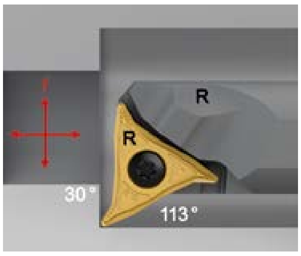
Four different indexable inserts can be fitted in the same tool.
The approach angles are formed by fitting the different indexable inserts.
The point angle of the WL25-VC… is 35°, as on a VBMT indexable insert.



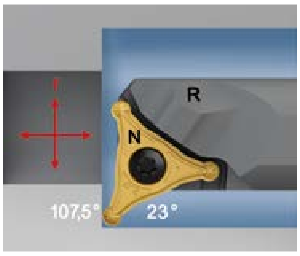
Example:
Right-hand tool:
W1211-25TR-WL25
Neutral indexable insert:
WL25-VC0708**N**-MP4 WPP20S



Example:
Right-hand tool:
W1211-25TR-WL25
Left-hand indexable insert:
WL25-VC0708**L**-MP4 WPP20S



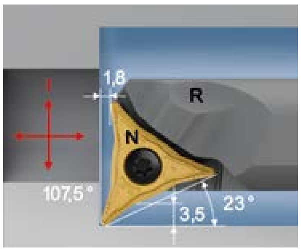
Example:
Right-hand tool:
W1211-25TR-WL25
Right-hand indexable insert:
WL25-VC0708**R**-MP4 WPP20S

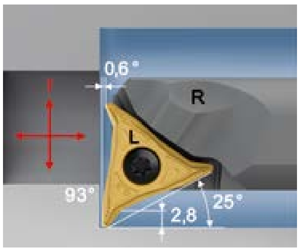


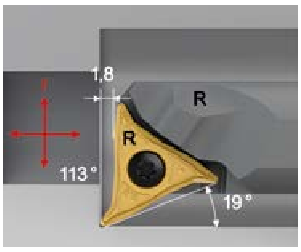
Example:
Right-hand tool:
W1211-25TR-WL25
Neutral full radius insert:
WL25-VC0708**R**-MP4 WPP20S

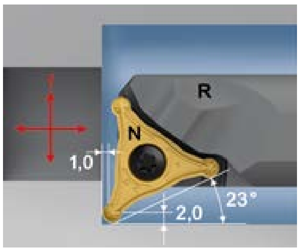
1.3 Maximum profiling capability WL25 indexable inserts W1211

Example – right-hand tool





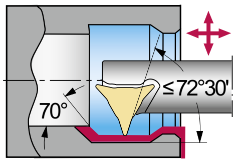




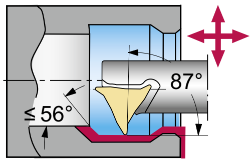
Application information:
W1211/W1210 Walter Turn copy turning system – Internal machining (continued)

2.1 Application area and profiling angle W1210

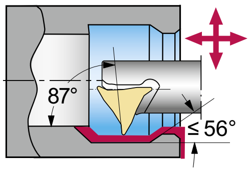
N



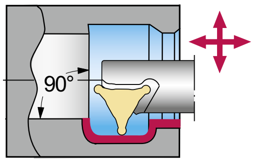
L



R

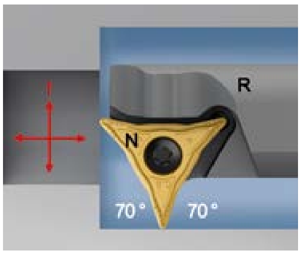


Full radius

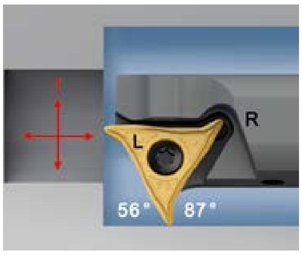


2.2 Insert options and approach angle W1210

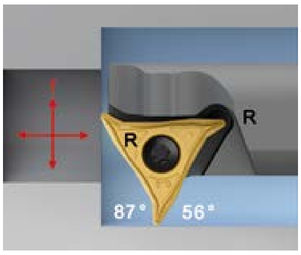
Four different indexable inserts can be fitted in the same tool.
The approach angles are formed by fitting the different indexable inserts.
The point angle of the WL25-VC… is 35°, as on a VBMT indexable insert.



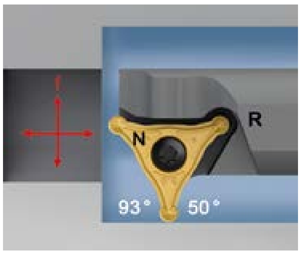
Example:
Right-hand tool,
neutral positioning:
W1210-25**TR**-WL25
Neutral indexable insert:
WL25-VC0708**N**-MP4 WPP20S



Example:
Right-hand tool,
neutral positioning:
W1210-25**TR**-WL25
Left-hand indexable insert:
WL25-VC0708**L**-MP4 WPP20S



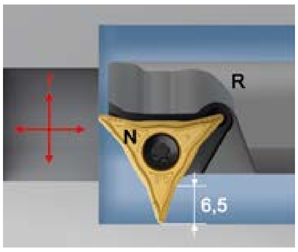
Example:
Right-hand tool,
neutral positioning:
W1210-25**TR**-WL25
Right-hand indexable insert:
WL25-VC0708**R**-MP4 WPP20S

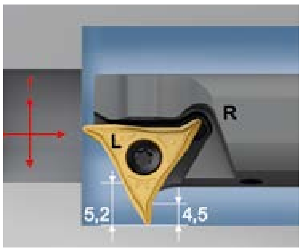


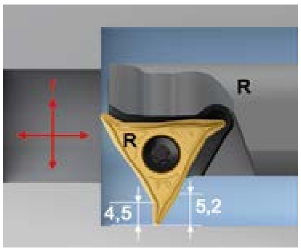
Example:
Right-hand tool,
neutral positioning:
W1210-25**TR**-WL25
Neutral indexable insert:
WL25-RC0420**N**-MU6 WPP20S

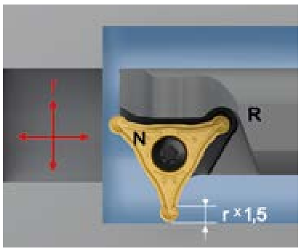
2.3 Maximum profiling capability WL25 indexable inserts W1210

Example – right-hand tool



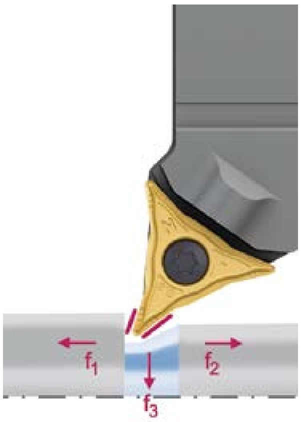






Application information:
Walter Turn copy turning system

3. Cutting data



f_1 = feed approach angle 93°–113°
f_2 = feed approach angle 31°–72.5°
f_3 = plunging
A feed of f = 0.2 mm is recommended for plunging into the workpiece (-X).

🟨 These values correspond to the depths of cut and feed values on the catalogue ordering page.

Geometry/corner radius	**WL25 … FM4 / FP4 – R0,2**				
	f_2			f_1	
Approach angle	35°	50°	72,5°	**93°**	107,5°
$a_{p\,min}$ [mm]	0,1	0,1	0,1	**0,1**	0,1
$a_{p\,max}$ [mm]	1,1	1,5	1,9	**2,0**	1,9
f_{min} [mm]	0,07	0,05	0,04	**0,05**	0,04
f_{max} [mm]	0,26	0,20	0,16	**0,15**	0,16

Geometry/corner radius	**WL25 … FM4 / FP4 – R0,4**				
	f_2			f_1	
Approach angle	35°	50°	72,5°	**93°**	107,5°
$a_{p\,min}$ [mm]	0,1	0,1	0,1	**0,1**	0,1
$a_{p\,max}$ [mm]	1,1	1,5	1,9	**2,0**	1,9
f_{min} [mm]	0,09	0,07	0,05	**0,05**	0,05
f_{max} [mm]	0,35	0,26	0,21	**0,20**	0,21

Geometry/corner radius	**WL25 … FM4 / FP4 – R0,8**				
	f_2			f_1	
Approach angle	35°	50°	72,5°	**93°**	107,5°
$a_{p\,min}$ [mm]	0,1	0,1	0,1	**0,1**	0,1
$a_{p\,max}$ [mm]	1,1	1,5	1,9	**2,0**	1,9
f_{min} [mm]	0,14	0,10	0,08	**0,08**	0,08
f_{max} [mm]	0,44	0,33	0,26	**0,25**	0,26

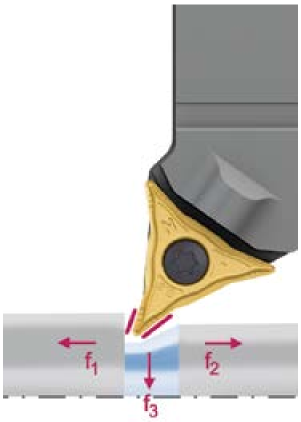
Geometry/corner radius	**WL25 … MM4 / MP4 – R0,4**				
	f_2			f_1	
Approach angle	31° / 35°	50°	72,5°	**93°**	107,5° / 113°
$a_{p\,min}$ [mm]	0,2	0,3	0,4	**0,4**	0,4
$a_{p\,max}$ [mm]	1,4	1,9	2,4	**2,5**	2,4
f_{min} [mm]	0,14	0,10	0,08	**0,08**	0,08
f_{max} [mm]	0,40	0,33	0,26	**0,25**	0,26

Geometry/corner radius	**WL25 … MM4 / MP4 – R0,8**				
	f_2			f_1	
Approach angle	31° / 35°	50°	72,5°	**93°**	107,5° / 113°
$a_{p\,min}$ [mm]	0,3	0,4	0,5	**0,5**	0,5
$a_{p\,max}$ [mm]	1,4	1,9	2,4	**2,5**	2,4
f_{min} [mm]	0,21	0,16	0,13	**0,12**	0,13
f_{max} [mm]	0,50	0,42	0,34	**0,32**	0,34

Geometry/corner radius	**WL25 … MM4 / MP4 – R1,2**				
	f_2			f_1	
Approach angle	35°	50°	72,5°	**93°**	107,5°
$a_{p\,min}$ [mm]	0,3	0,4	0,5	**0,5**	0,5
$a_{p\,max}$ [mm]	1,4	1,9	2,4	**2,5**	2,4
f_{min} [mm]	0,21	0,16	0,13	**0,12**	0,13
f_{max} [mm]	0,60	0,46	0,37	**0,35**	0,37

Application information:
Walter Turn copy turning system (continued)

3. Cutting data



f_1 = feed approach angle 93°–113°
f_2 = feed approach angle 31°–72.5°
f_3 = plunging
A feed of f = 0.2 mm is recommended for plunging into the workpiece (-X).

🟨 These values correspond to the depths of cut and feed values on the catalogue ordering page.

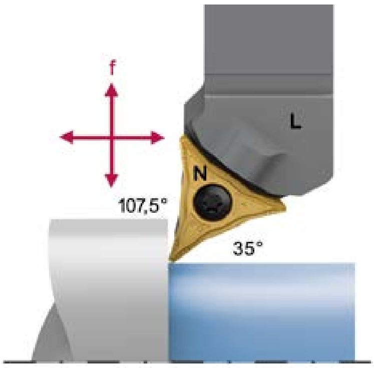
Geometry/corner radius	WL25 … MM4/MP4 – R1,6				
	f_2			f_1	
Approach angle	35°	50°	72,5°	**93°**	107,5°
$a_{p\,min}$ [mm]	0,3	0,4	0,5	**0,5**	0,5
$a_{p\,max}$ [mm]	1,4	1,9	2,4	**2,5**	2,4
f_{min} [mm]	0,21	0,16	0,13	**0,12**	0,13
f_{max} [mm]	0,65	0,52	0,42	**0,40**	0,42

Geometry/corner radius	WL25 … MU6 – R2,0				
	f_2			f_1	
Approach angle	31°/35°	50°	72,5°	**93°**	107,5°/113°
$a_{p\,min}$ [mm]	0,3	0,4	0,5	**0,5**	0,5
$a_{p\,max}$ [mm]	1,1	1,5	1,9	**2,0**	1,9
f_{min} [mm]	0,21	0,16	0,13	**0,12**	0,13
f_{max} [mm]	0,60	0,52	0,42	**0,40**	0,42

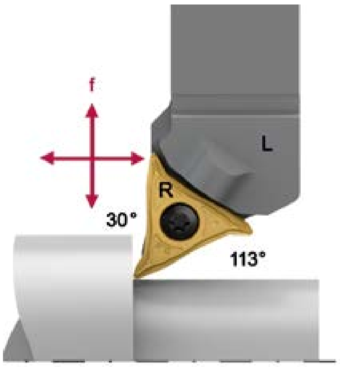
Geometry/corner radius	WL25 … MU6 – R2,5				
	f_2			f_1	
Approach angle	35°	50°	72,5°	**93°**	107,5°
$a_{p\,min}$ [mm]	0,3	0,4	0,5	**0,5**	0,5
$a_{p\,max}$ [mm]	1,4	1,9	2,4	**2,5**	2,4
f_{min} [mm]	0,21	0,16	0,13	**0,12**	0,13
f_{max} [mm]	0,65	0,59	0,47	**0,45**	0,47

Walter Turn W1011 copy turning system – Axial relief grooves

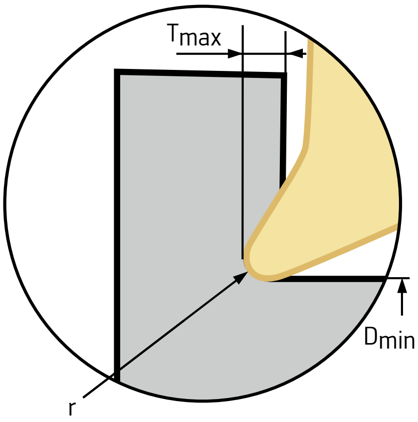
W1011 tools can be used in the following combinations for axial relief grooves:



Example:
Left-hand tool:
W1011-2525**L**-WL25-P
Neutral indexable insert:
WL25-VC0708**N**-MP4 WPP20S



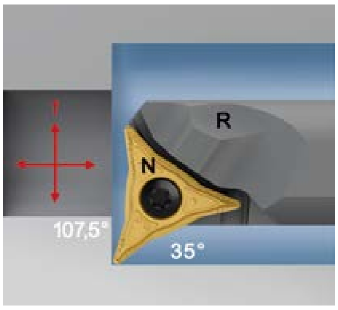
Example:
Left-hand tool:
W1011-2525**L**-WL25-P
Right-hand indexable insert:
WL25-VC0708**R**-MP4 WPP20S



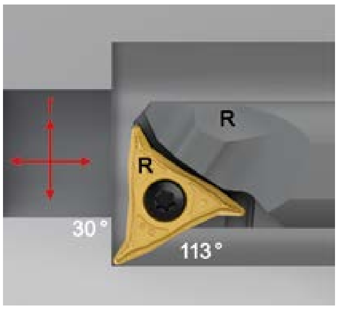
Designation	Indexable insert	r	T_{max} [mm]	D_{min} [mm]
W1011-…**L**-WL25(-P)	WL25-VC07**04R**-…	0,4	1,5	50
W1011-…**L**-WL25(-P)	WL25-VC07**08R**-…	0,8	1,7	50
W1011-…**R**-WL25(-P)	WL25-VC07**04L**-…	0,4	1,5	50
W1011-…**R**-WL25(-P)	WL25-VC07**08L**-…	0,8	1,7	50
W1011-…**L**/**R**-WL25(-P)	WL25-VC07**02N**-…	0,2	0,8	27
W1011-…**L**/**R**-WL25(-P)	WL25-VC07**04N**-…	0,4	0,8	27
W1011-…**L**/**R**-WL25(-P)	WL25-VC07**08N**-…	0,8	1,0	27
W1011-…**L**/**R**-WL25(-P)	WL25-VC07**12N**-…	1,2	1,2	25
W1011-…**L**/**R**-WL25(-P)	WL25-VC07**16N**-…	1,6	1,4	25

Walter Turn W1211 copy turning system – Axial relief grooves

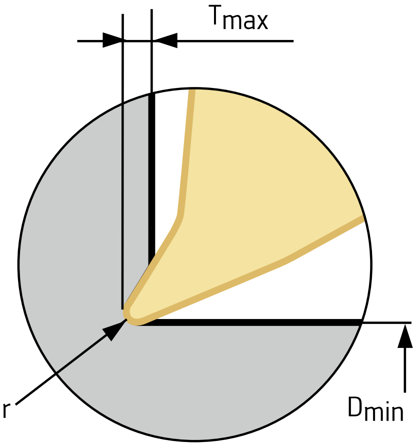
W1211 tools can be used in the following combinations for axial relief grooves:



Example:
Right-hand tool:
W1211-25T**R**-WL25
Neutral indexable insert:
WL25-VC0708**N**-MP4 WPP20S



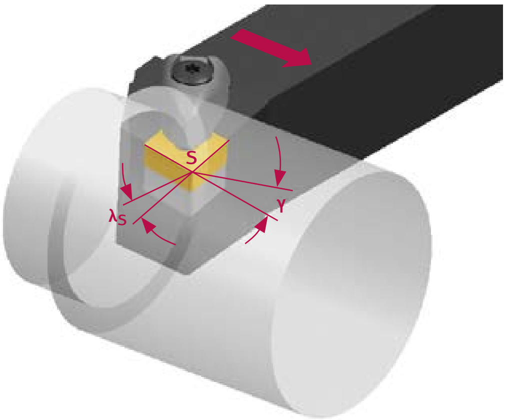
Example:
Right-hand tool:
W1211-25T**R**-WL25
Right-hand indexable insert:
WL25-VC0708**R**-MP4 WPP20S

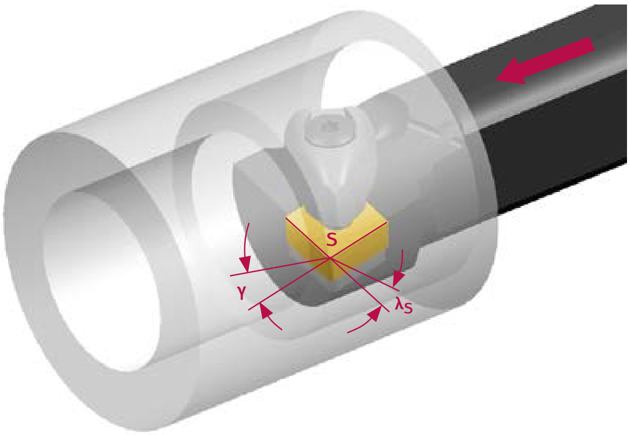


Designation	Indexable insert	r	T_{max} [mm]	D_{min} [mm]
W1211-…**R**-WL25	WL25-VC07**04R**-…	0,4	1,8	27
W1211-…**R**-WL25	WL25-VC07**08R**-…	0,8	2,0	27
W1211-…**L**-WL25	WL25-VC07**04L**-…	0,4	1,8	27
W1211-…**L**-WL25	WL25-VC07**08L**-…	0,8	2,0	27
W1211-…**R**/**L**-WL25	WL25-VC07**02N**-…	0,2	1,7	27
W1211-…**R**/**L**-WL25	WL25-VC07**04N**-…	0,4	1,7	27
W1211-…**R**/**L**-WL25	WL25-VC07**08N**-…	0,8	1,7	27
W1211-…**R**/**L**-WL25	WL25-VC07**12N**-…	1,2	1,8	25
W1211-…**R**/**L**-WL25	WL25-VC07**16N**-…	1,6	2,1	27

Application information: Walter Turn turning tools – Effective rake angle

The effective rake angle of a tooling system is determined by the indexable insert geometry and the inclination of the indexable insert in the tool holder.

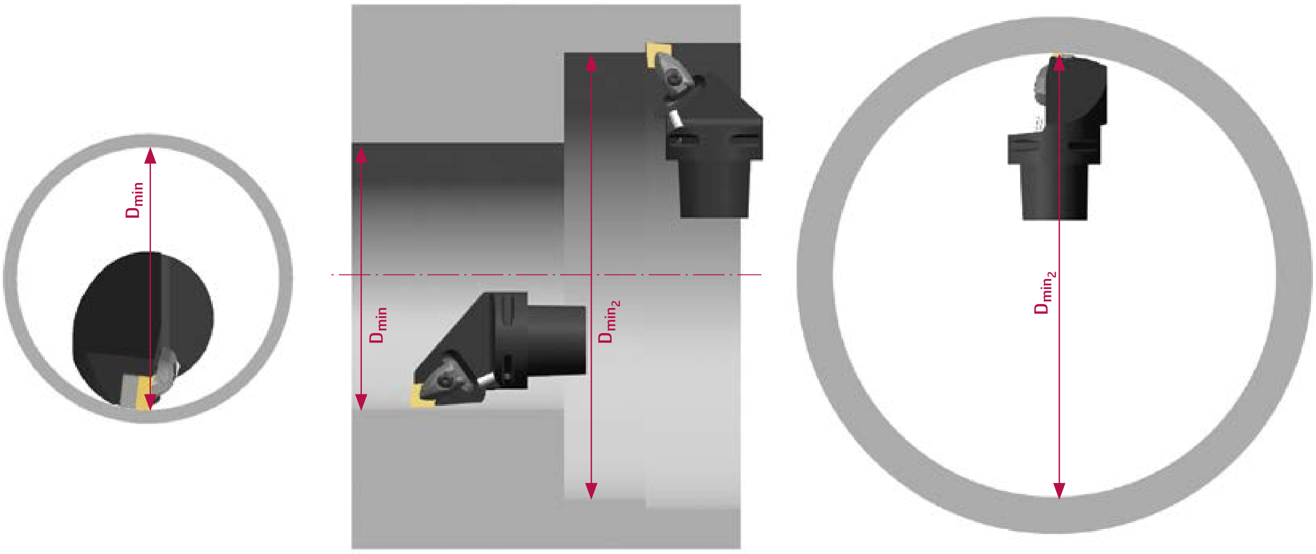




λ_S (inclination angle)	The angle is tilted around the peripheral cutting edge (S) parallel to the main cutting edge.
γ (rake angle)	This is the angle at right angles to the main cutting edge, measured with a smooth indexable insert without chip breaker groove. In order to obtain the effective rake angle of the tooling system, the rake angle of the indexable insert must also be taken into consideration.

Walter Capto™ – Bore machining with turning toolholders for external machining

Walter Capto™ tools for external machining can also be used for internal machining of large diameters.
This often takes place on turn/mill centres or vertical turret lathes.



D_{min} = Minimum internal machining diameter. Toolholder parallel to the axis of rotation.
D_{min_2} = Minimum internal machining diameter. Toolholder angled at 90° in relation to the axis of rotation.

Application information:
Accure·tec® A3000 – Vibration-damped boring bars/adaptors for turning

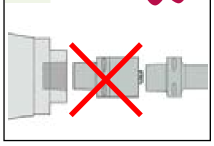
1. Assembly recommendations

The Accure·tec® vibration-damped boring bars are instantly ready for use: The built-in damping system is preset to provide the best results. The boring bars must be clamped directly onto the machine without any extensions or adaptor sleeves (see 1.1 and 1.2).

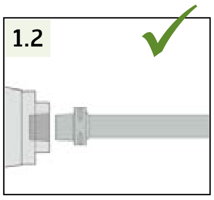
Additional recommendations are applicable when using plain cylindrical adaptors:

- Optimal clamping is achieved when clamping the boring bar directly into the lathe's machine tool adaptor or using a split adaptor (see 1.6) with 4 × D clamping length. Example: Clamp the boring bar diameter of 40 mm with a clamping length of 160 mm.
- Marking ❶ (see 1.3 and 1.4) indicates the divide between the clamping area and usable length. This marking has to be aligned such that it is flush with the face of the machine tool adaptor.
- As an alternative (though this is not ideal), the 6 × D and 8 × D plain cylindrical adaptors feature a clamping surface in the clamping length range suitable for clamping with clamping screws (see 1.5). 10 × D boring bars do not feature this clamping surface and can achieve maximum stability only if clamped using a split adaptor (see 1.6).

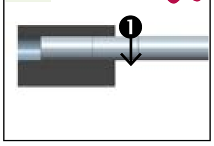
1.1



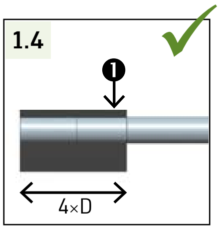
1.2



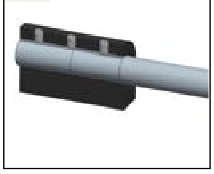
1.3



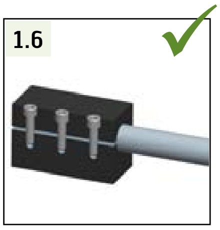
1.4



1.5



1.6

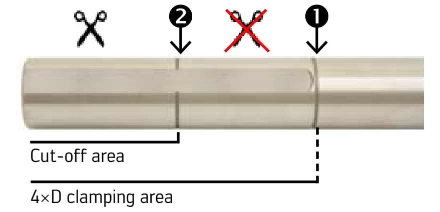


2. Shortening plain cylindrical adaptors

Optimal clamping is achieved using the Accure·tec® boring bars as delivered. If necessary, the adaptor can be shortened within the cut-off area between the end of the boring bar and the first marking ❷.

Take care: Shortening the boring bars will also remove the coolant connection thread.

2.1



3. Fitting and removing QuadFit exchangeable heads

Turning and boring heads are fitted on the Accure·tec® boring bars/adaptors using the QuadFit interface. The QuadFit interface allows quick and easy replacement of exchangeable heads, with perfect positioning and repeat accuracy.

Fitting:
Clamp the Accure·tec® boring bar to an assembly block or directly into the lathe tool adaptor.

- Ensure the tool-side and machine-side QuadFit interface is clean.
- Use the exchangeable head in a standard or overhead position (turned 180°).
- Tighten the union nut on the boring bar by hand.
  (Tighten the union nut in the direction of the "locked padlock" symbol (see 3.1)).
- Tighten the nut with the appropriate key.

3.1

Remark:
Using a torque wrench is advisable, to comply with the recommended tightening torque. Torque wrenches are available as an accessory (see Table 3.2).

Removal:

- Loosen the union nut using the appropriate key (do not use a torque wrench).
- Hold the exchangeable head and turn the nut manually until the head can be released. Turn the union nut in the direction of the "open padlock" symbol (see 3.1).

3.2. Tightening key/tightening torque

Connection size	Q25	Q32	Q40	Q50
Mounting wrench	SD9000-Q25	SD9000-Q32	SD9000-Q40	SD9000-Q50
Torque wrench	–	SD4000-Q32-25	SD4000-Q40-35	SD4000-Q50-55
Tightening torque	25 Nm	25 Nm	35 Nm	55 Nm

4. Speed limits for boring

Please make sure not to exceed the maximum speed of the vibration-damped boring bar/adaptor (see table 4.1).

Remark:
Plain cylindrical adaptors are intended for static applications (turning) only. The specified maximum speed is not applicable.

4.1. Maximum speed in boring [rpm]*

Connection size	Length		
	6 × D	8 × D	10 × D
Q25	10000	8000	6000
Q32	10000	8000	6000
Q40	8000	6000	5000
Q50	6000	4000	2500

* The maximum speed can be lower, depending on the rigidity of the spindle.

5. Maximum temperature in use

Make sure that the Accure·tec® boring bar never exceeds the maximum temperature in use, as this would damage the damping system.

Maximum temperature in use = 80 °C/176 °F

6. Recommended cutting data

Incorrect cutting data could cause vibration in the tooling system. This would influence the damper's efficiency and could damage the Accure·tec® boring bar's components. Therefore, make sure to set the cutting data so that no vibration is created.

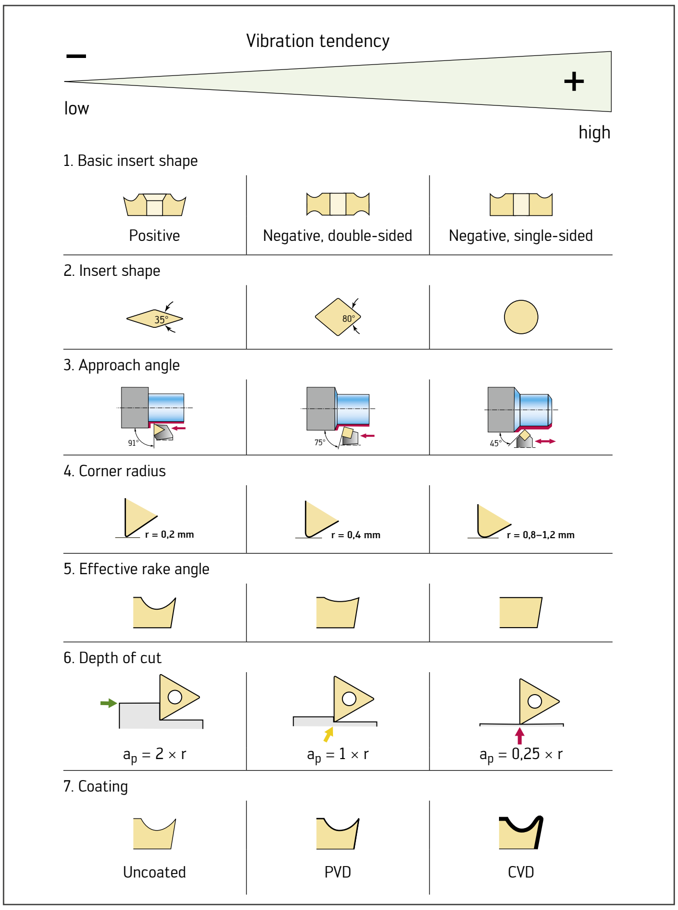
Cutting data selection order:

1. Cutting speed v_c and feed f: Select the average value for the indexable insert you are using (see Walter General Catalogue or Walter GPS tool navigation system).

2. Depth of cut a_p is the preferred parameter for optimisation. It can be increased within the recommended application range of the indexable insert provided that no vibration occurs.

Take care:

- In contrast to the use of conventional boring bars, machining cannot be stabilised using additional radial forces (e.g. by increasing the feed).
- Particularly for small boring bars (< 32 mm dia.), be mindful of good chip control to avoid chips getting stuck in the bore.



(((Accure·tec Application information: Accure·tec® A3001 – HSK-T and Walter Capto™ vibration-damped boring bars/adaptors with QuadFit Large interface

1. Installation instructions

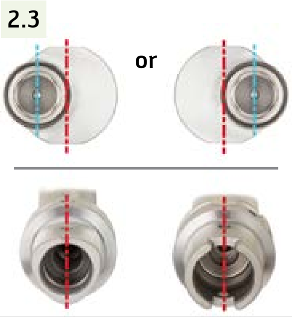
1.1

2. Installation of QuadFit Large intermediate adaptor

2.1

2.2

2.3



2.4

2.5

2.6

For QL size	4 × bolt	Tightening torque Nm	Tightening torque ft Lb
QL60 / QL64	FS2609	11	8.2
QL80 / QL76	FS2610	16	11.8

3. Installation of QuadFit exchangeable head

3.1

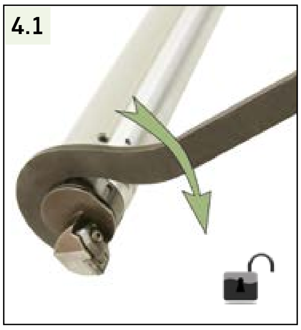
3.2

3.3

For QuadFit size	Tightening torque Nm	Tightening torque ft Lb
Q50	55	40.6

4. Removal of QuadFit and QuadFit Large exchangeable heads

4.1



4.2

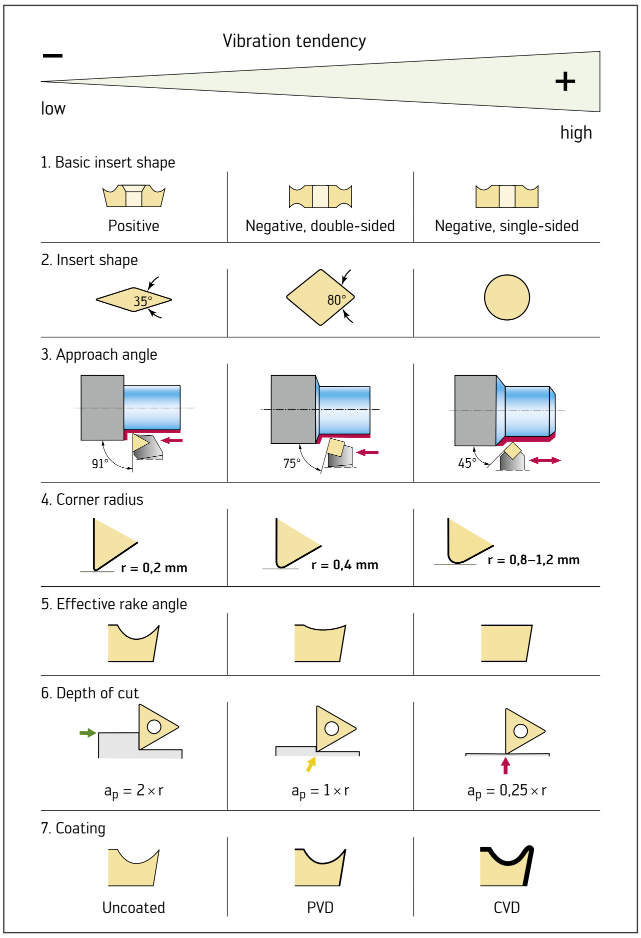
4.3

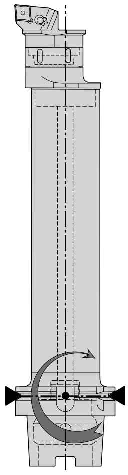
4.4

5. Max. permitted operating temperature, speed and load

5.1

6. Recommended cutting data and pull-out torques





For QL tool size	Pull-out torque* Nm	ft Lb
A3001-H100T-QL60-301	12	8,9
A3001-H100T-QL60-421	24	17,7
A3001-H100T-QL60-541	39	28,8
A3001-H100T-QL80-421	41	30,2
A3001-H100T-QL80-581	77	56,8
A3001-C6-QL60-301	13	9,6
A3001-C6-QL60-421	25	18,4
A3001-C8-QL60-301	13	9,6
A3001-C8-QL60-421	25	18,4
A3001-C8-QL60-541	40	29,5
A3001-C8-QL80-421	42	31
A3001-C8-QL80-581	79	58,3

* Calculated with a standard exchangeable head installed

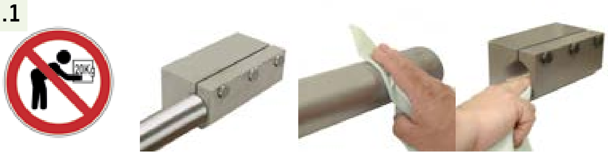
7. Safety recommendations

– Risk of injury due to tool cutting edges
– Protective gloves recommended
– Do not exceed the max. speed (see point 5.1)
– Observe the tool manufacturer's recommended cutting speeds

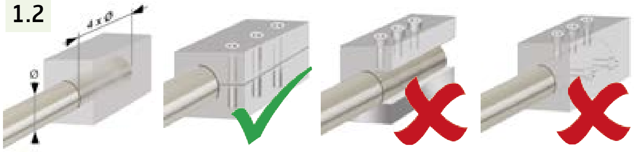
Accure·tec Application information: Accure·tec® A3001 – Vibration-damped plain cylindrical adaptors with QuadFit Large interface

1. Installation instructions

1.1



1.2



2. Installation of QuadFit Large intermediate adaptor

2.1

2.2

2.3

2.4

2.5

For QL size	4 × bolt	Tightening torque Nm	 ft Lb
QL60 / QL64	FS2609	11	8.2
QL80 / QL76	FS2610	16	11.8
QL100	FS2611	23	16.9

3. Installation of QuadFit exchangeable head

3.1

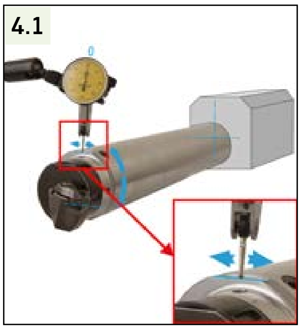
3.2

3.3

For QuadFit size	Tightening torque Nm	 ft Lb
GL 50	55	40.6

4. Centre height adjustment

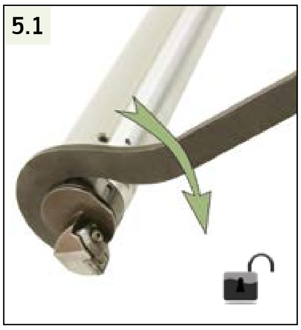
4.1



4.2

5. Removal of QuadFit (Q) and QuadFit Large (QL) exchangeable heads

5.1



5.2

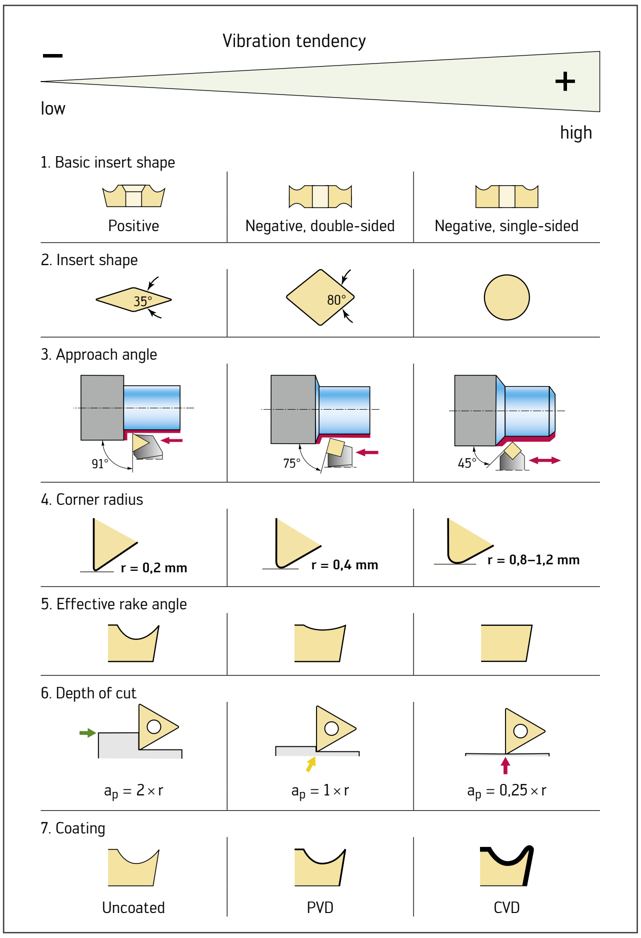
5.3

5.4

6. Max. permitted operating temperature and load

6.1

7. Cutting edge and tool design



8. Safety recommendations

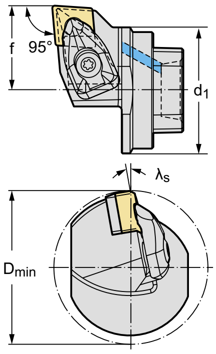
- Risk of injury due to tool cutting edges
- Protective gloves recommended
- Observe the tool manufacturer's recommended cutting speeds

Accure·tec®: D_{min} calculation

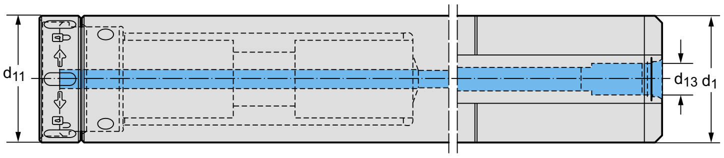
A3000

$D_{min} = D_{min}$ QuadFit exchangeable head

QuadFit exchangeable head



Accure·tec® A3000 boring bar/adaptor

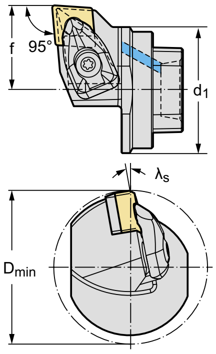


A3001

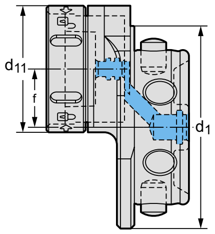
$D_{min} = f_{\text{exchangeable head}}$
$+ f_{\text{intermediate adaptor}}$
$+ (d_1/2) \times 1.05$ adaptor

(5% safety margin for chip removal from the bore included)

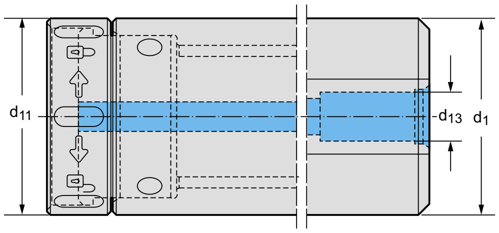
QuadFit exchangeable head



QuadFit Large intermediate adaptor



Accure·tec® A3001 boring bar/adaptor



Accure·tec General application information

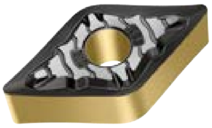
First choice geometries/grades

In general, we recommend geometries that generate a low cutting pressure and therefore increase the performance of the vibration-damped boring bars because the chips are ejected very smoothly.

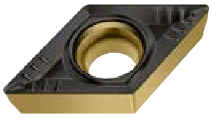
– **Performance** +

+ **Cutting pressure** –

Negative basic shape, narrow chip groove, e.g. FP5



Negative basic shape, open chip groove, e.g. MS3



Positive basic shape, open chip groove, e.g. RM4

Machining	**Roughing** **a_p: 1–3 mm, f: 0,1–0,35 mm**				**Finishing** **a_p: 0,2–1,0 mm, f: 0,05–0,15 mm**			
L / D	**6 × D / 8 × D**		**10 × D**		**6 × D / 8 × D**		**10 × D**	
Basic shape	negative	positive	negative	positive	negative	positive	negative	positive
ISO P	RP5 WPP20G	RP4 WPP20G	MS3 WMP20G	RP4 WPP20G	FP5 WPP20G	FP4 WPP20G	—	FM2 WSM20S
ISO M	RM5 WSM20S	RM4 WSM20S	MS3 WSM20S	RM4 WSM20S	FM5 WSM20S	FM4 WSM20S	—	FM2 WSM20S
ISO K	MK5 WKK20S	RK4 WKK20S	MS3 WPP20G	RK4 WKK20S	MK5 WKK20S	FK6 WKK20S	—	MK4 WKK20S
ISO N	MN3 WNN10	MN2 WNN10	—	MN2 WNN10	—	FN2 WNN10	—	FN2 WNN10
ISO S	NRS WSM20S	RM4 WSM20S	MS3 WSM20S	MM4 WSM20S	FM5 WSM20S	FM2 WSM20S	—	FM2 WSM20S

Selection example:
Machining: Roughing
L/D: 10 × D
Basic shape: Negative basic shape
Material: ISO M
Result: Geometry: MS3; Grade: WSM20S

Remark: For better chip removal, use the DNMG and DCMT basic shape as the 55° rhombus angle achieves a greater clearance between the boring bar and the inner wall of the hole.

Application information:
The indexable insert size is selected depending on the depth of cut a_p

Finishing

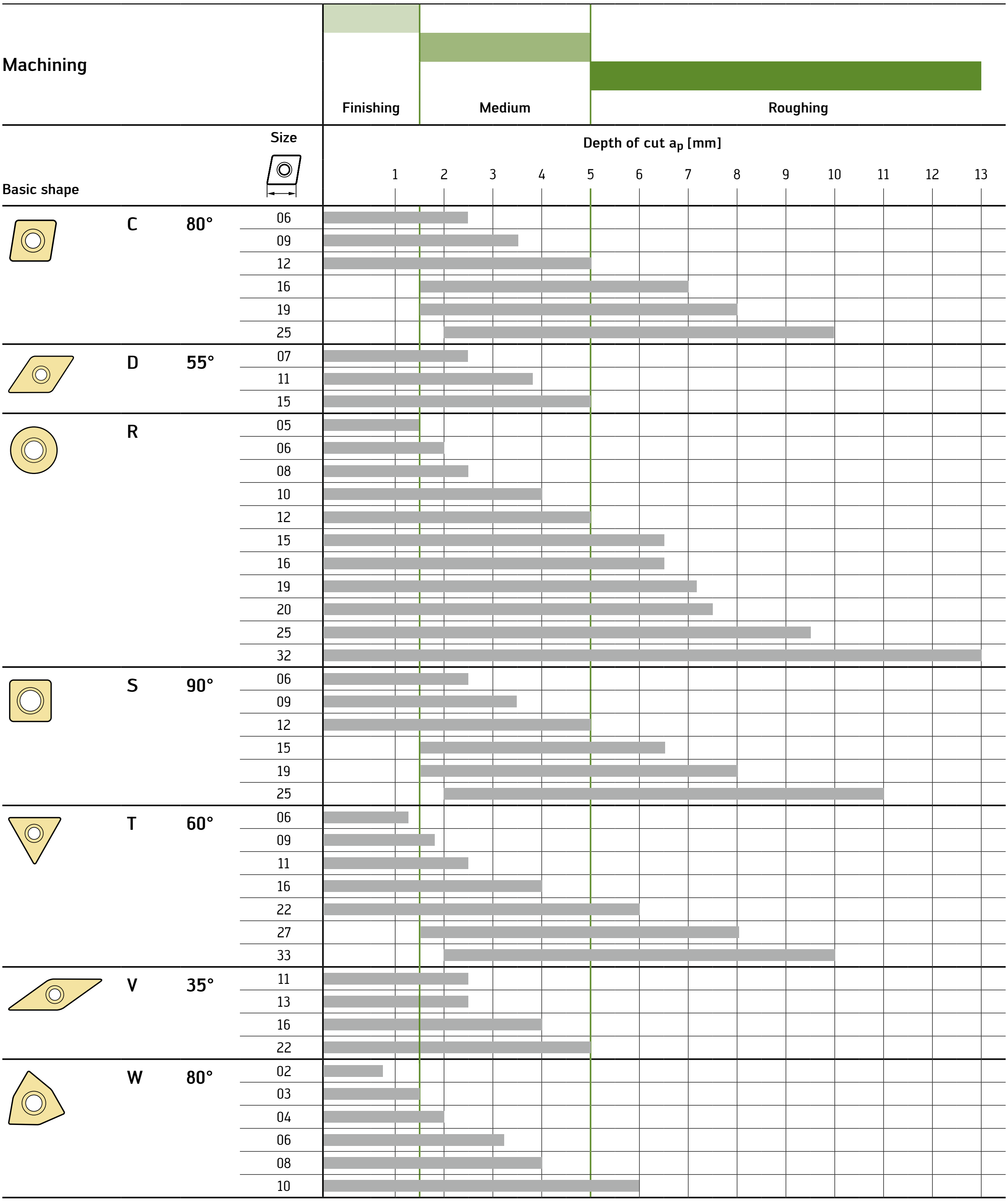
Applications with low
depths of cut and feeds
f = 0,1–0,3 mm

Medium

Applications with average
depths of cut and feeds
f = 0,2–0,5 mm

Roughing

Applications with high machining
volume and feeds
f = 0,4–1,5 mm



Application information – Cutting value optimisation

Sequence of the procedure for optimum tool life:

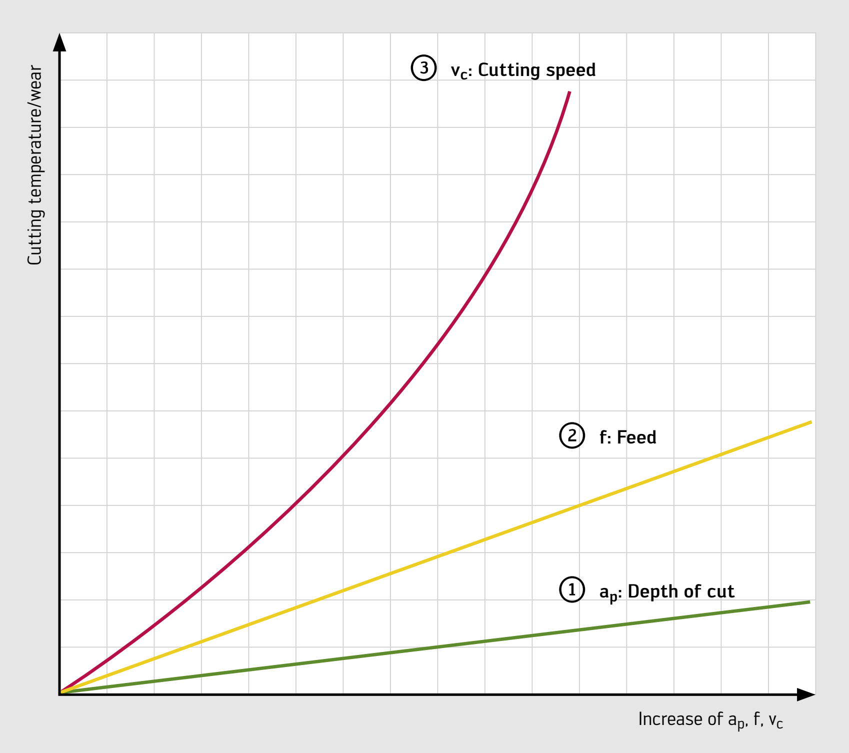
① Maximise the depth of cut (a_p)
→ Reduce the number of cuts

② Maximise the feed (f)
→ Shorten the contact time

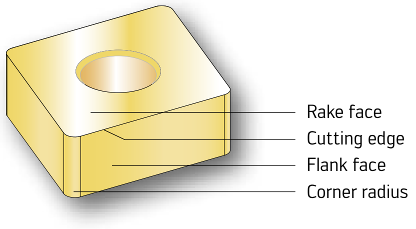
③ Adjust the cutting speed (v_c)
→ Decrease: Less wear
→ Increase: Increased productivity

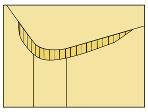
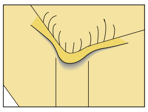
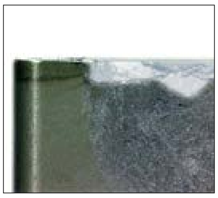
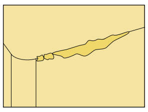
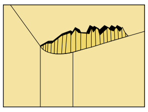
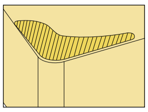
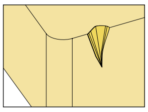
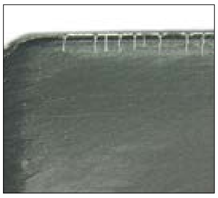
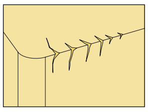
Rule of thumb for longer tool life

v_c	−10%
f	+10%
= Tool life	+20%

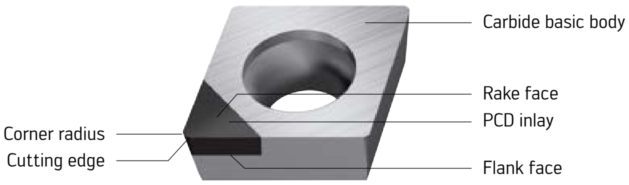


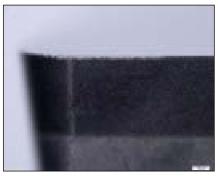
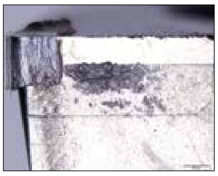
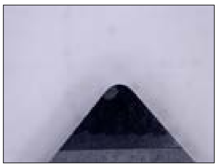
Application information:
Wear patterns from turning



Wear patterns			Characteristics	Measures
Flank face wear			Abrasion on the flank face of the indexable insert	– Use a more wear-resistant grade – Increase the feed – Reduce the cutting speed – Optimise the cooling
Plastic deformation			Deformation of the cutting edge due to thermal overload and high cutting forces	– Use a more wear-resistant grade – Reduce the feed – Reduce the depth of cut – Optimise the cooling – Reduce the cutting speed
Fractures			Fractures along the cutting edge	– Use a tougher carbide grade – Use a more stable tool and reduce the projection length – Use a more stable geometry – Reduce the cutting speed
Build-up on the cutting edge			Adhesion of material along the cutting edge on the rake face	– Increase the cutting speed – Use a sharper geometry with a larger rake angle – Optimise the cooling – Use an indexable insert with a treated surface (Tiger·tec® Silver)
Crater wear			Crater-shaped cavities on the rake face of the indexable insert	– Reduce the cutting speed – Use a geometry with a larger rake angle – Use a grade that is more wear-resistant with a high Al_2O_3 content – Optimise the cooling – Use a more open geometry
Notch or oxidation wear			Notching around the depth of cut on the indexable insert	– Vary the depth of cut – Use a tougher grade (PVD-coated) – Reduce the cutting speed – Use a more open geometry – Optimise the cooling – Use a tool with a leading cutting edge (κ = 45°/75°) – With notch wear, select a smaller corner radius
Thermal cracks			Multiple cracks running vertical to the cutting edge, caused by thermal shock	– Possibly work the interrupted cut without coolant – Reduce the cutting speed – Reduce the feed – Use a tougher grade – Use a more stable geometry

Application information: Wear patterns in turning applications with PCD

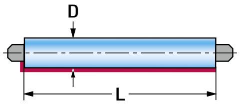


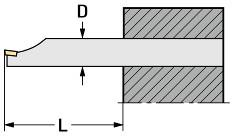
Wear patterns with PCD	Cause	Measures
Abrasion 	– Due to hard inclusions (e.g. silicon grains) or alloying elements, small parts of the cutting edge are gradually worn away (abrasion)	– Use a coarser PCD grain size – Reduce the cutting speed – Reduce the feed – Implement a more stable cutting edge – Optimise the coolant/increase the pressure – Increase the clearance angle
Build-up on the cutting edge 	– The material to be machined adheres to the tool cutting edge (adhesion) – When it is stripped away, small particles are torn from the cutting edge	– Check for wear – Increase the cutting speed v_c – Use a finer PCD grain size – Use an insert with a sharper wedge angle/ chip breaker – Optimise the coolant/increase the pressure – Check the lubricant concentration
Fractures 	– When machining very hard materials or performing interrupted cuts – Flaking, cracks or fractures can occur along the cutting edge	– Grade with a higher breakage resistance – Review the machining strategy – Adjust the cutting edge preparation (more stable cutting edge) – Reduce the clearance angle – Check for chip impacts
Apparent chip 	– When machining extremely tough and freshly cast aluminium without cooling lubricant or with only minimum quantity lubrication – Insufficient lateral clearance angle or projection	– Optimise the cooling or use a coolant with a higher concentration of lubricant – Use chip breaker geometry – Increase the minor clearance angle – Increase the projection of the PCD insert or the PCD blank beyond the basic body
Layer flaking 	– Often occurs when machining sintered materials and irregular surfaces – Potentially excessively sharp cutting edge design – Vibrating, unstable components	– Select a more stable edge design – Select a coarser PCD grain size – Reduce the cutting speed – Reduce the clearance angle
Overload fracture 	– Sudden overloading of the cutting edge	– Analyse the machining strategy – It may even be necessary to select a negative chamfer

Important:
Avoid machining temperatures of above 730 °C at all times.

Consequences of excessive machining temperatures:
- The solder joint loses adhesion
- The PCD grain reaches reaction temperature → microstructure transforms into graphite

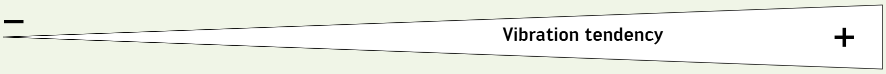
Application information: Vibration tendency

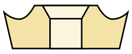
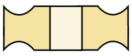
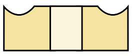
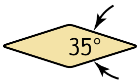
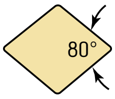
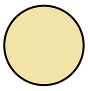
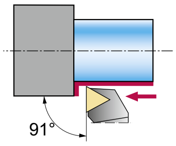
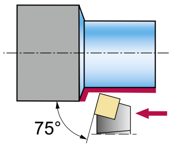
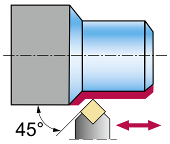
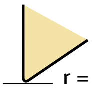
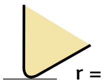
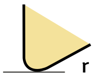
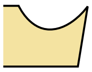
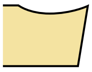
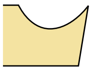
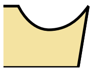
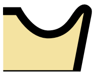




Vibration occurs when machining long, small diameter components or during internal machining using boring bars with a long projection length. This is particularly the case if L/D > 4.

When selecting a tool, the following parameters must be taken into account in order to reduce the risk of vibration:



1. Basic insert shape	 Positive	 Negative, double-sided	 Negative, single-sided
2. Insert shape			
3. Approach angle			
4. Corner radius	 r = 0,2 mm	 r = 0,4 mm	 r = 0,8–1,2 mm
5. Effective rake angle			
6. Coating	 Uncoated	 PVD	 CVD

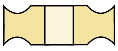
Following selection of the tool/indexable insert, there are other factors that play an important role in reducing vibration:

1. Unclamp tools and boring bars at the shortest length possible
2. Select a depth of cut 0.1 mm greater than the corner radius of the indexable insert
3. If vibration occurs, reduce the cutting speed by 50–70% in comparison to the specified catalogue values
4. Check the clamping pressure at the tailstock spindle during external machining

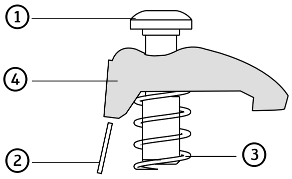
Assembly parts and accessories for Walter Turn rigid clamping

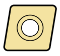
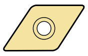
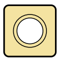
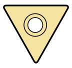
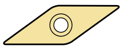
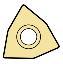
Standard clamps

Application



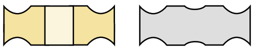
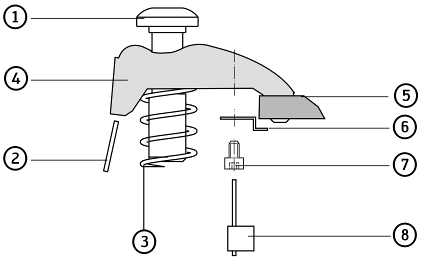
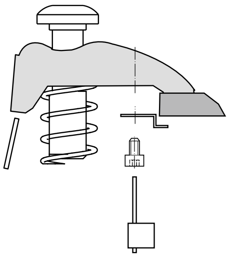
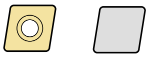
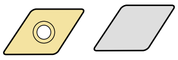
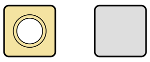
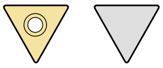
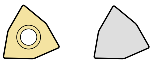
for indexable inserts with bore



Set	**PK240-SET**	**PK244-SET**	**PK241-SET**	**PK242-SET**	**PK243-SET**	**PK301-SET**
① Clamp screw	FS1472 (Torx 9IP)	FS1473 (Torx 15IP)	FS1473 (Torx 15IP)	FS1474 (Torx 20IP)	FS1474 (Torx 20IP)	FS1589 (Torx 25IP)
② Pin (fitted in the toolholder)	RS116	RS117	RS117	RS117	RS117	RS117
③ Pressure spring	FS1469	FS1470	FS1470	FS1471	FS1471	FS1590
④ Clamp	PK240	PK244	PK241	PK242	PK243	PK301
Type	**Size**					
	CN..09..		CN..12..	CN..16..	CN..19..	
	DN..11..		DN..15..	DN..15..		
	SN..09..		SN..12..	SN..15..	SN..19..	SN..25..
	TN..16..		TN..22..			
		VN..16..				
	WN..06..		WN..08..	WN..10..		

Assembly parts and accessories for Walter Turn rigid clamping (continued)

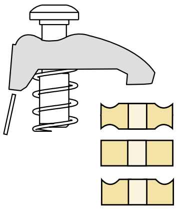
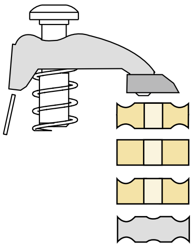
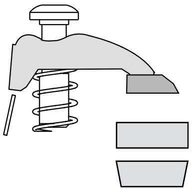
Reinforced clamps with carbide shoe

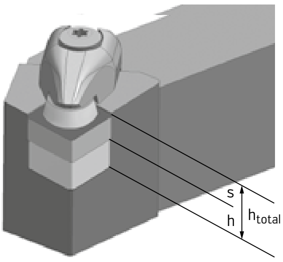
Application	 for indexable inserts with bore* or dimple		 for indexable inserts without bore
			
Set	**PK245-SET**	**PK246-SET**	**PK254-SET**
① Clamp screw	FS1473 (Torx 15IP)	FS1474 (Torx 20IP)	FS1473 (Torx 15IP)
② Pin (fitted in the toolholder)	RS117	RS117	RS117
③ Pressure spring	FS1470	FS1471	FS1470
④ Clamp	PK245	PK246	PK254
⑤ Carbide clamping plate	FK371	FK372	FK 371
⑥ Clip for clamping plate	FK373	FK373	FK 373
⑦ Screw for clamping plate	FS1492	FS1492	FS1492
⑧ Key for clip screw	FS1490 (Torx 7IP)	FS1490 (Torx 7IP)	FS1490 (Torx 7IP)
Shim for basic shape CN..1207..			AP411–CN1207
Shim for basic shape DN..1507..			AP412–DN1507
Shim for basic shape SN..1207..			AP413–SN1207
Type	**Size**		
	CN..12..	CN..16..	CN..12..
	DN..15..		DN..15..
	SN..12..	SN..15..	SN..12..
	TN..22..		TN..22..
	WN..08..	WN..10..	WN..08..

Walter Turn clamp holders are fitted as standard with the PK241-SET. By using the PK254-SET, they can be used to clamp the following ceramic indexable inserts without bore: CN..12.. /DN..15.. /SN..12.. → For this, separate shims must be ordered (see table).

* Alternatively in the event of erosion on the standard clamp

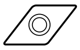
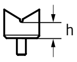
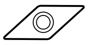
Shims for Walter Turn clamp holders – External and internal machining

Standard clamps	Reinforced clamps with carbide shoe	
for indexable inserts with bore **PK240-SET/ PK244-SET** **PK241-SET/ PK242-SET** **PK243-SET/ PK301-SET**	**for indexable inserts with bore* or dimple** **PK245-SET** **PK246-SET**	**for indexable inserts without bore** **PK254-SET**
		



s = insert thickness

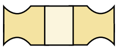
* Alternatively in the event of erosion on the standard clamp

Indexable insert			Shim					
Insert seat	**for insert**	**Insert thickness s mm**	**Type**	**Designation**	**Status**	**Height h mm**	**Clearance angle**	**Centre height h_{total} mm**
CN..09..	CN..0903..	3,18		AP414–CN09	Assembly part	3,18	7°	6,36
CN..12..	CN..1204..	4,76		AP301–CN12	Assembly part	6,35	0°	11,11
	CN..1204..	4,76		AP354–CN12	Assembly part	3,175	12°	7,935
	CN..1207..	7,94		AP411–CN1207	Accessories	3,175	0°	11,11
CN..16..	CN..1606..	6,35		AP302–CN16	Assembly part	6,35	0°	12,7
CN..19..	CN..1906..	6,35		AP303–CN19	Assembly part	4,76	8°	11,11
DN..11..	DN..1104..	4,76		AP305–DN11	Assembly part	3,18	8°	7,94
DN..15..	DN..1504..	4,76		AP304–DN1504	Accessories	6,35	0°	11,11
	DN..1506..	6,35		AP304–DN15	Assembly part	4,76	0°	11,11
	DN..1507..	7,94		AP412–DN1507	Accessories	3,17	0°	11,11
RC/P..09..	RC/P..0907..	7,74		AP416–RC0907	Assembly part	4	0°	11,74
RC/P..12..	RC/P..1207..	7,74		AP417–RC1207	Assembly part	4	0°	11,74
RN..12..	RN..1207..	7,94		AP418–RN1207	Assembly part	4,76	0°	12,7
RN..15..	RN..1507..	7,94		AP419–RN1507	Assembly part	4	0°	11,94
RN..19..	RN..1907..	7,94		AP420–RN1907	Assembly part	6	0°	13,94
SN..09..	SN..0903..	3,18		AP415–SN09	Assembly part	3,175	7°	6,355
SN..12..	SN..1204..	4,76		AP308–SN12	Assembly part	6,35	0°	11,11
	SN..1204..	4,76		AP355–SN12	Assembly part	3,175	12°	7,935
	SN..1207..	7,94		AP413–SN1207	Accessories	3,17	0°	11,11
SN..15..	SN..1506..	6,35		AP309–SN15	Assembly part	6,35	0°	12,7
SN..19..	SN..1906..	6,35		AP310–SN19	Assembly part	6,35	0°	12,7
TN..16..	TN..1604..	4,76		AP321–TN16	Assembly part	6,35	0°	11,11
	TN..1604..	4,76		AP356–TN16	Assembly part	3,175	12°	7,935
TN..22..	TN..2204..	4,76		AP322–TN22	Assembly part	6,35	0°	11,11
VN..16..	VN..1604..	4,76		AP312–VN16	Assembly part	3,175	7°	7,935
WN..06..	WN..0604..	4,76		AP306–WN06	Assembly part	3,175	7°	7,935
WN..08..	WN..0804..	4,76		AP331–WN08	Assembly part	3,175	10°	7,935
	WN..0804..	4,76		AP307–WN08	Assembly part	4,76	0°	9,52
WN..10..	WN..1006..	6,35		AP311–WN10	Assembly part	6,35	0°	12,7

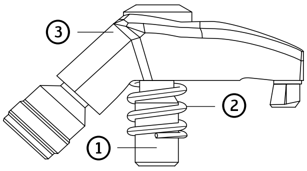
Assembly parts and accessories for Walter Turn rigid clamping with precision cooling

Standard clamps for tools with precision cooling

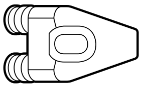
Application

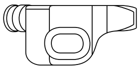


for indexable inserts with bore

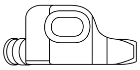


Version

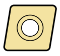
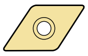
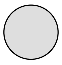
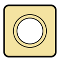
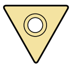
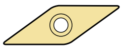
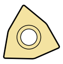




Right



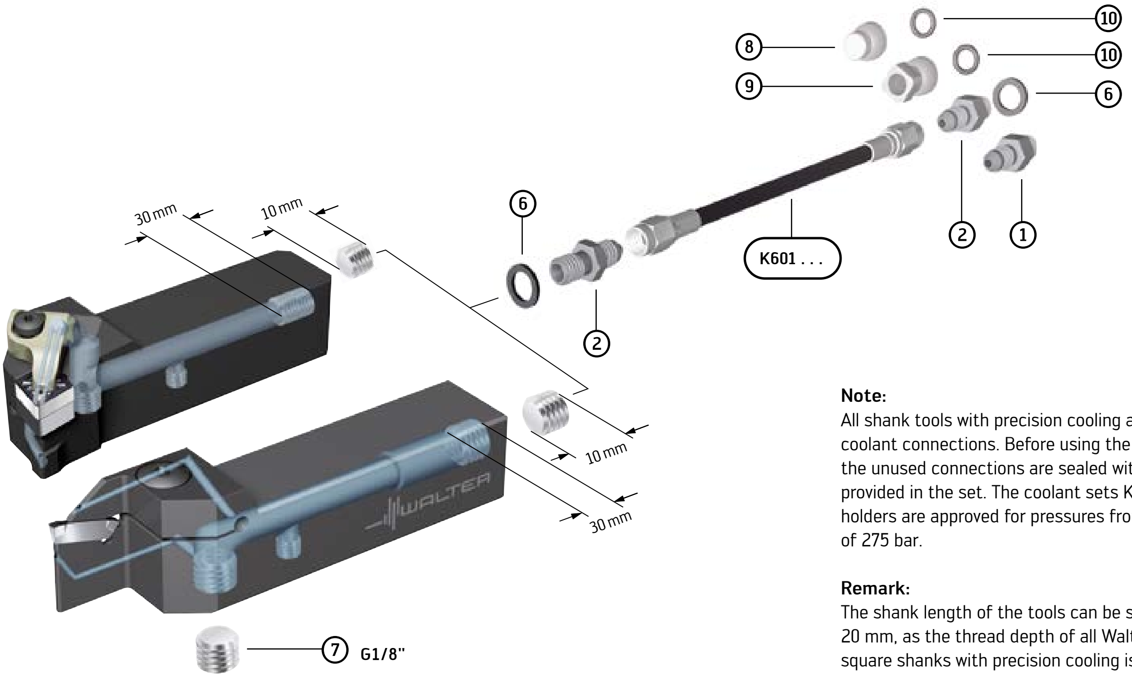
Left

Set	**PK255-SET**	**PK256-SET**	**PK264-SET**	**PK267-SET**	**PK268-SET[2]**	**PK261R/L-SET**	**PK265R/L-SET**	**PK266R/L-SET**
① Clamp screw	FS1473 (Torx 15IP)	FS1473 (Torx 15IP)	FS1474 (Torx 20IP)	FS1474 (Torx 20IP)	FS1474 (Torx20IP)	FS1473 (Torx 15IP)	FS1473 (Torx 15IP)	FS1473 (Torx 15IP)
② Pressure spring	FS2188	FS2188	FS2298	FS2298	FS2298	FS2188	FS2188	FS2188
③ Clamp	PK255	PK256	PK264	PK267	PK268	PK261R/L	PK265R/L	PK266R/L
Type	**Size**							
	CN..12..		CN..19..	CN..16..		CN..12..	CN..12..[1]	
	DN..11..	DN..15..				DN..11.. DC..11..	DN..15..	
					RN . N12..			
	SN..12..					SN..12..	SN..12..[1]	
	TN..16.. TC..16T3..					TN..16.. TC..16T3..		
	VB..1604..					VB..1604..		
	WN..08..							WN..08..

[1] First choice
[2] for ceramic indexable inserts without bore

Assembly parts and accessories
Coolant hose set for shank tools with precision cooling (-P)

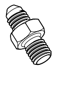
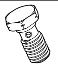
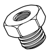
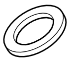
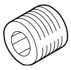
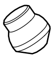
Shank tools -P



Note:
All shank tools with precision cooling are equipped with three coolant connections. Before using the tools, ensure that the unused connections are sealed with the threaded plugs provided in the set. The coolant sets K601 . . . for shank tool holders are approved for pressures from 10 bar to a maximum of 275 bar.

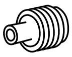
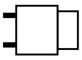
Remark:
The shank length of the tools can be shortened by up to 20 mm, as the thread depth of all Walter Turn and Walter Cut square shanks with precision cooling is 30 mm.

Walter coolant hose set -P

				Length			
				150 mm	K601.01.150-SET	K601.02.150-SET	K601.03.150-SET
				250 mm	K601.01.250-SET	K601.02.250-SET	K601.03.250-SET
Individual components			**Designation**	300 mm	K601.01.300-SET	K601.02.300-SET	K601.03.300-SET
						Number per set	
①		M10 connection element	FS2252		1 ×	—	—
		M8×1 connection element	FS2597		—	—	—
		5/16" UNF connection element	FS2595		—	—	—
②		G1/8" double connection element	FS2253		2 ×	1 ×	—
③		M10 angle connection	FS2255		—	1 ×	2 ×
④		G1/8" angle connection	FS2254		—	1 ×	1 ×
		M8×1 angle connection	FS2596		—	—	—
		5/16" UNF angle connection	FS2594		—	—	—
⑤		G1/4"–G1/8" reducer	FS2256		—	1 ×	1 ×
⑥		Copper gasket	FS2257		2 ×	3 ×	4 ×
⑦		G1/8" threaded plug	FS2258		1 ×	1 ×	1 ×
		M8×1 threaded plug	FS2587		—	—	—
		5/16-24 UNF threaded plug	FS2593		—	—	—
⑧		Brass blanking plug	FS2259		1 ×	1 ×	1 ×
⑨		G1/8" brass nozzle	FS2260		1 ×	1 ×	1 ×
⑩		O-ring	FS2261		2 ×	2 ×	2 ×

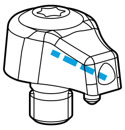
Assembly parts and accessories
Coolant nozzles and coolant adaptors

Coolant nozzles – Walter Capto™

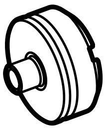
		Walter Capto™ size		
		C3 + C4	C5 + C6	C6 + C 8
	Standard brass coolant nozzle up to 80 bar	FS1477	FS1476	FS1479
	Plug-in inserts for changing the nozzles	FS1477HEX (SW5)	FS1476HEX (SW5)	FS1479HEX (SW5)
	Key for plug-in insert	FS2158 (SW5)	FS2158 (SW5)	FS2158 (SW5)

Please note:
A different coolant nozzle is installed in certain Walter Capto™ tools (C3–C8) from the one specified in the table above.
This detailed information can be found on the relevant tool page.

Coolant nozzles/cooling lubricant nozzles with universal application

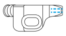
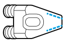
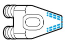
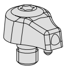
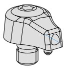
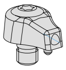
	Designation	Number per set
	CN1000-M4-1	Additively manufactured cooling lubricant nozzle for clamping surface cooling, seal, M4 × 0.5 screw

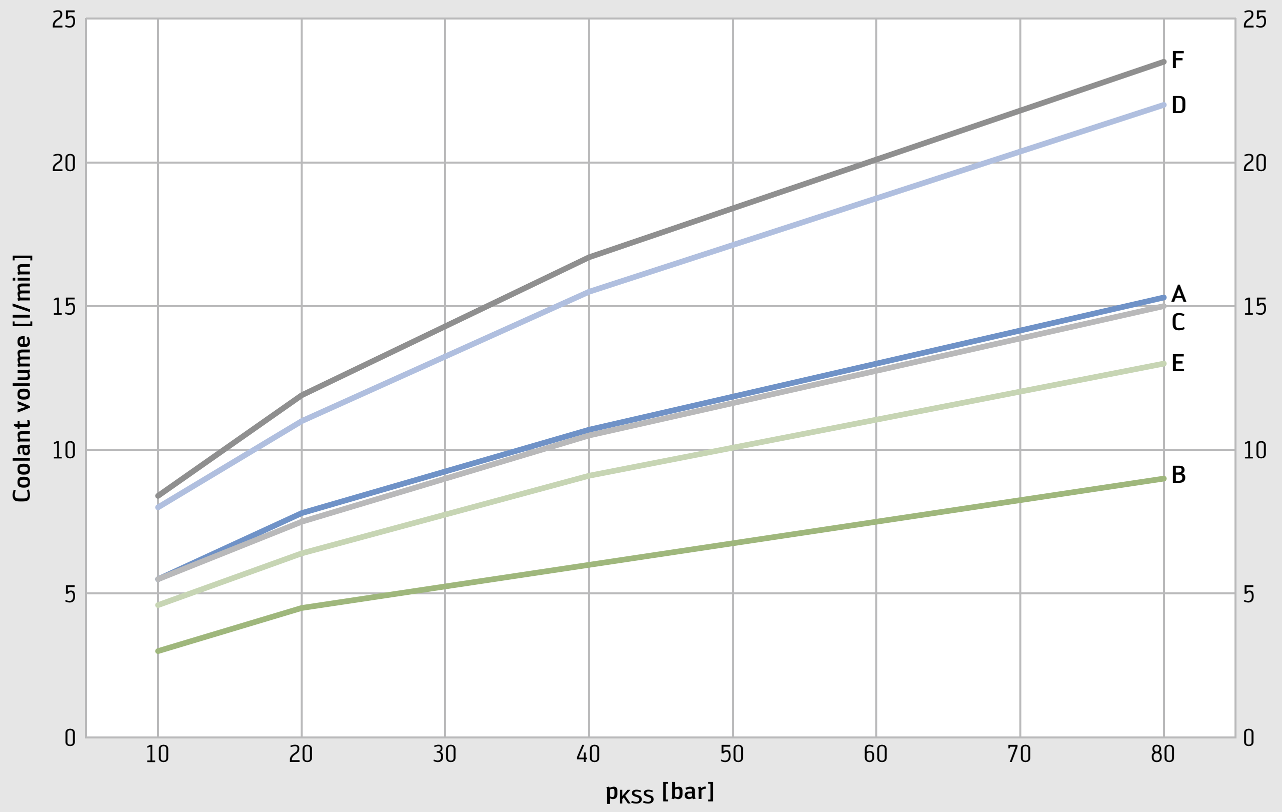
Coolant sealing adaptor for Walter Turn boring bars with clamping surface

		Boring bar diameter		
	Designation	Ø 25 mm	Ø 32 mm	Ø 40 mm
	Adaptor for sealing the cooling lubricant on boring bars with clamping surfaces and internal coolant	CN3000-25-8.5	CN3000-32-8.5	CN3000-40-11.5

Standard value diagrams for coolant pressure/flow rate data

Walter Turn rigid clamping with precision cooling and cooling lubricant nozzles

Type	Description	Symbol	Relevant items
A	Coolant hose set		K601 . . .
B	Clamp with one coolant inlet and two coolant outlets		PK261, PK265, PK266
C	Clamp with two coolant inlets and two coolant outlets		PK255, PK256
D	Clamp with two coolant inlets and four coolant outlets		PK264, PK267, PK268
E	Additively manufactured cooling lubricant nozzle with one coolant inlet and one coolant outlet (1 ×)		1 pc. CN1000-M4-1
F	Additively manufactured cooling lubricant nozzle with one coolant inlet and one coolant outlet (2 ×)	 + 	2 pc. CN1000-M4-1



Note:
The standard values shown were determined under laboratory conditions.
During use, deviations may occur due to factors including the machine type being used, the coolant, the coolant preparation or the coolant pump.

Abbreviations

p_{KSS}	Coolant pressure

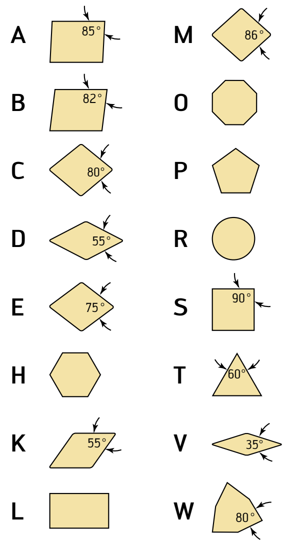
Designation key in accordance with ISO 1832 for carbide indexable inserts for turning

Example 1:

C	N	M	G	12	04	08	–	M	P	5
1	2	3	4	5	6	7		12	13	14

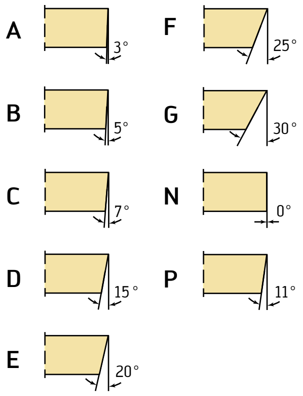
1

Insert shape



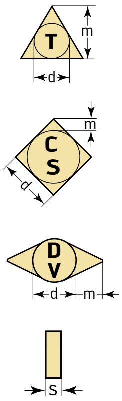
2

Clearance angle



3

Tolerances



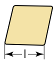
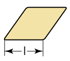
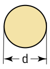
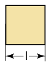
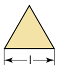
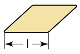
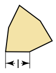
Permissible deviation in mm for

	d	m	s
A	± 0,025	± 0,005	± 0,025
C	± 0,025	± 0,013	± 0,025
E	± 0,025	± 0,025	± 0,025
F	± 0,013	± 0,005	± 0,025
G	± 0,025	± 0,025	± 0,130
H	± 0,013	± 0,013	± 0,025
J[1]	± 0,05–0,15[2]	± 0,005	± 0,025
K[1]	± 0,05–0,15[2]	± 0,013	± 0,025
L[1]	± 0,05–0,15[2]	± 0,025	± 0,025
M	± 0,05–0,15[2]	± 0,08–0,20[2]	± 0,130
N	± 0,05–0,15[2]	± 0,08–0,20[2]	± 0,025
U	± 0,08–0,25[2]	± 0,13–0,38[2]	± 0,130

[1] Inserts with ground planar cutting edges
[2] Depending on the insert size (see ISO standard 1832)

5

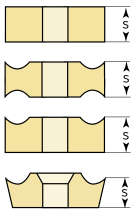
Cutting edge length l
[mm]

Inner circle diameter d		C 		D 		R 	S 		T 		V 		W 	
mm	Inches	Size	l	Size	l	Size	Size	l	Size	l	Size	l	Size	l
3,97	5/32								06	6,9				
5	0,197					05							03	3,8
5,56	7/32								09	9				
6	0,236					06								
6,35	2/8	06	6,4	07	7,7	06[1]			11	11	11	11	04	4,3
8	0,315					08							05	5,2
9,525	3/8	09	9,6	11	11,6	09[1]	09	9,5	16	16,5	16	16,5	06	6,5
10	0,394					10								
12	0,472					12								
12,7	4/8	12	12,9	15	15,5	12[1]	12	12,7	22	22	22	22,1	08	8,7
15,875	5/8	16	16,1				15	15,8	27	27			10	10,8
16	0,63					16								
17,46	11/16												12	11,6
19,05	6/8	19	19,3			19[1]	19	19,0						
20	0,787					20								
25	0,984					25								
25,4	8/8	25	25,8			25[1]	25	25,4						
32	1,26					32								

[1] Inch version (00)

6

Insert thickness s
[mm]



01	s = 1,59
T1	s = 1,98
02	s = 2,38
T2	s = 2,78
03	s = 3,18
T3	s = 3,97
04	s = 4,76
05	s = 5,56
06	s = 6,35
07	s = 7,94
09	s = 9,52

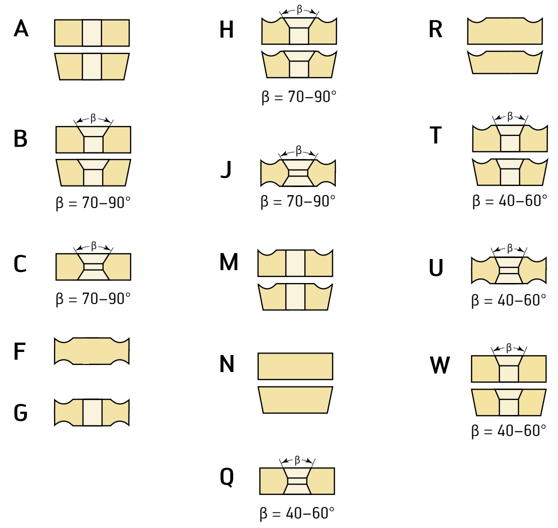
Designation key in accordance with ISO 1832 for carbide indexable inserts for turning (continued)

Example 2:

T	N	M	A	16	04	08	T	020	20
1	2	3	4	5	6	7	8	10	11

4

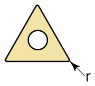
Machining and fastening features



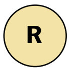
X Drawing or precise description of the indexable insert is required

7

Corner radius r [mm]



005M r = 0,03
01M r = 0,07
01 r = 0,1
02M r = 0,17
02 r = 0,2
04M r = 0,37
04 r = 0,4
08M r = 0,77
08 r = 0,8
12 r = 1,2
16 r = 1,6
24 r = 2,4

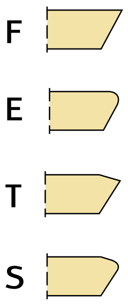


M0 Metric version (diameter in [mm])

00 Inch version (diameter with inch units in [mm])

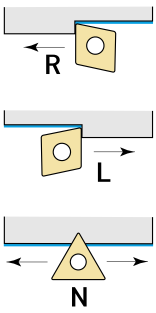
8

Edge formation



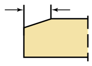
9

Cutting direction



10

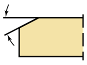
Chamfer width



010 = 0,10 mm
020 = 0,20 mm
025 = 0,25 mm
070 = 0,70 mm
150 = 1,50 mm
200 = 2,00 mm

11

Chamfer angle



15 = 15°
20 = 20°

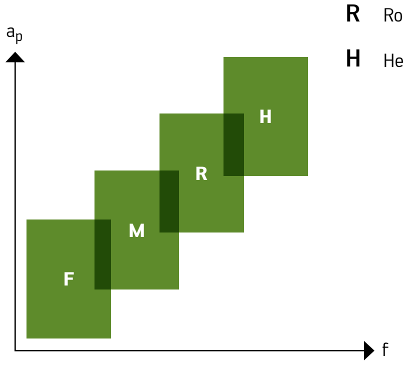
Geometry designation key for carbide indexable inserts for turning

Geometry index

C	N	M	G	12	04	08	–	M	P	5
1	2	3	4	5	6	7		12	13	14

12

Chip breaking range



F	Finishing operation
M	Medium machining
R	Roughing operation
H	Heavy machining

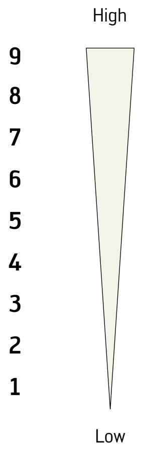
13

Material

P	Steel
M	Stainless steel
K	Cast iron
N	NF metals
S	Materials with difficult cutting properties
H	Hard materials
U	Universal
L	Long-chipping materials
W	**Wiper**

14

Feed/depth of cut within chip breaking range



Designation key for carbide cutting tool materials – Turning

Example:

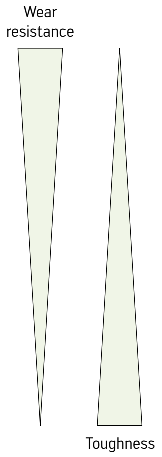
W	P	P	20	G
Walter	**1**	**2**	**3**	**4**

1	
1. Primary application or coating type	
P	Steel
M	Stainless steel
K	Cast iron
N	NF metals
S	Materials with difficult cutting properties
H	Hard materials
X	PVD coating

2	
2. Primary application	
P	Steel
M	Stainless steel
K	Cast iron
N	NF metals
S	Materials with difficult cutting properties
H	Hard materials

3

ISO application range



01
05
10
20
21
23
30
32
33
43

Cutting tool materials for:

0	ISO turning
1	ISO turning
5	ISO turning
2	Thread turning
3	Grooving

4	
Generation	
G	Tiger·tec® Gold
S	Tiger·tec® Silver

Designation key for system inserts for turning

Example:

W	L	2	5	–	V	C	0	7	0	4	R	–	M	P	4		WPP20G
1		2			3	4	5		6		7		8				9

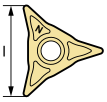
1

Type of indexable insert

WL	Walter Lock

2

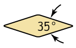
Indexable insert size

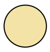


17	17 mm
25	25 mm

3

Basic shape

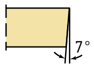




V	35°
R	Round

4

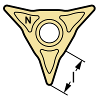
Clearance angle

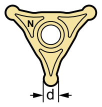


C	7°

5

Cutting edge length



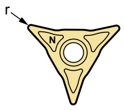


04	4 mm
05	5 mm
07	7 mm

6

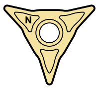
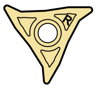
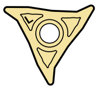
Corner radius

02	0,2 mm
04	0,4 mm
08	0,8 mm
12	1,2 mm
16	1,6 mm



7

Direction of cut

N	Neutral
R	Right
L	Left

8

Geometry

MP4	Medium machining, ISO P, 4

See geometry designation key for carbide indexable inserts for turning

9

Grade

WPP20G	ISO P20 Tiger·tec® Gold

See designation key for carbide cutting tool materials – Turning

ISO designation key for turning toolholders – External machining

Example: Walter Turn

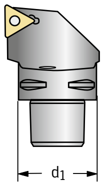
P	W	L	N	R	25	25	M	08	...
1	2	3	4	5	6	7	8	9	10

0

Coupling size d_1 [mm]

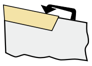
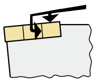
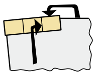
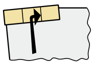
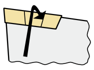
C = Walter Capto™
ISO 26623

C3	$d_1 = 32$
C4	$d_1 = 40$
C5	$d_1 = 50$
C6	$d_1 = 63$
C8	$d_1 = 80$



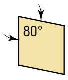
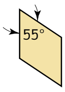
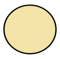
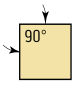
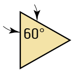
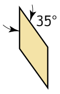
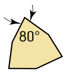
1

Insert mounting type

C	Top clamping	
D	Top and hole clamping	
M	Top and hole clamping	
P	Hole clamping	
S	Screw clamping	

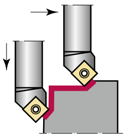
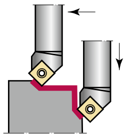
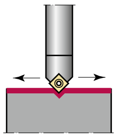
2

Indexable insert basic shape

C	
D	
R	
S	
T	
V	
W	

5

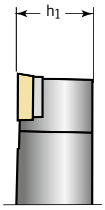
Turning toolholder design

R	
L	
N	

6

Turning toolholder height h_1 [mm]

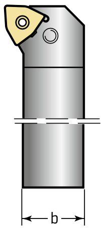
Height of the peripheral cutting edge h_1 in mm. Figures after the decimal point are ignored. Single-digit numbers are preceded by a “0”, e.g. h_1 = 8 mm = 08.

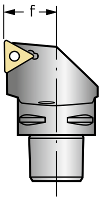


7

Toolholder width b or f dimension [mm]

Shank width b in mm. Figures after the decimal point are ignored. Single-digit numbers are preceded by a “0”, e.g. b = 8 mm = 08. For CA cartridges.





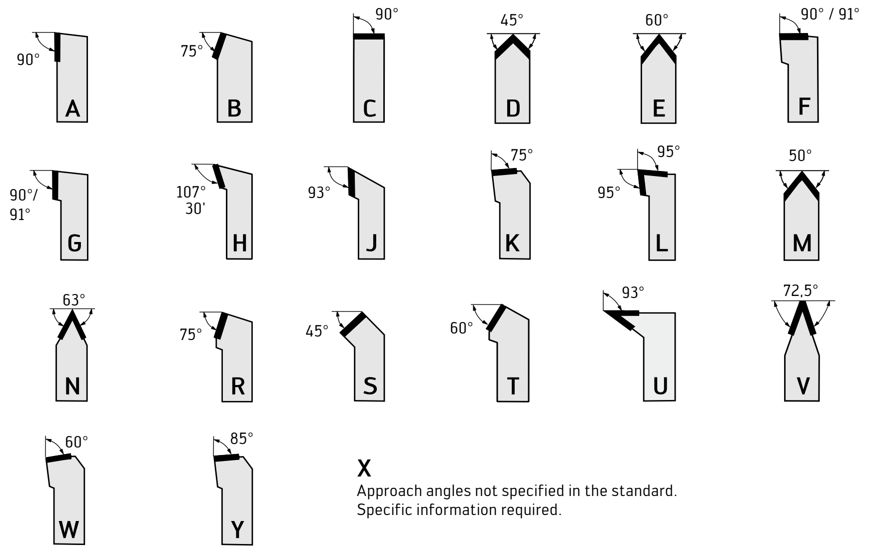
ISO designation key for turning toolholders – External machining (continued)

Example: Walter Capto™

C5	–	P	W	L	N	R	–	22	110	–	08	...
0		1	2	3	4	5		7	8		9	10

3

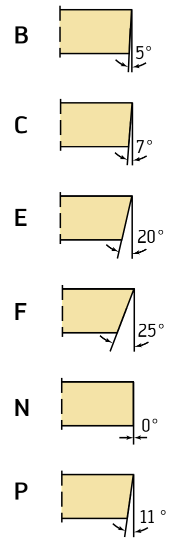
Approach angle



X
Approach angles not specified in the standard.
Specific information required.

4

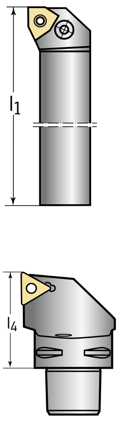
Indexable insert clearance angle



8

Turning toolholder length l_1/l_4 [mm]

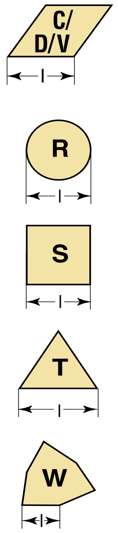
32 = A
40 = B
50 = C
60 = D
70 = E
80 = F
100 = H
110 = J
125 = K
140 = L
150 = M
160 = N
170 = P
180 = Q
200 = R
250 = S
300 = T
350 = U
400 = V
450 = W



Special = X
500 = Y

9

Length of cutting edge l [mm]



10

Manufacturer option

If necessary, an additional symbol comprising a maximum of three letters or figures can be added to the standard code.

This symbol must be separated from the standard designation with a hyphen.

–W Wedge-type clamping
–P Precision cooling

–S Shank design for automatic lathes (f = b)

ISO designation key for turning toolholders – Internal machining

Example: Walter Turn

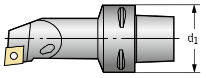
A	20	S	–	S	C	L	C	R	09	–	R
1	2	3		4	5	6	7	8	9		10

0

Coupling size d_1 [mm]

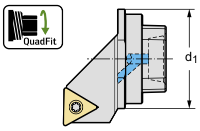
C = Walter Capto™
ISO 26623

C3 $d_1 = 32$
C4 $d_1 = 40$
C5 $d_1 = 50$
C6 $d_1 = 63$
C8 $d_1 = 80$



Q = QuadFit

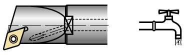
Q25 $d_1 = 25$
Q32 $d_1 = 32$
Q40 $d_1 = 40$
Q50 $d_1 = 50$



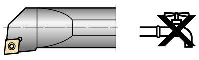
1

Shank design

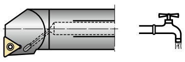
A Solid steel design
with internal coolant supply



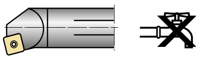
S Solid steel design
without internal coolant supply



E Carbide shank with steel head
and internal coolant supply



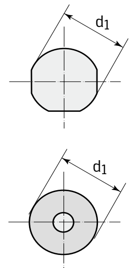
C Carbide shank with steel head,
without internal coolant supply



2

Boring bar diameter d_1 [mm]

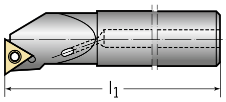
Shank diameter in mm. Figures after the decimal point are ignored. Single-digit numbers are preceded by a “0”.



3

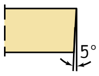
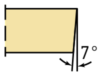
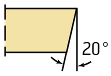
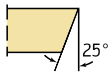
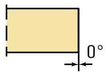
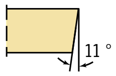
Turning toolholder length l_1 [mm]

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



7

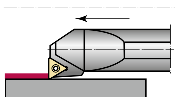
Indexable insert clearance angle

B	
C	
E	
F	
N	
P	

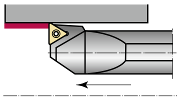
8

Turning toolholder design

R = Right

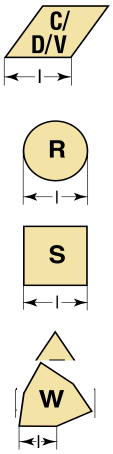


L = Left



9

Length of cutting edge l [mm]



10

Manufacturer option

If necessary, an additional symbol comprising a maximum of three letters or figures can be added to the standard code.

This symbol must be separated from the standard designation with a hyphen.

The following versions:

–R	Boring bars with full cylindrical shank
–X	Back copy boring bars
–W	Wedge-type clamping

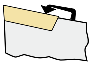
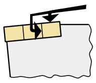
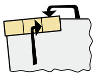
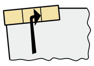
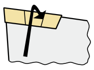
ISO designation key for turning toolholders – Internal machining (continued)

Example: Walter Capto™

C4	–	S	C	L	C	R	–	27	080	–	12	...
0		4	5	6	7	8		11	12		9	10

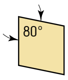
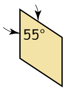
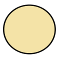
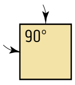
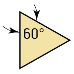
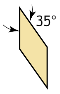
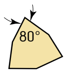
4

Insert mounting type

C	Top clamping	
D	Top and hole clamping	
M	Top and hole clamping	
P	Hole clamping	
S	Screw clamping	

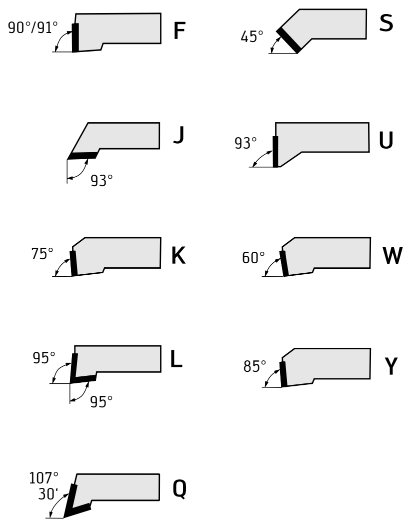
5

Indexable insert basic shape

C	
D	
R	
S	
T	
V	
W	

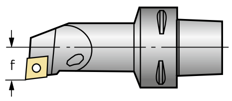
6

Lead angle



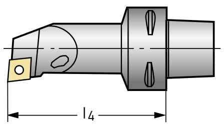
11

f dimension
[mm]



12

Tool length l_4
[mm]



Designation key for Walter Turn system tools – External machining

Example:

W	1	0	1	1	–	2	5	2	5	R	–	W	L	2	5	–	P
1	2	3	4		5	6				7		8					9

1

Tool group

W	Walter Turning

2

Generation

1	Walter Lock

3

Application

0	External machining
2	Internal machining

4

Tool type

10	0° angle (72.5°)
11	35° angle (107°)

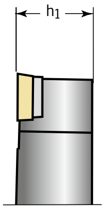
5

1. Delimiters

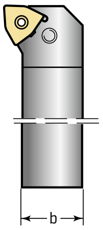
–	Metric
.	Inch

6

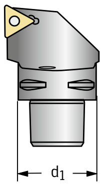
Shank size



25 Dia. 25 mm



25 Width 25 mm



Walter Capto™

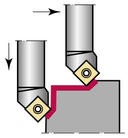
C4

C5

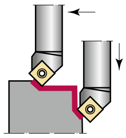
C6

7

Version



R Right



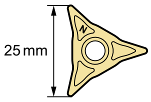
L Left

8

Type of indexable insert

WL17

WL25



9

Manufacturer option

–P	Precision cooling
–S	Shank design for automatic lathe (f = b)

Designation key for Walter Turn system tools – Internal machining

Example:

W	1	2	1	1	–	2	5	T	R	–	W	L	2	5
1	2	3	4		5	6		7	8		9			

1

Tool group

W	Walter Turning

2

Generation

1	Walter Lock

3

Application

0	External machining
2	Internal machining

4

Tool type

10	0° angle (72.5°)
11	35° angle (107°)

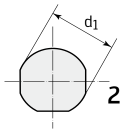
5

1. Delimiters

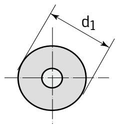
–	Metric
.	Inch

6

Boring bar diameter d_1 [mm]



25 Diameter 25 mm



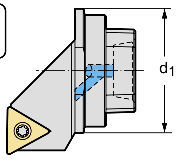
Walter QuadFit

Q25

Q32

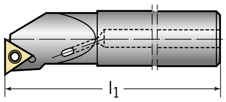
Q40

Q50



7

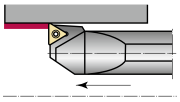
Turning toolholder length l_1 [mm]



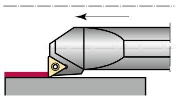
T = l_1 = 300 mm
(as described in standard DIN 8024)

8

Version



L Left



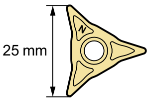
R Right

9

Type of indexable insert

WL17

WL25



Designation key for Accure·tec® adaptors for turning

Example:

A	3	0	00	–	32	–	Q	32	–	288	–	
1	2	3	4	5	6		7	8		9		10

1	
Tool group	
A	Boring bars/adaptors

2	
Generation	
3	Vibration-damped with internal coolant
4	Vibration-damped without internal coolant

3	
Tool type	
0	Monoblock

4	
Type	
00	Modular interface without intermediate adaptor
01	Modular interface with intermediate adaptor

5	
1. Delimiters	
–	Metric
·	Inch

6	
Machine-side adaptor type/size	
25	Cylindrical, 25 mm
32	Cylindrical, 32 mm
40	Cylindrical, 40 mm
50	Cylindrical, 50 mm
60	Cylindrical, 60 mm
80	Cylindrical, 80 mm
100	Cylindrical, 100 mm
C4	Walter Capto™
C5	Walter Capto™
C6	Walter Capto™
C8	Walter Capto™
H63T	HSK-T
H100T	HSK-T
16	Cylindrical, 1"
20	Cylindrical, 1.25"
24	Cylindrical, 1.5"
32	Cylindrical, 2"
40	Cylindrical, 2.5"
48	Cylindrical, 3"
64	Cylindrical, 4"

7	
Tool-side version adaptor type	
Q	QuadFit
QL	QuadFit Large

8		
Tool-side version size		
25	25 mm	**Q**
32	32 mm	
40	40 mm	
50	50 mm	
60	60 mm	**QL**
80	80 mm	
64	2.5"	
76	3"	
100	100 mm	

9	
Length of the shank adaptor	
160	160 mm
224	224 mm
…	…

10
Version
Optional

Designation key for Accure·tec® intermediate adaptors for turning

Example:

A	2	2	01	–	QL60	–	05	27	–	Q50	–	
1	2	3	4	5	6		7	8		9		10

1	
Tool group	
A	Boring bars/adaptors

2	
Generation	
2	Intermediate adaptor

3	
Tool type	
0	Monoblock
2	Intermediate adaptor

4	
Type	
01	Intermediate adaptor

5	
1. Delimiters	
–	Metric
·	Inch

6	
Machine-side adaptor type/size	
QL60	Intermediate adaptor, 60 mm
QL64	Intermediate adaptor, 64 mm/ 2.5"
QL76	Intermediate adaptor, 76 mm/ 3"
QL80	Intermediate adaptor, 80 mm
QL100	Intermediate adaptor, 100 mm/ 4"

7	
Centric offset	
05	Offset in mm
10	
15	
23	
07	
12	
13	
21	

8	
Length of the intermediate adaptor	
27	27 mm
29	29 mm

9	
Tool-side version adaptor type/size	
Q50	QuadFit 50

10
Version
Optional

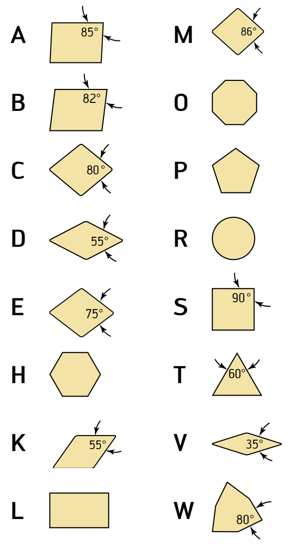
Designation key in accordance with ISO 1832 for CBN, PCD and ceramic indexable inserts for turning

Example: Ceramic indexable inserts

R	N	G	N	12	07	00	T	010	20
1	2	3	4	5	6	7	8	11	12

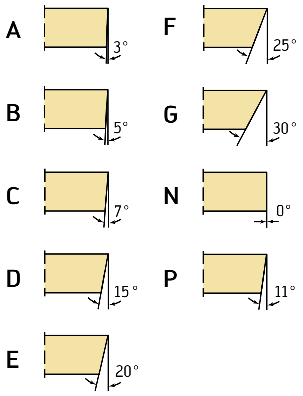
1

Insert shape



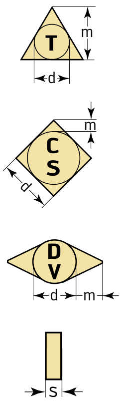
2

Clearance angle



3

Tolerances



Permissible deviation in mm for

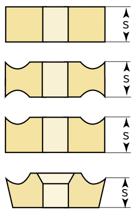
	d	m	s
A	± 0,025	± 0,005	± 0,025
C	± 0,025	± 0,013	± 0,025
E	± 0,025	± 0,025	± 0,025
F	± 0,013	± 0,005	± 0,025
G	± 0,025	± 0,025	± 0,130
H	± 0,013	± 0,013	± 0,025
J[1]	± 0,05–0,15[2]	± 0,005	± 0,025
K[1]	± 0,05–0,15[2]	± 0,013	± 0,025
L[1]	± 0,05–0,15[2]	± 0,025	± 0,025
M	± 0,05–0,15[2]	± 0,08–0,20[2]	± 0,130
N	± 0,05–0,15[2]	± 0,08–0,20[2]	± 0,025
U	± 0,08–0,25[2]	± 0,13–0,38[2]	± 0,130

[1] Inserts with ground planar cutting edges

[2] Depending on the insert size (see ISO standard 1832)

6

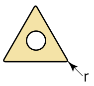
Insert thickness s [mm]



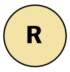
01	s = 1,59
T1	s = 1,98
02	s = 2,38
T2	s = 2,78
03	s = 3,18
T3	s = 3,97
04	s = 4,76
05	s = 5,56
06	s = 6,35
07	s = 7,94
09	s = 9,52

7

Corner radius r [mm]



01	r = 0,1
02	r = 0,2
04	r = 0,4
08	r = 0,8
12	r = 1,2
16	r = 1,6
24	r = 2,4

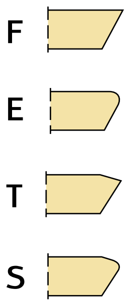


M0 Metric version "diameter in [mm]"

00 Inch version "diameter with inch units in [mm]"

8

Edge formation



9

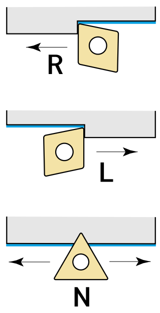
Cutting edge preparation

S small

M medium

10

Cutting direction



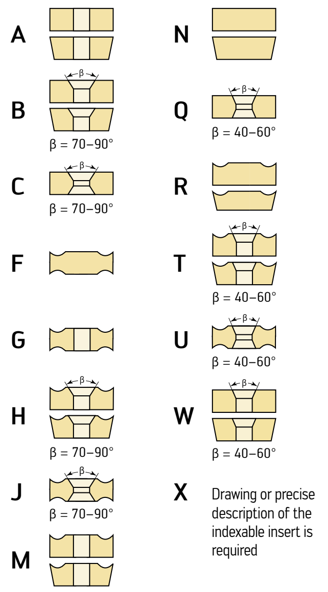
Designation key in accordance with ISO 1832 for CBN, PCD and ceramic indexable inserts for turning (continued)

Example: CBN indexable insert

C	N	G	A	12	04	08	T	M	.	–	MW	.	2
1	2	3	4	5	6	7	8	9	10		13	14	15

4

Machining and fastening features



X Drawing or precise description of the indexable insert is required

5

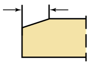
Cutting edge length l [mm]

Inner circle diameter d		C		D		R	S		T		V		W	
mm	Inches	Size	l	Size	l	Size	Size	l	Size	l	Size	l	Size	l
3,97	5/32								**06**	6,9				
5	0,197					**05**							**03**	3,8
5,56	7/32								**09**	9				
6	0,236					**06**								
6,35	2/8	**06**	6,4	**07**	7,7	**06**[1]			**11**	11	**11**	11	**04**	4,3
8	0,315					**08**							**05**	5,2
9,525	3/8	**09**	9,6	**11**	11,6	**09**[1]	**09**	9,5	**16**	16,5	**16**	16,5	**06**	6,5
10	0,394					**10**								
12	0,472					**12**								
12,7	4/8	**12**	12,9	**15**	15,5	**12**[1]	**12**	12,7	**22**	22			**08**	8,7
15,875	5/8	**16**	16,1				**15**	15,8	**27**	27			**10**	10,8
16	0,63					**16**								
17,46	11/16												**12**	11,6
19,05	6/8	**19**	19,3			**19**[1]	**19**	19,0						
20	0,787					**20**								
25	0,984					**25**								
25,4	8/8	**25**	25,8			**25**[1]	**25**	25,4						
32	1,26					**32**								

[1] Inch version (00)

11

Chamfer width



010 = 0,10 mm

020 = 0,20 mm

025 = 0,25 mm

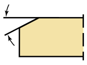
070 = 0,70 mm

150 = 1,50 mm

200 = 2,00 mm

12

Chamfer angle



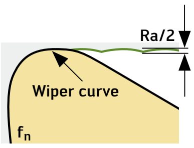
15 = 15°

20 = 20°

13

Wiper cutting edge

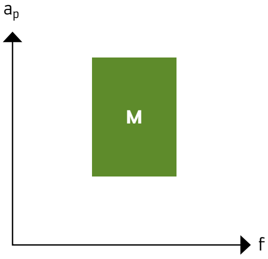
W **Wiper**



MW Wiper – medium feed

14

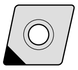
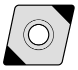
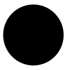
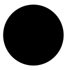
Chip breaking range



M Medium machining

15

Number of cutting edges/version

1	single	
2	double	
3	triple	
4	quadruple	
9	strip	
0	full-face	
S	solid	

Designation key for CBN/cermet/ceramic/PCD cutting tool materials – Turning

Example:

W	B	H	10	C
Walter	**1**	**2**	**3**	**4**

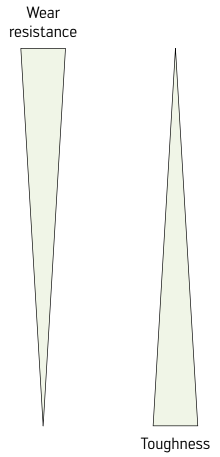
1	
Cutting tool material	
B	CBN
C	Si_3N_4 ceramic
D	PCD (diamond)
E	Cermet
I	SiAlON ceramic
W	Whisker-reinforced ceramic

2	
Primary application	
P	Steel
M	Stainless steel
K	Cast iron
N	NF metals
S	Materials with difficult cutting properties
H	Hard materials

3

ISO application range

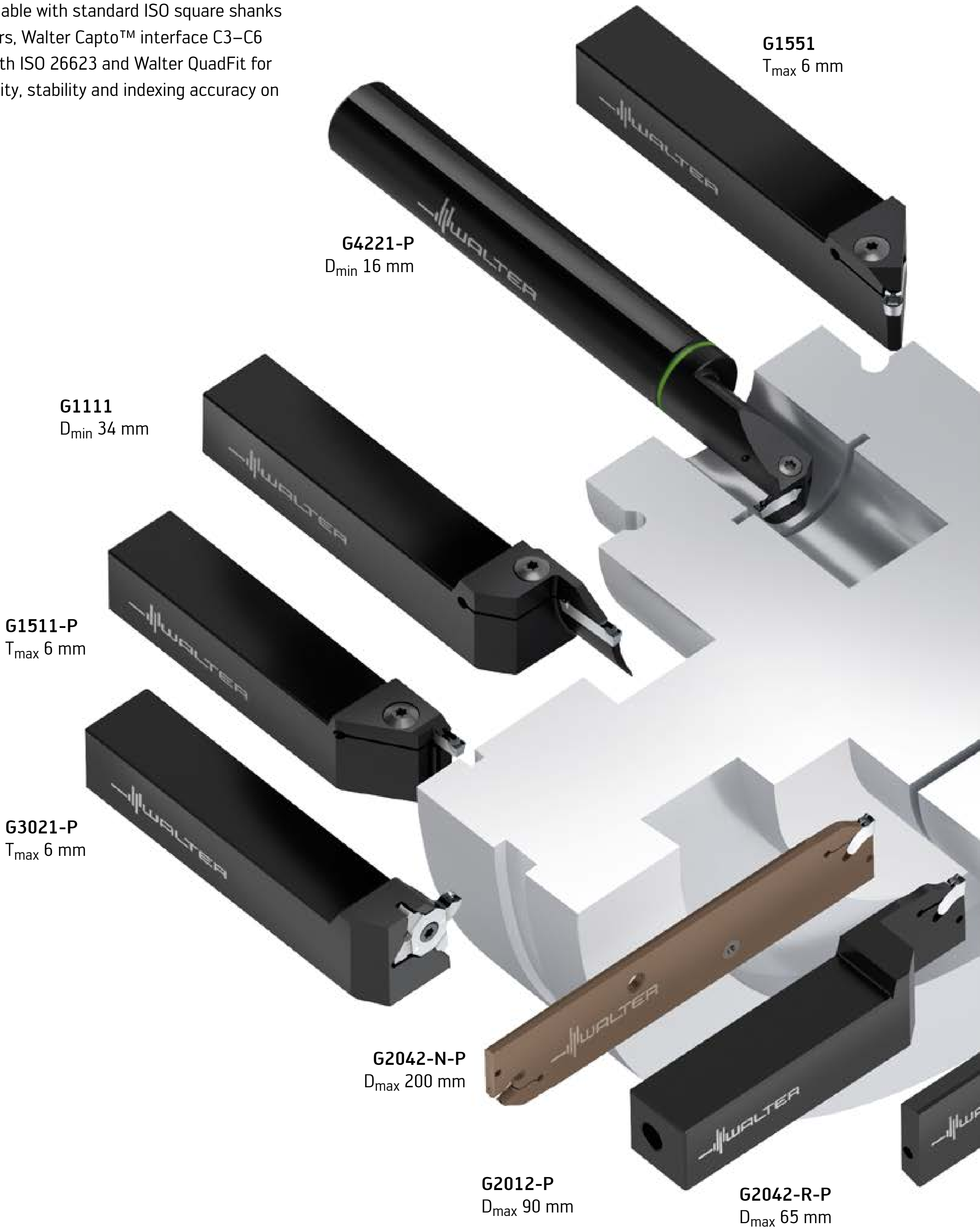
01
05
10
20
21
23
30
32
33
43

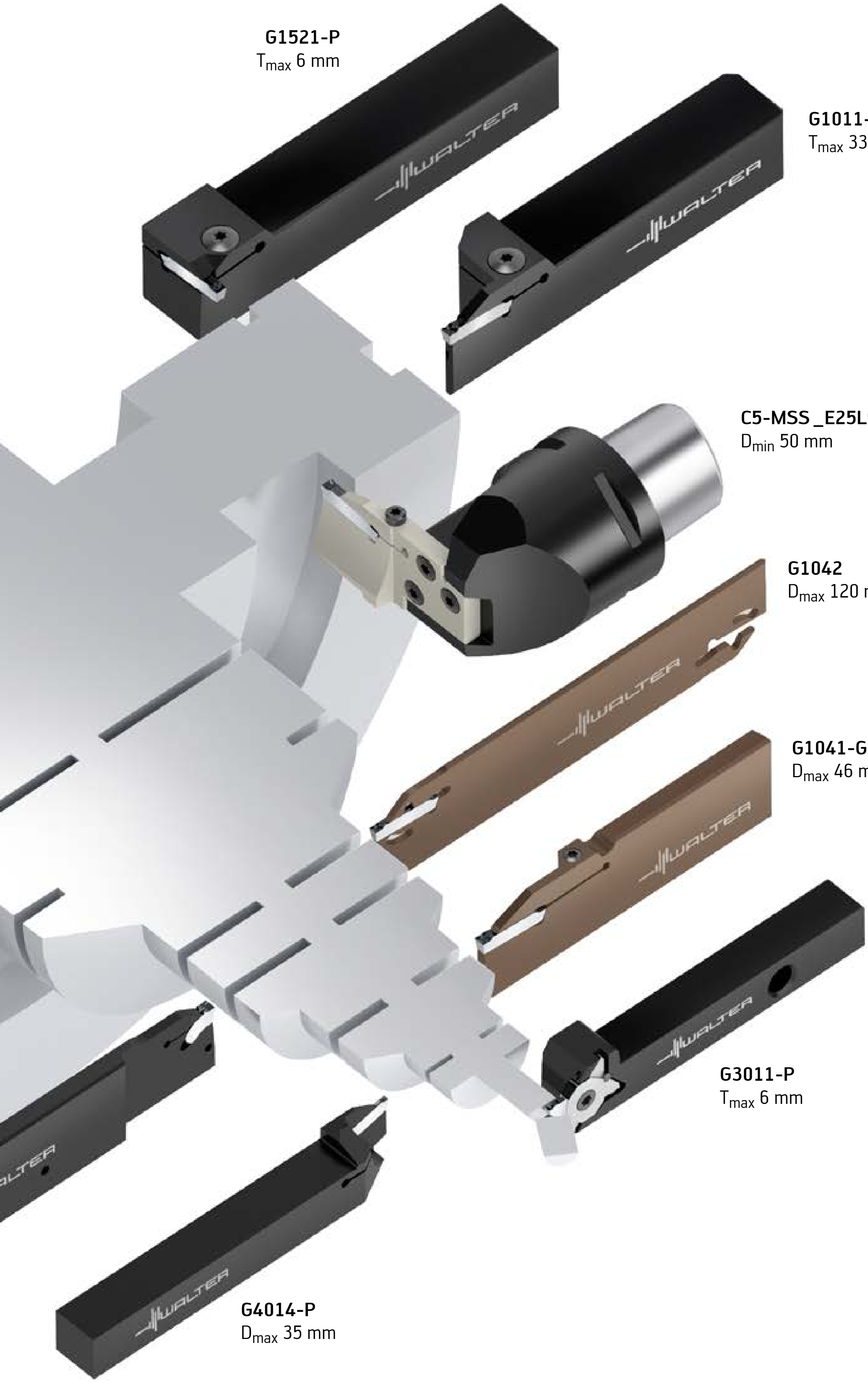


4	
Coating	
C	First generation

Grooving tools

Walter offers a complete range of tools for grooving. All tools are available with standard ISO square shanks and as boring bars, Walter Capto™ interface C3–C6 in accordance with ISO 26623 and Walter QuadFit for maximum flexibility, stability and indexing accuracy on any lathe.





G1521-P
T_{max} 6 mm

G1011-P
T_{max} 33 mm

C5-MSS _E25L90..
D_{min} 50 mm

G1042
D_{max} 120 mm

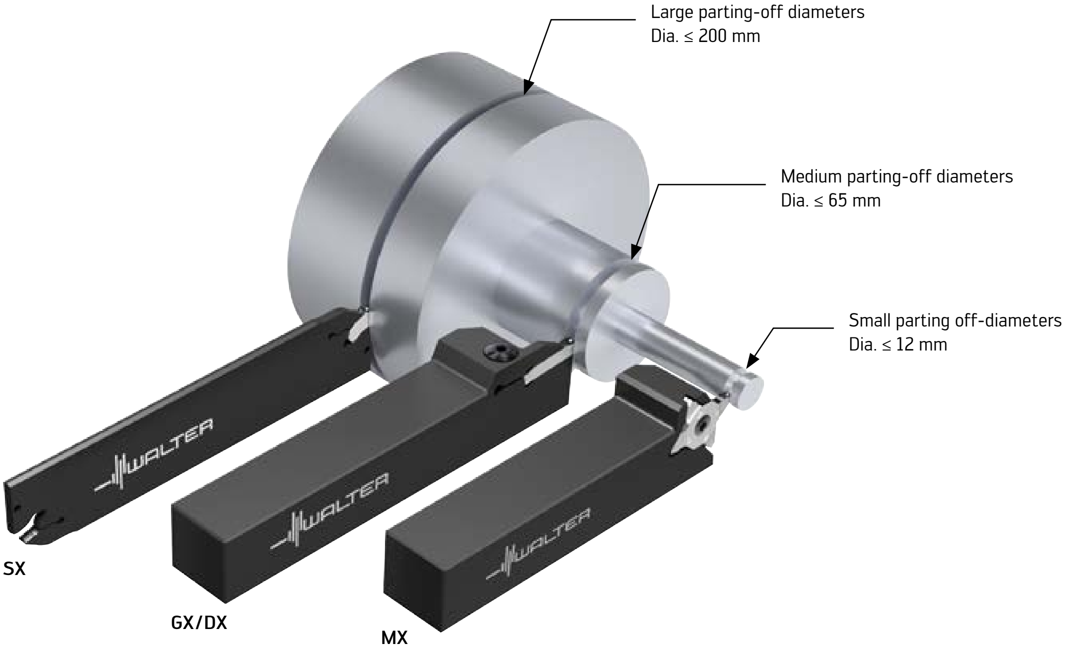
G1041-GX24-P
D_{max} 46 mm

G3011-P
T_{max} 6 mm

G4014-P
D_{max} 35 mm

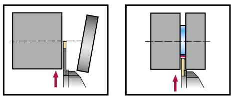
Walter Cut grooving systems by diameter range

Four systems – up to 200 mm parting off



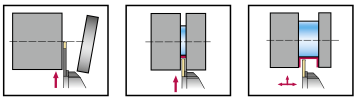
Small parting-off diameters of up to 12 mm

- Four-edged MX indexable inserts
- For economical grooving and parting off in mass production, as well as grooving special profiles



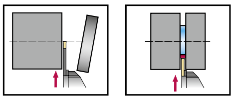
Medium parting-off diameters of up to 65 mm

- Double-edged GX/DX indexable inserts
- Method for grooving, parting off and groove turning universally and efficiently



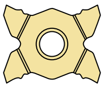
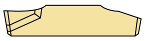
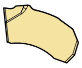
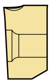
Large parting-off diameters of up to 200 mm

- Single-edged SX indexable inserts
- Inserts with self-clamping system, ideal for deep grooving and slot milling

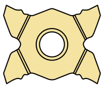
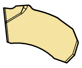


Product range overview of cutting inserts and cutting tool materials: Grooving

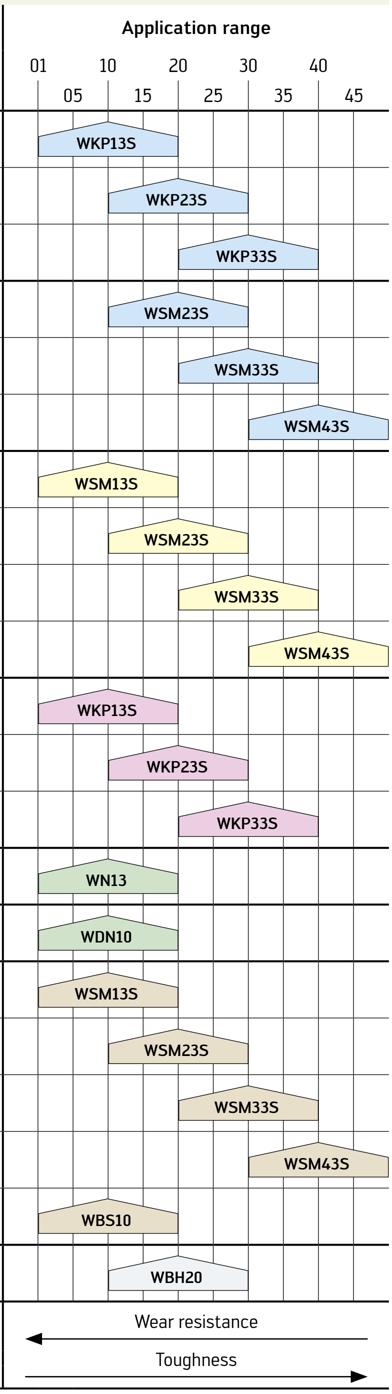
Grooving and parting off/groove turning

Insert shape		Description
	**MX**	MX grooving inserts, four cutting edges
 	**DX..E** **DX..F**	DX grooving inserts, two cutting edges, one cutting edge
 	**GX..E** **GX..F**	GX grooving inserts, two cutting edges, one cutting edge
	**SX**	SX grooving inserts, one cutting edge
	**UX**	UX grooving inserts, one cutting edge

Semi-finished products/blanks

Insert shape		Description
	**MX**	MX grooving inserts, four cutting edges
	**GX**	GX grooving inserts, two cutting edges
	**SX**	SX grooving inserts, one cutting edge

Cutting tool materials: Carbide

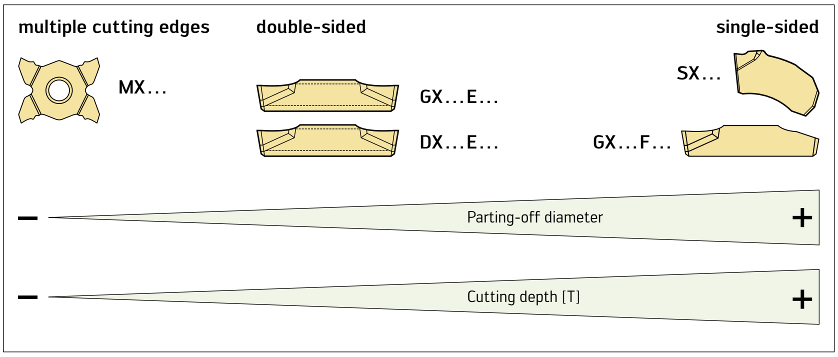


Application	Coating	Application range
ISO P	CVD	WKP13S
	CVD	WKP23S
	CVD	WKP33S
	PVD	WSM23S
	PVD	WSM33S
	PVD	WSM43S
ISO M	PVD	WSM13S
	PVD	WSM23S
	PVD	WSM33S
	PVD	WSM43S
ISO K	CVD	WKP13S
	CVD	WKP23S
	CVD	WKP33S
ISO N	—	WN13
ISO N	PCD	WDN10
ISO S	PVD	WSM13S
	PVD	WSM23S
	PVD	WSM33S
	PVD	WSM43S
	CBN	WBS10
ISO H	CBN	WBH20

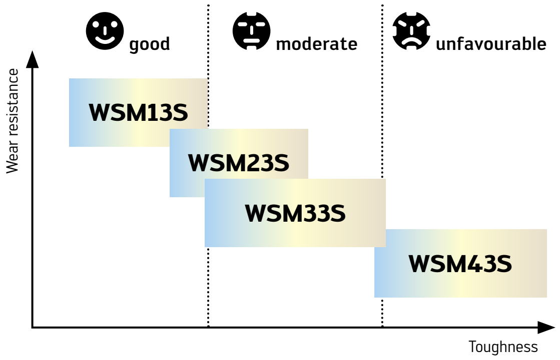
Product range overview for cutting inserts Carbide – Grades and Geometries

STEP 1 FOR ALL GROOVING OPERATIONS

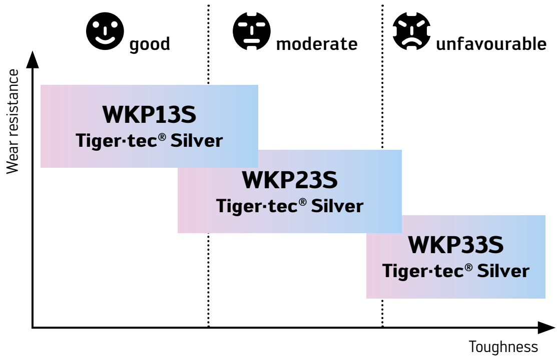
Determine the basic shape of the cutting insert.



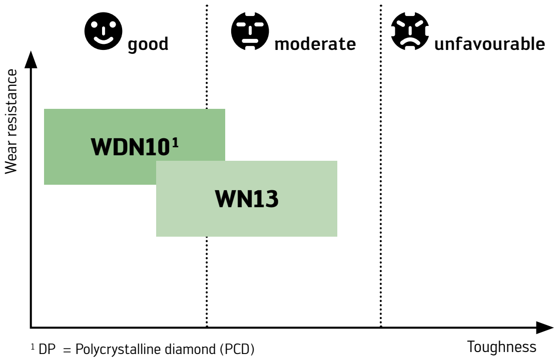
Steel ISO P
Stainless steel ISO M
High-temperature alloys and titanium alloys ISO S



Cast iron ISO K
Steel ISO P



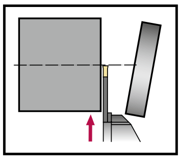
NF metals ISO N



[1] DP = Polycrystalline diamond (PCD)

[2] HW = Uncoated carbide

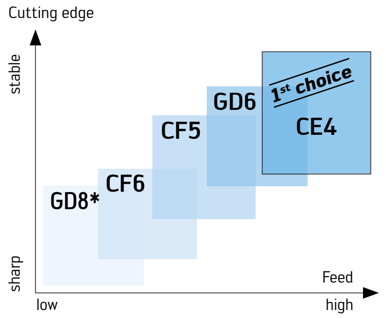
WALTER SELECT Optimum indexable insert for → Good = ☺ → Moderate = 😐 → Poor = ☹ machining conditions



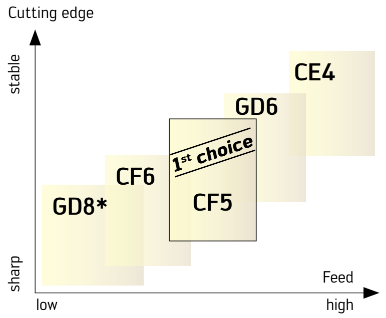
STEP 2 – PARTING OFF

Determine the **cutting insert geometry** via the cutting edge stability and feed.

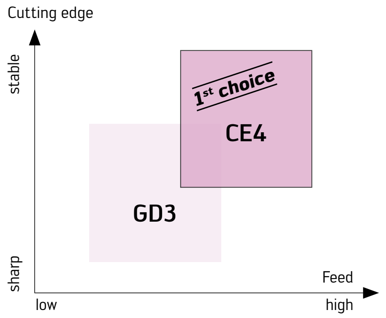
P **Steel**



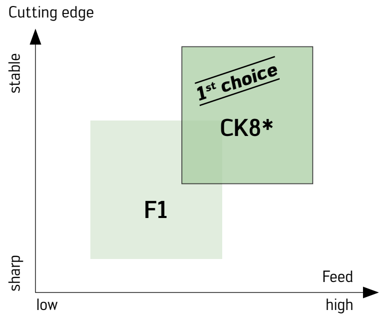
M/S **Stainless steel**



K **Cast iron**



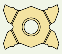
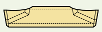
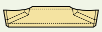
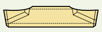
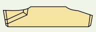
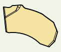
N **NF metals**



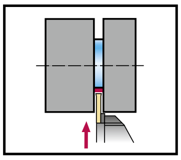
*Fully ground circumference

STEP 3 – PARTING OFF

Check whether your chosen geometry is available in the required insert width [s].
Identify the available system.

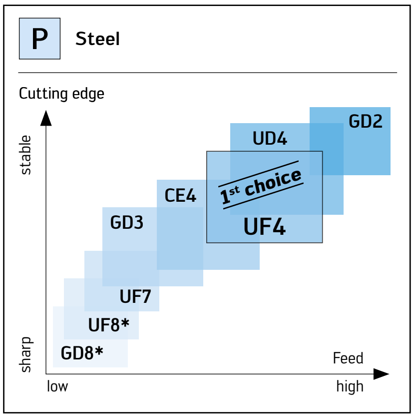
Chip formation Insert width s [mm]	 MX…	 DX…E	 DX…F	 GX…E	 GX…F	 SX…
CK8	–	1,5–2,0	–	2,0–4,0	–	2,0–6,0
GD8 [1]	0,5–3,25	–	–	–	–	–
CF6	–	1,5–3,0	–	1,5–3,0	3,0	1,5–3,0
GD3 [1]	–	2,0–4,0	–	2,0–6,0	–	–
CF5	0,8–5,56	1,5–3,0	3,0	1,5–5,0	3,0–5,0	1,5–6,0
GD6 [1]	–	2,0–4,0	–	2,0–6,0	–	–
CE4	–	1,5–3,0	3,0	1,5–6,0	3,0–4,0	1,5–10,0
F1 [2]	–	–	–	–	2,0–6,0	–

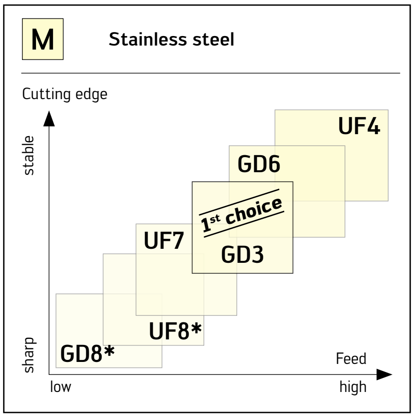
[1] These grooving geometries are suitable for both parting off and grooving.
[2] PCD cutting insert

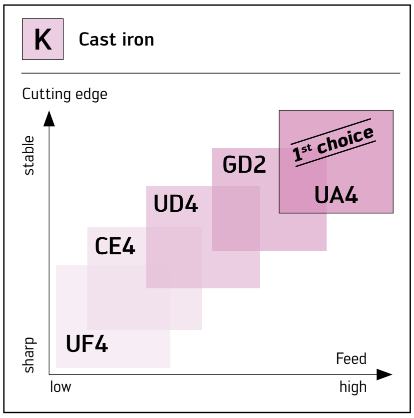


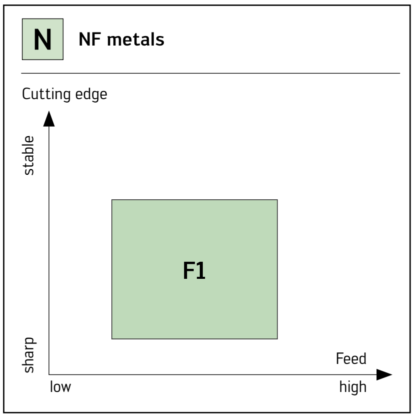
STEP 2 – GROOVING

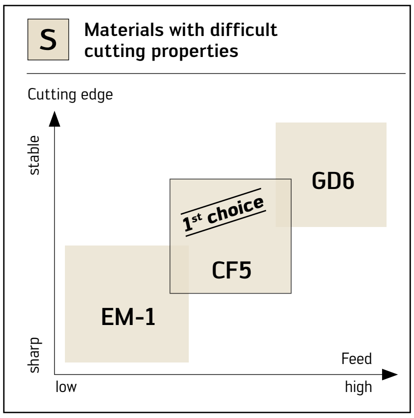
Determine the **cutting insert geometry** via the cutting edge stability and feed.

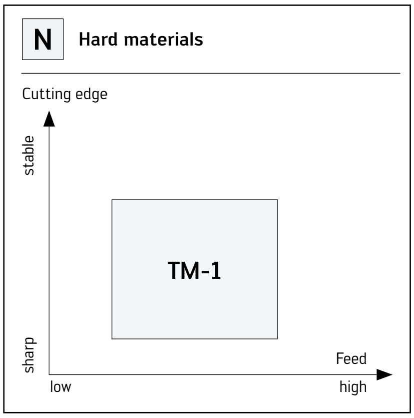








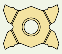
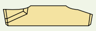
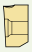




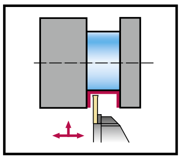
* Fully ground circumference

STEP 3 – GROOVING

Check whether your chosen geometry is available in the required insert width [s].
Identify the available system.

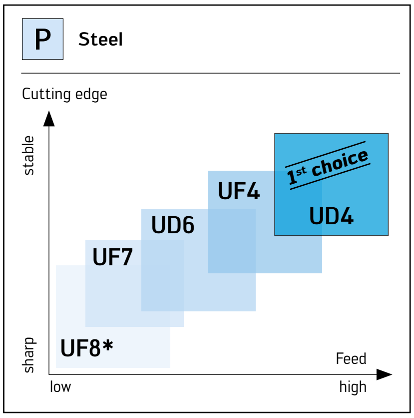
Chip formation Insert width s [mm]	 MX…	 DX…E	 DX…F	 GX…E	 GX…F	 SX…	 UX…
GD8[1]	0,5–3,25	–	–	1,0–1,4	–	–	–
GD3[1]	–	2,0–4,0	–	2,0–6,0	–	–	–
GD6[1]	–	2,0–4,0	–	2,0–6,0	–	–	–
GD2[1]	–	–	–	–	–	–	12,0–19,0
CF5	–	–	3,0	–	–	–	–
CE4[1]	–	1,5–3,0	3,0	1,5–6,0	3,0–4,0	1,5–10,0	–
UF8	–	1,6–4,25		1,7–8,0	–	–	–
UF7	–	2,0–4,0	–	–	–	–	–
UF4	–	2,0–4,0	4,0	2,0–8,0	_	8,0	–
UD4	–	2,0–4,0	–	2,0–8,0	–	–	–
F1[2]	–	–	–	–	2,0–6,0	–	–
EM-1[3]					3,0–6,0		
TM-1[3]					3,0–6,0		

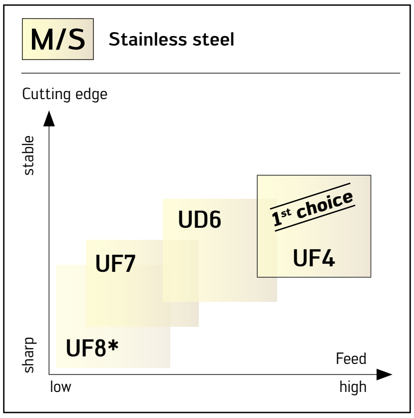
[1] These grooving geometries are suitable for both parting off and grooving.
[2] PCD cutting insert
[3] CBN cutting insert

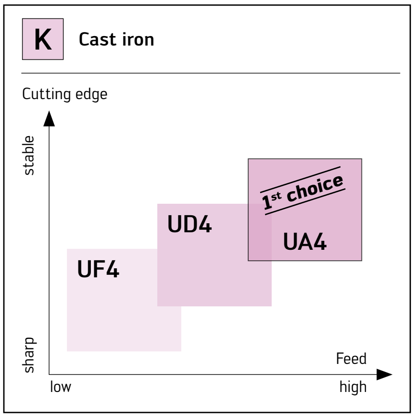


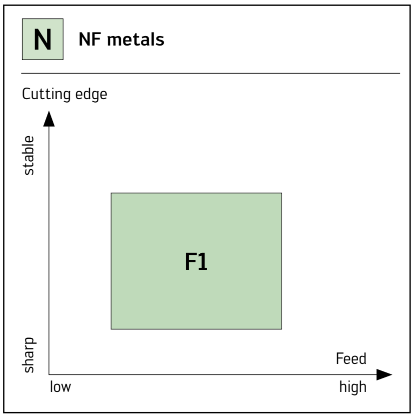
STEP 2 – GROOVE TURNING

Determine the **cutting insert geometry** via the cutting edge stability and feed.





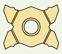
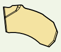




* Fully ground circumference

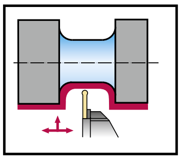
STEP 3 – GROOVE TURNING

Check whether your chosen geometry is available in the required insert width [s].
Identify the available system.

Chip formation Insert width s [mm]	 MX…	 DX…E	 DX…F	 GX…E	 GX…F	 SX…
UF7	–	2,0–4,0	–	–	–	–
UF8	–	1,6–4,25	–	1,7–8,0	–	–
UF4	–	2,0–4,0	–	–	–	–
UD4	–	2,0–4,0	–	–	–	–
UA4	–	2,0–4,0	–	–	–	–
UD6	–	–	–	2,0–6,0	–	–
CF5[1]	0,8–5,56	–	–	–	–	–
UF4	–	–	4,0	2,0–8,0	3,0 - 6,0	8,0
UD4	–	–	–	2,0–8,0	–	–
UA4	–	–	–	2,0–6,0	–	–
F1[2]	–	–	–	–	2,0–6,0	–

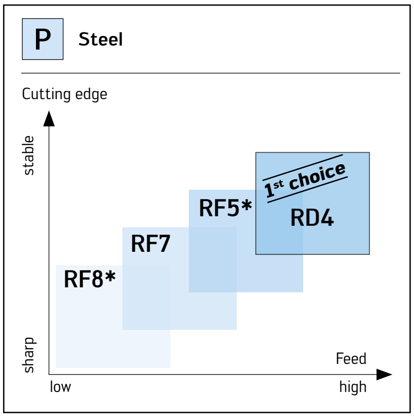
[1] Only for finishing operations with max. $a_p = 0.3 \times s$

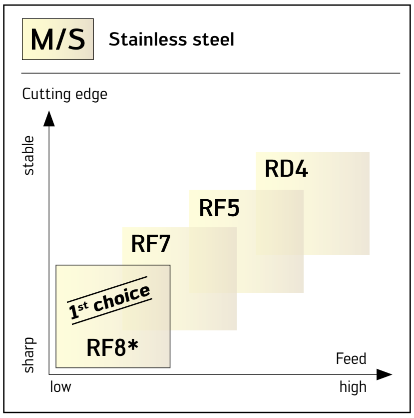
[2] PCD cutting insert

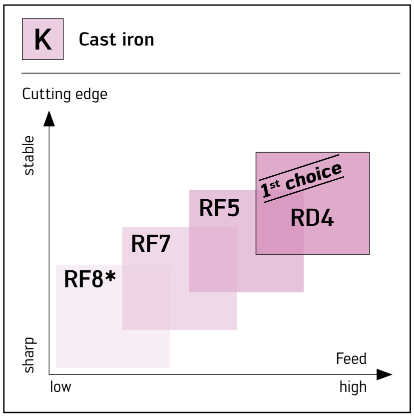


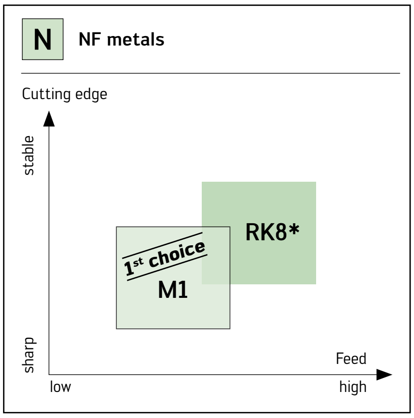
STEP 2 – COPY TURNING

Determine the **cutting insert geometry** via the cutting edge stability and feed.





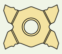
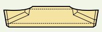
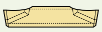
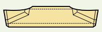
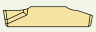




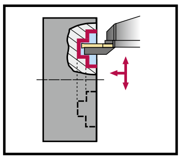
* Fully ground circumference

STEP 3 – COPY TURNING

Check whether your chosen geometry is available in the required insert width [s].
Identify the available system.

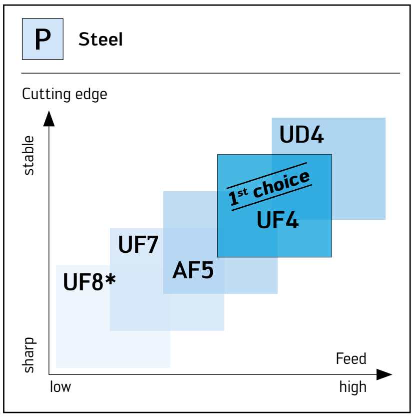
Chip formation Insert width s [mm]	 MX…	 DX…E	 DX…F	 GX…E	 GX…F	 SX…
RK8	–	–	–	6,0–8,0	–	–
RF8	–	–	–	2,0–8,0	–	–
RF7	–	2,0–4,0	–	3,0–5,0	4,0–5,0	–
RF5	1,57–5,0	–	–	–	–	–
RD4	–	–	–	2,0–8,0	–	–
M1[1]	–	–	–	–	2,0–8,0	–

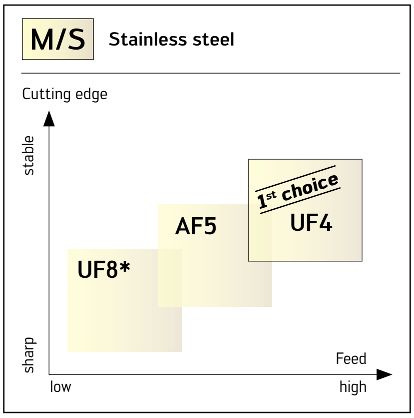
[1] PCD cutting insert

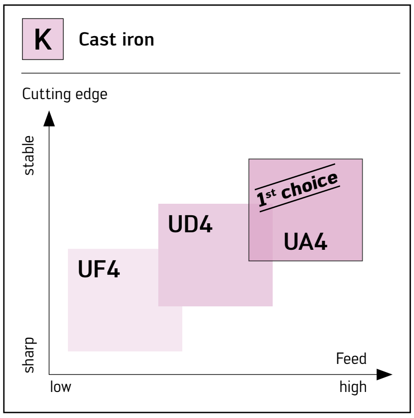


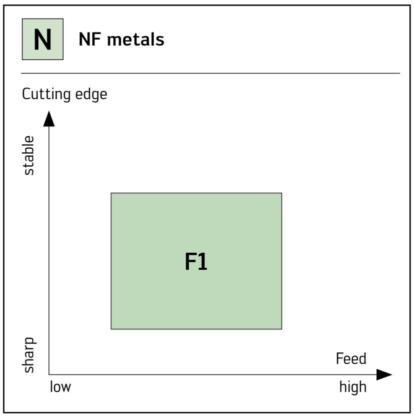
STEP 2 – AXIAL GROOVE TURNING

Determine the **cutting insert geometry** via the cutting edge stability and feed.









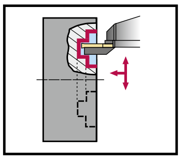
* Fully ground circumference

STEP 3 – AXIAL GROOVE TURNING

Check whether your chosen geometry is available in the required insert width [s].
Identify the available system.

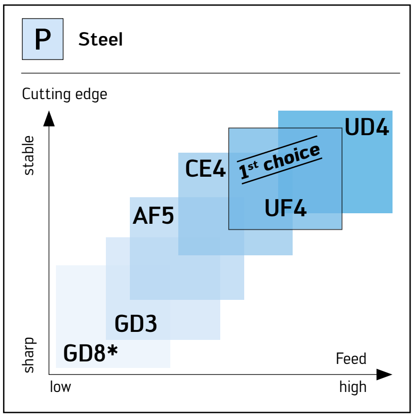
Chip formation Insert width s [mm]	DX…E	DX…F	GX…E	GX…F
UF7	2,0–4,0	–	–	–
UF8	1,6–4,25	–	1,7–8,0	–
AF5	–	–	5,0	5,0
UF4	2,0–4,0	4,0	2,0–8,0	3,0–6,0
UD4	2,0–4,0	–	2,0–8,0	–
UA4	2,0–4,0	–	2,0–6,0	–
F1[1]	–	–	–	2,0–6,0

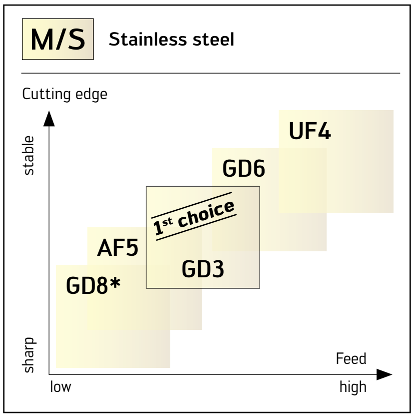
[1] PCD cutting insert

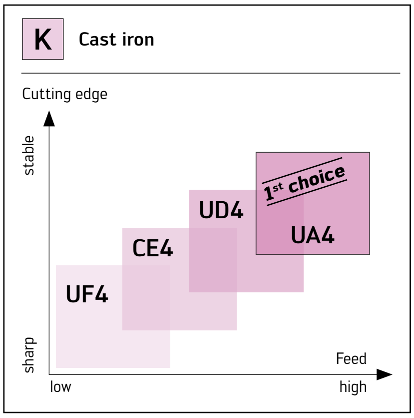


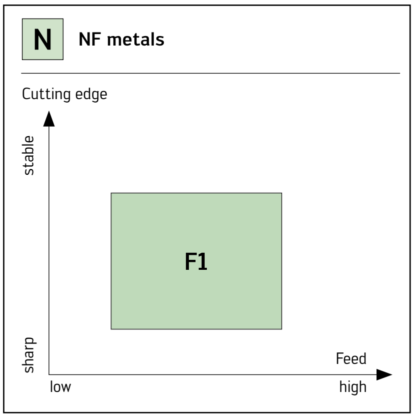
STEP 2 – AXIAL GROOVING

Determine the **cutting insert geometry** via the cutting edge stability and feed.









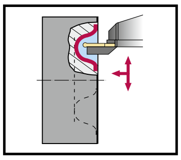
* Fully ground circumference

STEP 3 – AXIAL GROOVING

Check whether your chosen geometry is available in the required insert width [s].
Identify the available system.

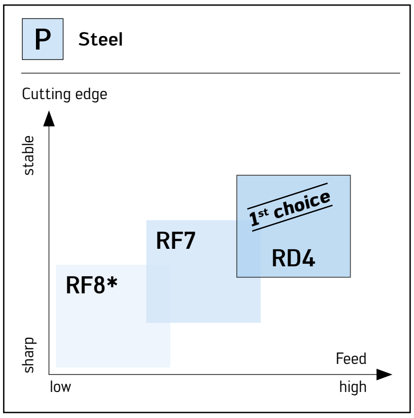
Chip formation Insert width s [mm]	 DX…E	 GX…E	 GX…F
UF7	2,0–4,0	–	–
UF8	1,6–4,25	1,7–8,0	–
GD3	2,0–4,0	–	–
GD6	2,0–4,0	–	–
GD8	–	1,0–1,4	–
GD3	–	2,0–6,0	–
GD6	–	2,0–6,0	–
CE4	1,5–3,0	2,0–6,0	3,0–4,0
UF4	2,0–4,0	2,0–8,0	3,0–6,0
UD4	2,0–4,0	2,0–8,0	–
F1[1]	–	–	2,0–6,0

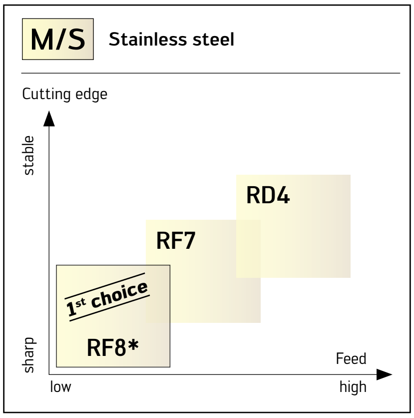
[1] PCD cutting insert

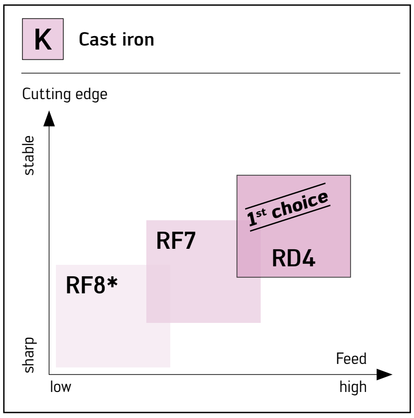


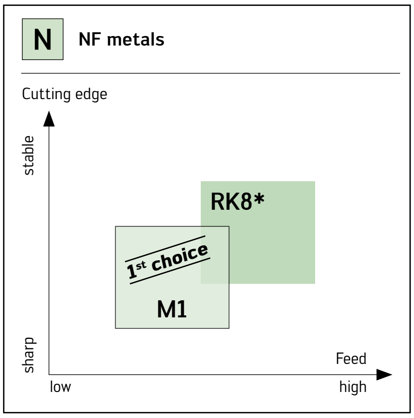
STEP 2 – AXIAL COPY TURNING

Determine the **cutting insert geometry** via the cutting edge stability and feed.









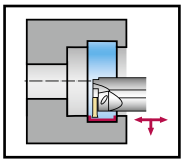
*Fully ground circumference

STEP 3 – AXIAL COPY TURNING

Check whether your chosen geometry is available in the required insert width [s].
Identify the available system.

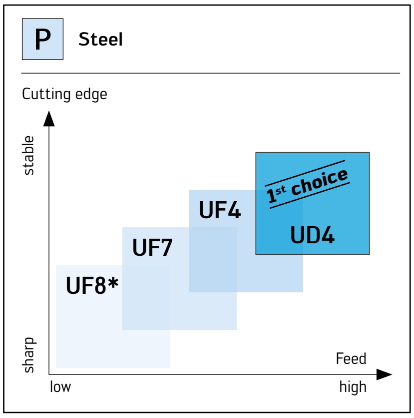
Chip formation Insert width s [mm]	 DX…E	 GX…E	 GX…F
RK8	–	6,0–8,0	–
RF8	–	2,0–8,0	–
RF7	2,0–4,0	3,0–5,0	4,0–5,0
RD4	–	2,0–8,0	–
M1 [1]	–	–	2,0–8,0

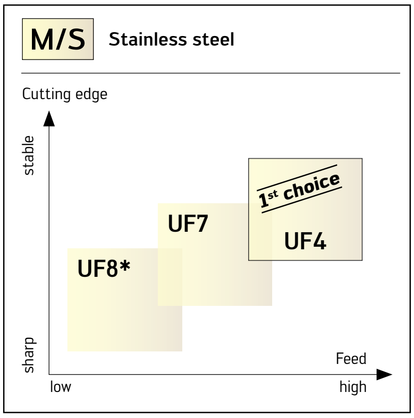
[1] PCD cutting insert

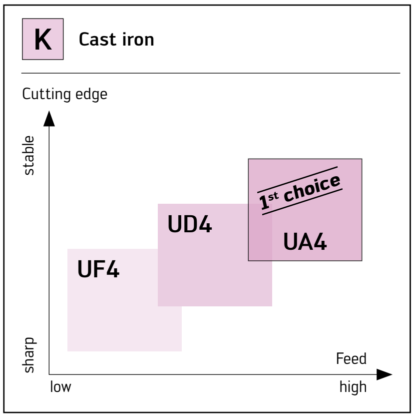


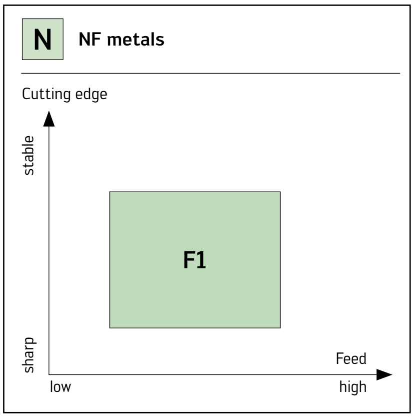
STEP 2 – INTERNAL RECESSING

Determine the **cutting insert geometry** via the cutting edge stability and feed.





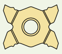




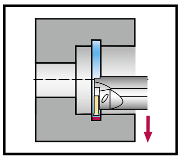
*Fully ground circumference

STEP 3 – INTERNAL RECESSING

Check whether your chosen geometry is available in the required insert width [s].
Identify the available system.

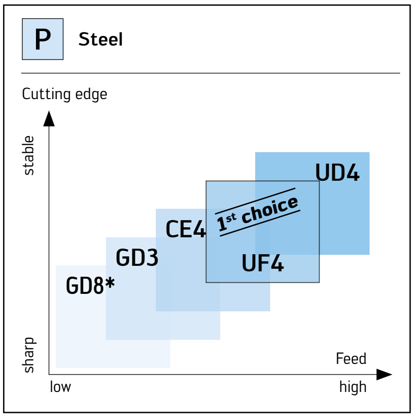
Chip formation Insert width s [mm]	 MX…	 DX…E	 DX…F	 GX…E	 GX…F
UF7	–	2,0–4,0	–	–	–
UF8	–	1,6–4,25	–	1,7–6,0	–
GD3	–	2,0–4,0	–	–	–
GD6	–	2,0–4,0	–	–	–
GD8	–	–	–	–	–
CE4	–	1,5–3,0	–	–	–
CF5	0,8–5,56	–	–	–	–
UF7	–	–	–	–	–
UF4	–	2,0–4,0	4,0	2,0–6,0	3,0–6,0
UD4	–	2,0–4,0	–	2,0–6,0	–
UA4	–	2,0–4,0	–	2,0–6,0	–
F1[1]	–	–	–	–	2,0–6,0

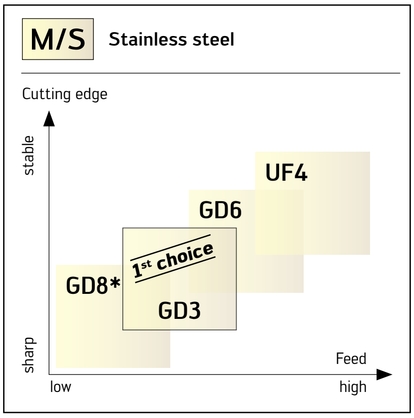
[1] PCD cutting insert

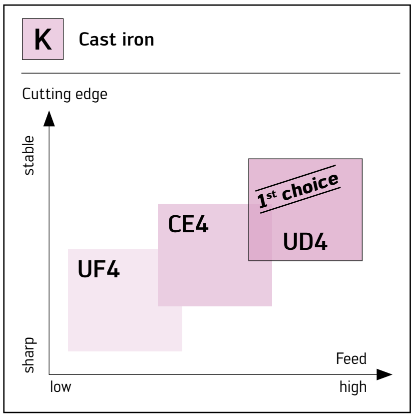


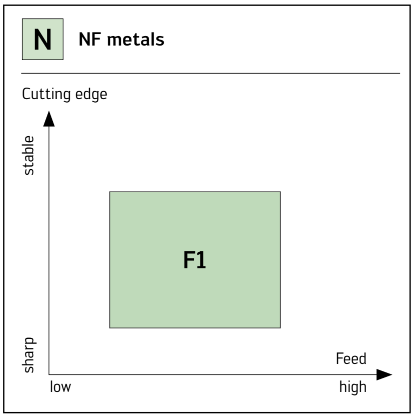
STEP 2 – INTERNAL GROOVING

Determine the **cutting insert geometry** via the cutting edge stability and feed.





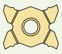




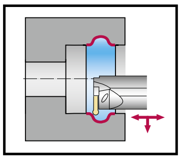
* Fully ground circumference

STEP 3 – INTERNAL GROOVING

Check whether your chosen geometry is available in the required insert width [s].
Identify the available system.

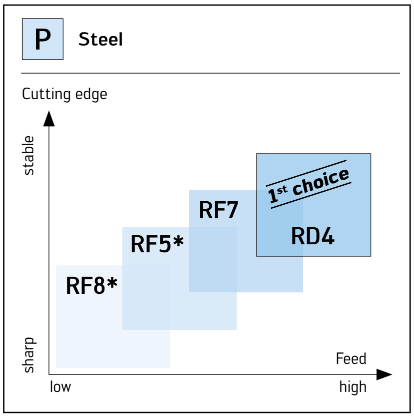
Chip formation Insert width s [mm]	 MX…	 DX…E	 DX…F	 GX…E	 GX…F
GD8	0,5–3,25	–	–	1,0–1,4	–
GD3	–	2,0–4,0	–	2,0–6,0	–
GD6	–	2,0–4,0	–	2,0–6,0	–
CE4	–	1,5–3,0	–	2,0–6,0	3,0–4,0
CF5	0,8–5,56	–	–	–	–
UF4	–	2,0–4,0	4,0	2,0–8,0	3,0–6,0
UF7	–	2,0–4,0	–	–	–
UF8	–	1,6–4,25	–	–	–
UD4	–	2,0–4,0	–	2,0–8,0	–
F1[1]	–	–	–	–	2,0–6,0

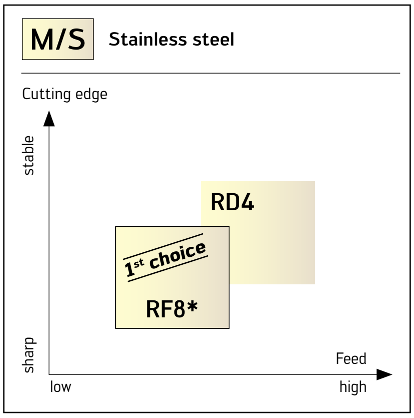
[1] PCD cutting insert

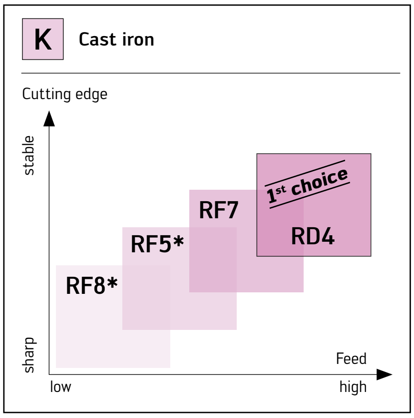


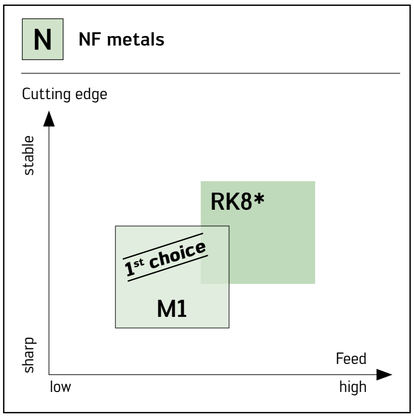
STEP 2 – INTERNAL COPY TURNING

Determine the **cutting insert geometry** via the cutting edge stability and feed.





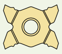




* Fully ground circumference

STEP 3 – INTERNAL COPY TURNING

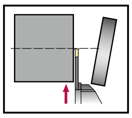
Check whether your chosen geometry is available in the required insert width [s].
Identify the available system.

Chip formation Insert width s [mm]	 MX…	 DX…E	 GX…E	 GX…F
RK8	–	–	6,0–8,0	–
RF8	–	–	2,0–8,0	–
RF5	1,57–5,0	–	–	–
RF7	–	2,0–4,0	3,0–5,0	4,0–5,0
RD4	–	–	2,0–8,0	–
M1[1]	–	–	–	2,0–8,0

[1] PCD cutting insert

Cutting data for Walter Cut

Parting off



= Cutting data for wet machining
= Dry machining is possible

Material group	Overview of the main material groups and code letters			Brinell hardness HB	Tensile strength R_m N/mm^2	Machining group [1]			Cutting material grades		
									Starting values for cutting speed v_c [m/min]		
										HC WKP13S ↑	
									0,1	0,2	0,3
P	Non-alloyed steel	C ≤ 0,25 %	Annealed	125	430	P1	●●	●	210	195	175
		C > 0,25… ≤ 0,55 %	Annealed	190	640	P2	●●	●	190	170	150
		C > 0,25… ≤ 0,55 %	Heat-treated	210	710	P3	●●	●	180	170	155
		C > 0,55 %	Annealed	190	640	P4	●●	●	190	170	155
		C > 0,55 %	Heat-treated	300	1010	P5	●●	●	160	150	135
		Free-machining steel (short-chipping)	Annealed	220	750	P6	●●	●	190	175	160
	Low-alloy steel	Annealed		175	590	P7	●●	●	190	165	140
		Heat-treated		285	960	P8	●●	●	160	150	135
		Heat-treated		380	1280	P9	●●	●	160	140	120
		Heat-treated		430	1480	P10	●●	●	90	65	50
	High-alloy steel and high-alloy tool steel	Annealed		200	680	P11	●●	●	170	145	120
		Hardened and tempered		300	1010	P12	●●	●	150	110	75
		Hardened and tempered		380	1280	P13	●●	●	90	80	65
	Stainless steel	Ferritic/martensitic, annealed		200	680	P14	●●	●	190	180	170
		Martensitic, heat-treated		330	1110	P15	●●	●	120	110	100
M	Stainless steel	Austenitic, quench hardened		200	680	M1					
		Austenitic, precipitation hardened (PH)		300	1010	M2	●●	●	120	110	90
		Austenitic/ferritic, duplex		230	780	M3					
K	Malleable cast iron	Ferritic		200	400	K1	●●	●	180	160	145
		Pearlitic		260	700	K2	●●	●	160	140	125
	Grey cast iron	Low strength		180	200	K3	●●	●	340	285	235
		High strength/austenitic		245	350	K4	●●	●	300	270	240
	Cast iron with spheroidal graphite	Ferritic		155	400	K5	●●	●	290	260	235
		Pearlitic		265	700	K6	●●	●	250	230	210
	CGI			230	400	K7	●●	●		200	180
N	Wrought aluminium alloys	Not hardenable		30	–	N1	●●	●			
		Hardenable, hardened		100	340	N2	●●	●			
	Cast aluminium alloys	≤ 12% Si, not hardenable		75	260	N3	●●	●			
		≤ 12% Si, hardenable, hardened		90	310	N4	●●	●			
		> 12% Si, not hardenable		130	450	N5					
	Magnesium-based alloys			70	250	N6					
	Copper and copper alloys (bronze/brass)	Non-alloyed, electrolytic copper		100	340	N7	●●	●			
		Brass, bronze, red brass		90	310	N8	●●	●			
		Copper alloys, short-chipping		110	380	N9	●●	●			
		High tensile, Ampco		300	1010	N10					
S	Heat-resistant alloys	Fe-based	Annealed	200	680	S1	●●	●			
			Hardened	280	940	S2	●●	●			
		Ni- or Co-based	Annealed	250	840	S3	●●	●			
			Hardened	350	1180	S4	●●	●			
			Cast	320	1080	S5	●●	●			
	Titanium alloys	Pure titanium		200	680	S6	●●	●			
		α and β alloys, hardened		375	1260	S7	●●	●			
		β alloys		410	1400	S8	●●	●			
	Tungsten alloys			300	1010	S9					
	Molybdenum alloys			300	1010	S10					
H	Hardened steel	Hardened and tempered		50 HRC	–	H1	●●	●	55	50	
		Hardened and tempered		55 HRC	–	H2	●●	●	45	40	
		Hardened and tempered		60 HRC	–	H3	●●	●	35	30	
	Hardened cast iron	Hardened and tempered		55 HRC	–	H4	●●	●	45	40	
O	Thermoplastics	Without abrasive fillers				O1	●●	●			
	Thermosetting plastics	Without abrasive fillers				O2	●●	●			
	Plastic, glass-fibre reinforced	GFRP				O3	●●	●			
	Plastic, carbon-fibre reinforced	CFRP				O4	●●	●			
	Plastic, aramid-fibre reinforced	AFRP				O5	●●	●			
	Graphite (technical)			80 Shore		O6	●●	●			

●● Recommended application (the specified cutting data is regarded as starting values for the recommended application)
● Possible application

Note:
– The specified cutting data indicates standard values. For specific applications, adjustment is recommended.
– If dry machining is possible, the tool life is reduced by 20–30% on average.

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[1] The assignment of the machining groups can be found in the “General” section of the Technical Compendium, page F 7.

Cutting material grades																	
Starting values for cutting speed v_c [m/min]																	
HC																	
WKP23S			WKP33S			WSM13S			WSM23S			WSM33S			WSM43S		
	↑			↑			↑			↑			↑			↑	
0,1	0,2	0,3	0,1	0,2	0,3	0,1	0,2	0,3	0,1	0,2	0,3	0,1	0,2	0,3	0,1	0,2	0,3
190	175	160	170	145	120	190	185		180	165	150	170	165	155	160	155	145
170	150	135	160	135	110	170	155		160	145	125	160	150	140	150	140	130
160	150	145	150	130	115	160	150		150	140	130	140	115	95	130	110	90
170	165	155	160	125	100	180	160		170	145	125	160	150	135	150	140	125
140	130	120	140	120	100	150	120		140	110	80	130	95	65	120	85	60
170	165	155	160	155	145	180	165		170	155	135	160	140	125	150	130	115
170	165	155	150	130	110	180	145		170	140	115	150	140	75	140	100	70
140	130	115	140	110	85	150	120		140	110	80	100	75	50	90	65	45
140	120	100	120	95	75	150	120		140	110	80	90	65	45	80	55	35
70	60	50															
160	150	145	150	115	85	130	115		120	90	70	110	90	70	100	80	65
140	125	115	130	110	140	110	90		100	75	60	80	60	40	70	50	35
70	60	50															
170	160	150	150	135	125	180	145		170	130	100	150	110	75	130	95	65
110	100	85	100	95	85	110	90		90	70	50	70	50	35	50	35	25
						170	150		160	130	105	140	110	85	120	95	75
110	90	70	100	90	80	100	80		100	80		70	60		50	40	
						150	140		140	115	90	120	100	80	100	80	65
150	140	130	130	125	115	180	160	145	170	160	140	160	155	135			
120	110	100	90	85	75	160	140	125	150	140	115	140	130	110			
320	310	300	240	235	225	210	175	145	200	195	180	190	185	175			
290	270	245	280	260	235	170	155	135	160	150	125	150	140	115			
280	260	240	270	250	230	210	190	170	200	185	160	190	180	150			
240	215	190	230	205	180	170	155	145	160	145	110	150	135	105			
200	180	160	180	160	140												
						890	730	600	690	590	490						
						590	430	315	470	340	250						
						340	250	180	270	240	150						
						240	180	130	190	150	130						
						390	300	230	310	240	180						
						290	250	215	230	210	190						
						190	150	115	150	130	110						
						100	70		90	70	55	80	55	40	70	50	35
						50	35		40	35	30	30	25	20	20	15	10
						80	60		70	60	50	60	35	20	50	30	15
						70	50		60	50	40	50	35	25	40	30	20
						70	45		60	50	35	50	35	20	40	25	15
						150	140		140	130	120	120	110		110	100	
						35	30		30	25	20	25	20		25	25	
						25	20		20	20	15	15	15				

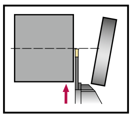
BH = CBN with high CBN content
DP = Polycrystalline diamond

HC = Coated carbide
HW = Uncoated carbide

The specified cutting data are average standard values.
For specific applications, adjustment is recommended.

Cutting data for Walter Cut (continued)

Parting off



= Cutting data for wet machining

= Dry machining is possible

Material group	Overview of the main material groups and code letters			Brinell hardness HB	Tensile strength R_m N/mm²	Machining group ¹			Cutting material grades		
									Starting values for cutting speed v_c [m/min]		
									HW WN13 ↑		
									0,1	0,2	0,4
P	Non-alloyed steel	C ≤ 0,25 %	Annealed	125	430	P1					
		C > 0,25… ≤ 0,55 %	Annealed	190	640	P2					
		C > 0,25… ≤ 0,55 %	Heat-treated	210	710	P3					
		C > 0,55 %	Annealed	190	640	P4					
		C > 0,55 %	Heat-treated	300	1010	P5					
		Free-machining steel (short-chipping)	Annealed	220	750	P6					
	Low-alloy steel	Annealed		175	590	P7					
		Heat-treated		285	960	P8					
		Heat-treated		380	1280	P9					
		Heat-treated		430	1480	P10					
	High-alloy steel and high-alloy tool steel	Annealed		200	680	P11					
		Hardened and tempered		300	1010	P12					
		Hardened and tempered		380	1280	P13					
	Stainless steel	Ferritic/martensitic, annealed		200	680	P14					
		Martensitic, heat-treated		330	1110	P15					
M	Stainless steel	Austenitic, quench hardened		200	680	M1					
		Austenitic, precipitation hardened (PH)		300	1010	M2					
		Austenitic/ferritic, duplex		230	780	M3					
K	Malleable cast iron	Ferritic		200	400	K1	●●	●			
		Pearlitic		260	700	K2	●●	●			
	Grey cast iron	Low strength		180	200	K3	●●	●			
		High strength/austenitic		245	350	K4	●●	●			
	Cast iron with spheroidal graphite	Ferritic		155	400	K5	●●	●			
		Pearlitic		265	700	K6	●●	●			
	CGI			230	400	K7	●●	●			
N	Wrought aluminium alloys	Not hardenable		30	–	N1	●●	●	2390	1790	1290
		Hardenable, hardened		100	340	N2	●●	●	740	590	290
	Cast aluminium alloys	≤ 12% Si, not hardenable		75	260	N3	●●	●	790	440	290
		≤ 12% Si, hardenable, hardened		90	310	N4	●●	●	490	290	190
		> 12% Si, not hardenable		130	450	N5	●●	●			
	Magnesium-based alloys			70	250	N6	●●	●			
	Copper and copper alloys (bronze/brass)	Non-alloyed, electrolytic copper		100	340	N7	●●	●	590	390	260
		Brass, bronze, red brass		90	310	N8	●●	●	390	290	240
		Copper alloys, short-chipping		110	380	N9	●●	●	270	190	120
		High tensile, Ampco		300	1010	N10	●●	●			
S	Heat-resistant alloys	Fe-based	Annealed	200	680	S1	●●	●	60	40	
			Hardened	280	940	S2	●●	●	40	40	
		Ni- or Co-based	Annealed	250	840	S3	●●	●	40	40	
			Hardened	350	1180	S4	●●	●	40	30	
			Cast	320	1080	S5	●●	●	30	20	
	Titanium alloys	Pure titanium		200	680	S6	●●	●	190	170	130
		α and β alloys, hardened		375	1260	S7	●●	●	50	40	
		β alloys		410	1400	S8	●●	●	30	20	
	Tungsten alloys			300	1010	S9	●●	●			
	Molybdenum alloys			300	1010	S10					
H	Hardened steel	Hardened and tempered		50 HRC	–	H1	●●	●			
		Hardened and tempered		55 HRC	–	H2	●●	●			
		Hardened and tempered		60 HRC	–	H3	●●	●			
	Hardened cast iron	Hardened and tempered		55 HRC	–	H4	●●	●			
O	Thermoplastics	Without abrasive fillers				O1	●●	●			
	Thermosetting plastics	Without abrasive fillers				O2	●●	●			
	Plastic, glass-fibre reinforced	GFRP				O3	●●	●			
	Plastic, carbon-fibre reinforced	CFRP				O4	●●	●			
	Plastic, aramid-fibre reinforced	AFRP				O5	●●	●			
	Graphite (technical)			80 Shore		O6	●●	●			

●● Recommended application (the specified cutting data is regarded as starting values for the recommended application)

● Possible application

Note:
– The specified cutting data indicates standard values. For specific applications, adjustment is recommended.
– If dry machining is possible, the tool life is reduced by 20–30% on average.

[1] The assignment of the machining groups can be found in the “General” section of the Technical Compendium, page F 7.

Cutting material grades								
Starting values for cutting speed v_c [m/min]								
DP			BH					
WDN10			WBS10			WBH20		
↑			↑			↑		
0,1	0,2	0,4	0,05	0,15	0,2	0,05	0,15	0,2
			1500	1300	1000			
			1300	1100	900			
			1700	1450	1200			
			1450	1250	1050			
			400	300	200			
			300	200	100			
			200	150	100			
2990	2790	2190						
1990	1790	1390						
2190	1990	1590						
1790	1590	1190						
490	440	290						
1790	1590	1190						
990	890	690						
690	640	490						
640	540	390						
390	290	140						
			270	210	190			
			270	210	190			
			270	210	190			
290	210	190						
20	15	5						
			200			240	190	170
			170			210	170	140
			150			190	140	110
			200			190	140	110
1490	1190	790						
1490	1190	790						
990	890	690						
790	690	490						
790	690	490						
390	290	140						

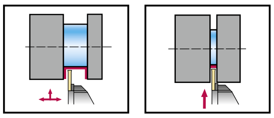
BH = CBN with high CBN content
DP = Polycrystalline diamond

HC = Coated carbide
HW = Uncoated carbide

The specified cutting data are average standard values.
For specific applications, adjustment is recommended.

Cutting data for Walter Cut

Grooving and groove turning



🚰 = Cutting data for wet machining

🚰✗ = Dry machining is possible

Material group	Overview of the main material groups and code letters			Brinell hardness HB	Tensile strength R_m N/mm^2	Machining group [1]	🚰	🚰✗	Cutting material grades Starting values for cutting speed v_c [m/min] HC WKP13S		
									0,1	0,2	0,3
P	Non-alloyed steel	C ≤ 0,25 %	Annealed	125	430	P1	●●	●	220	205	185
		C > 0,25… ≤ 0,55 %	Annealed	190	640	P2	●●	●	200	180	160
		C > 0,25… ≤ 0,55 %	Heat-treated	210	710	P3	●●	●	190	180	165
		C > 0,55 %	Annealed	190	640	P4	●●	●	200	180	165
		C > 0,55 %	Heat-treated	300	1010	P5	●●	●	170	160	145
		Free-machining steel (short-chipping)	Annealed	220	750	P6	●●	●	200	185	170
	Low-alloy steel	Annealed		175	590	P7	●●	●	200	175	150
		Heat-treated		285	960	P8	●●	●	170	160	145
		Heat-treated		380	1280	P9	●●	●	170	150	130
		Heat-treated		430	1480	P10	●●	●	100	75	60
	High-alloy steel and high-alloy tool steel	Annealed		200	680	P11	●●	●	180	155	130
		Hardened and tempered		300	1010	P12	●●	●	160	120	85
		Hardened and tempered		380	1280	P13	●●	●	100	90	75
	Stainless steel	Ferritic/martensitic, annealed		200	680	P14	●●	●	200	190	180
		Martensitic, heat-treated		330	1110	P15	●●	●	130	120	110
M	Stainless steel	Austenitic, quench hardened		200	680	M1	●●	●	130	120	100
		Austenitic, precipitation hardened (PH)		300	1010	M2					
		Austenitic/ferritic, duplex		230	780	M3					
K	Malleable cast iron	Ferritic		200	400	K1	●●	●	190	170	155
		Pearlitic		260	700	K2	●●	●	170	150	135
	Grey cast iron	Low strength		180	200	K3	●●	●	350	295	245
		High strength/austenitic		245	350	K4	●●	●	310	280	250
	Cast iron with spheroidal graphite	Ferritic		155	400	K5	●●	●	300	270	245
		Pearlitic		265	700	K6	●●	●	260	240	220
	CGI			230	400	K7	●●	●	220	200	180
N	Wrought aluminium alloys	Not hardenable		30	–	N1	●●	●			
		Hardenable, hardened		100	340	N2	●●	●			
	Cast aluminium alloys	≤ 12% Si, not hardenable		75	260	N3	●●	●			
		≤ 12% Si, hardenable, hardened		90	310	N4	●●	●			
		> 12% Si, not hardenable		130	450	N5					
	Magnesium-based alloys			70	250	N6					
	Copper and copper alloys (bronze/brass)	Non-alloyed, electrolytic copper		100	340	N7	●●	●			
		Brass, bronze, red brass		90	310	N8	●●	●			
		Copper alloys, short-chipping		110	380	N9	●●	●			
		High tensile, Ampco		300	1010	N10					
S	Heat-resistant alloys	Fe-based	Annealed	200	680	S1	●●	●			
			Hardened	280	940	S2	●●	●			
		Ni- or Co-based	Annealed	250	840	S3	●●	●			
			Hardened	350	1180	S4	●●	●			
			Cast	320	1080	S5	●●	●			
	Titanium alloys	Pure titanium		200	680	S6	●●	●			
		α and β alloys, hardened		375	1260	S7	●●	●			
		β alloys		410	1400	S8	●●	●			
	Tungsten alloys			300	1010	S9					
	Molybdenum alloys			300	1010	S10					
H	Hardened steel	Hardened and tempered		50 HRC	–	H1	●●	●	55	50	
		Hardened and tempered		55 HRC	–	H2	●●	●	45	40	
		Hardened and tempered		60 HRC	–	H3	●●	●	35	30	
	Hardened cast iron	Hardened and tempered		55 HRC	–	H4	●●	●	45	40	
O	Thermoplastics	Without abrasive fillers				O1					
	Thermosetting plastics	Without abrasive fillers				O2					
	Plastic, glass-fibre reinforced	GFRP				O3					
	Plastic, carbon-fibre reinforced	CFRP				O4					
	Plastic, aramid-fibre reinforced	AFRP				O5					
	Graphite (technical)			80 Shore		O6					

●● Recommended application (the specified cutting data is regarded as starting values for the recommended application)
● Possible application

Note:
– The specified cutting data indicates standard values. For specific applications, adjustment is recommended.
– If dry machining is possible, the tool life is reduced by 20–30% on average.

[1] The assignment of the machining groups can be found in the "General" section of the Technical Compendium, page F 7.

Cutting material grades																	
Starting values for cutting speed v_c [m/min]																	
HC																	
WKP23S			WKP33S			WSM13S			WSM23S			WSM33S			WSM43S		
0,1	0,2	0,3	0,1	0,2	0,3	0,1	0,2	0,3	0,1	0,2	0,3	0,1	0,2	0,3	0,1	0,2	0,3
200	185	170	180	155	130	200	195		190	175	160	180	175	165	170	165	155
180	160	145	170	145	120	180	165		170	155	135	170	160	150	160	150	140
170	160	155	160	140	125	170	160		160	150	140	150	125	105	140	120	100
180	175	165	170	135	110	190	170		180	155	135	170	160	145	160	150	135
150	140	130	150	130	110	160	130		150	120	90	140	105	75	130	95	70
180	175	165	170	165	155	190	175		180	165	145	170	150	135	160	140	125
180	175	165	160	140	120	190	155		180	150	125	160	150	85	150	110	80
150	140	125	150	120	95	160	130		150	120	90	110	85	60	100	75	55
150	130	110	130	105	85	160	130		150	120	90	100	75	55	90	65	45
80	70	60															
170	160	155	160	125	95	140	125		130	100	80	120	100	80	110	90	75
150	135	125	140	120	150	120	100		110	85	70	90	70	50	80	60	45
80	70	60															
180	170	160	160	145	135	190	155		180	140	110	160	120	85	140	105	75
120	110	95	110	105	95	120	100		100	80	60	80	60	45	60	45	35
						190	160		170	140	115	150	120	95	130	105	85
120	100	80	110	100	80	120	105		100	90		80	70		60	50	
						170	150		150	125	100	130	110	90	110	90	75
160	150	140	140	135	125	190	170	155	180	170	150	170	165	145			
130	120	110	100	95	85	170	150	135	160	150	125	150	140	120			
330	320	310	250	245	235	220	185	155	210	205	190	200	195	185			
300	280	255	290	270	245	180	165	145	170	160	135	160	150	125			
290	270	250	280	260	240	220	200	180	210	195	170	200	190	160			
250	225	200	240	215	190	180	165	155	170	155	120	160	145	115			
200	180	160	180	160	140												
						900	740	610	700	600	500						
						600	440	325	480	350	260						
						350	260	190	280	250	160						
						250	190	140	200	160	140						
						400	310	240	320	250	190						
						300	260	225	240	220	200						
						200	160	125	160	140	120						
						110	80		100	80	65	90	65	50	80	60	45
						60	45		50	45	40	40	35	30	30	25	20
						90	70		80	70	60	70	45	30	60	40	25
						80	60		70	60	50	60	45	35	50	40	30
						80	55		70	60	45	60	45	30	50	35	25
						160	150		150	140	130	130	120		120	110	
						45	40		40	35	30	35	30		30	30	
						35	30		30	30	25	25	25				

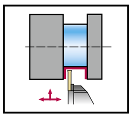
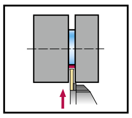
BH = CBN with high CBN content
DP = Polycrystalline diamond

HC = Coated carbide
HW = Uncoated carbide

The specified cutting data are average standard values.
For specific applications, adjustment is recommended.

Cutting data for Walter Cut (continued)

Grooving and groove turning

= Cutting data for wet machining
= Dry machining is possible

Material group	Overview of the main material groups and code letters			Brinell hardness HB	Tensile strength R_m N/mm²	Machining group [1]			Cutting material grades Starting values for cutting speed v_c [m/min] HW WN13		
									0,1	0,2	0,4
P	Non-alloyed steel	C ≤ 0,25 %	Annealed	125	430	P1					
		C > 0,25… ≤ 0,55 %	Annealed	190	640	P2					
		C > 0,25… ≤ 0,55 %	Heat-treated	210	710	P3					
		C > 0,55 %	Annealed	190	640	P4					
		C > 0,55 %	Heat-treated	300	1010	P5					
		Free-machining steel (short-chipping)	Annealed	220	750	P6					
	Low-alloy steel	Annealed		175	590	P7					
		Heat-treated		285	960	P8					
		Heat-treated		380	1280	P9					
		Heat-treated		430	1480	P10					
	High-alloy steel and high-alloy tool steel	Annealed		200	680	P11					
		Hardened and tempered		300	1010	P12					
		Hardened and tempered		380	1280	P13					
	Stainless steel	Ferritic/martensitic, annealed		200	680	P14					
		Martensitic, heat-treated		330	1110	P15					
M	Stainless steel	Austenitic, quench hardened		200	680	M1					
		Austenitic, precipitation hardened (PH)		300	1010	M2					
		Austenitic/ferritic, duplex		230	780	M3					
K	Malleable cast iron	Ferritic		200	400	K1	●●	●			
		Pearlitic		260	700	K2	●●	●			
	Grey cast iron	Low strength		180	200	K3	●●	●			
		High strength/austenitic		245	350	K4	●●	●			
	Cast iron with spheroidal graphite	Ferritic		155	400	K5	●●	●			
		Pearlitic		265	700	K6	●●	●			
	CGI			230	400	K7	●●	●			
N	Wrought aluminium alloys	Not hardenable		30	–	N1	●●	●	2400	1800	1300
		Hardenable, hardened		100	340	N2	●●	●	750	600	300
	Cast aluminium alloys	≤ 12% Si, not hardenable		75	260	N3	●●	●	800	450	300
		≤ 12% Si, hardenable, hardened		90	310	N4	●●	●	500	300	200
		> 12% Si, not hardenable		130	450	N5	●●	●			
	Magnesium-based alloys			70	250	N6	●●	●			
	Copper and copper alloys (bronze/brass)	Non-alloyed, electrolytic copper		100	340	N7	●●	●	600	400	270
		Brass, bronze, red brass		90	310	N8	●●	●	400	300	250
		Copper alloys, short-chipping		110	380	N9	●●	●	280	200	130
		High tensile, Ampco		300	1010	N10	●●	●			
S	Heat-resistant alloys	Fe-based	Annealed	200	680	S1	●●	●	70	50	
			Hardened	280	940	S2	●●	●	50	50	
		Ni- or Co-based	Annealed	250	840	S3	●●	●	50	50	
			Hardened	350	1180	S4	●●	●	50	40	
			Cast	320	1080	S5	●●	●	40	30	
	Titanium alloys	Pure titanium		200	680	S6	●●	●	200	180	140
		α and β alloys, hardened		375	1260	S7	●●	●	60	50	
		β alloys		410	1400	S8	●●	●	40	30	
	Tungsten alloys			300	1010	S9	●●	●			
	Molybdenum alloys			300	1010	S10					
H	Hardened steel	Hardened and tempered		50 HRC	–	H1	●●	●			
		Hardened and tempered		55 HRC	–	H2	●●	●			
		Hardened and tempered		60 HRC	–	H3	●●	●			
	Hardened cast iron	Hardened and tempered		55 HRC	–	H4	●●	●			
O	Thermoplastics	Without abrasive fillers				O1	●●	●			
	Thermosetting plastics	Without abrasive fillers				O2	●●	●			
	Plastic, glass-fibre reinforced	GFRP				O3	●●	●			
	Plastic, carbon-fibre reinforced	CFRP				O4	●●	●			
	Plastic, aramid-fibre reinforced	AFRP				O5	●●	●			
	Graphite (technical)			80 Shore		O6	●●	●			

●● Recommended application (the specified cutting data is regarded as starting values for the recommended application)
● Possible application

Note:
– The specified cutting data indicates standard values. For specific applications, adjustment is recommended.
– If dry machining is possible, the tool life is reduced by 20–30% on average.

[1] The assignment of the machining groups can be found in the "General" section of the Technical Compendium, page F 7.

Cutting material grades								
Starting values for cutting speed v_c [m/min]								
DP			BH					
WDN10			WBS10			WBH20		
0,1	0,2	0,4	0,05	0,15	0,2	0,05	0,15	0,2
			1500	1300	1000			
			1300	1100	900			
			1700	1450	1200			
			1450	1250	1050			
			400	300	200			
			300	200	100			
			200	150	100			
3000	2800	2200						
2000	1800	1400						
2200	2000	1600						
1800	1600	1200						
500	450	300						
1800	1600	1200						
1000	900	700						
700	650	500						
650	550	400						
400	300	150						
			280	220	200			
			280	220	200			
			280	220	200			
300	220	200						
30	25	15						
			200			250	200	180
			170			220	180	150
			150			200	150	120
			200			200	150	120
1500	1200	800						
1500	1200	800						
1000	900	700						
800	700	500						
800	700	500						
400	300	150						

BH = CBN with high CBN content
DP = Polycrystalline diamond

HC = Coated carbide
HW = Uncoated carbide

The specified cutting data are average standard values.
For specific applications, adjustment is recommended.

Cutting tool material application charts – Grooving

Carbide

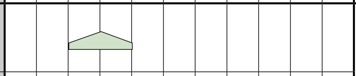
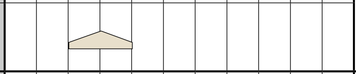
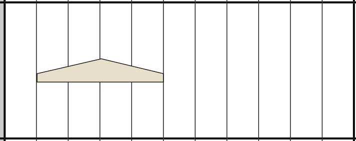
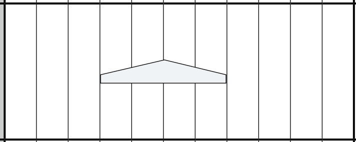
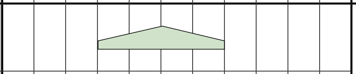
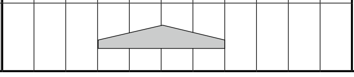
Walter grade designation	Standard designation	P Steel	M Stainless steel	K Cast iron	N NF metals	S Materials with difficult cutting properties	H Hard materials	O Other	Application range	Coating process	Coating composition	Example of indexable insert
WSM13S	HC – M 10		●●						01–20	PVD	TiAlN + Al_2O_3 (Al)	
	HC – S 10					●●			01–20			
	HC – P 10	●							05–15			
	HC – N 10				●				05–15			
WSM23S	HC – M 20		●●						10–30	PVD	TiAlN + Al_2O_3 (Al)	
	HC – S 20					●●			10–30			
	HC – P 20	●●							10–30			
	HC – N 20				●				15–25			
WSM33S	HC – S 30					●●			20–40	PVD	TiAlN + Al_2O_3 (Al)	
	HC – M 30		●●						20–40			
	HC – P 30	●●							20–40			
WSM43S	HC – S 45					●●			35–45	PVD	TiAlN + Al_2O_3 (Al)	
	HC – M 45		●●						35–45			
	HC – P 45	●●							35–45			
WKP13S	HC – P 10	●●							01–20	CVD	TiCN + Al_2O_3 (+ TiCN)	
	HC – K 20			●●					10–30			
	HC – H 10						●		05–15			
WKP23S	HC – P 20	●●							10–30	CVD	TiCN + Al_2O_3 (+ TiCN)	
	HC – K 25			●●					15–35			
WKP33S	HC – P 30	●●							20–40	CVD	TiCN + Al_2O_3 (+ TiCN)	
	HC – K 30			●●					20–40			

HC = Coated carbide
HW = Uncoated carbide

●● Primary application
● Additional application

Cutting tool material application charts – Grooving (continued)

Uncoated carbide/CBN/PCD

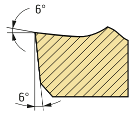
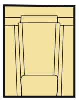
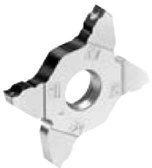
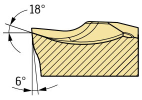
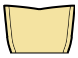
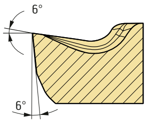
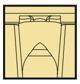
Walter grade designation	Standard designation	Material groups							Application range	Coating process	Coating compo-sition	Example of indexable insert
		P Steel	M Stainless steel	K Cast iron	N NF metals	S Materials with difficult cutting properties	H Hard materials	O Other	01 05 10 15 20 25 30 35 40 45			
WN13	HW – N 10				●●					—	—	
	HW – S 10					●						
WBS10	BH – S 10					●●				—	CBN	
WBH20	BL – H 20						●●			—	CBN	
WDN10	DP – N 20				●●					—	PCD	
	DP – O 20							●●				

HW = Uncoated carbide
BH = CBN with high CBN content
BL = CBN with low CBN content
DP = Polycrystalline diamond

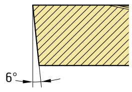
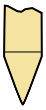
●● Primary application
● Additional application

Geometry overview of cutting inserts

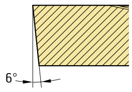
MX system: Grooving and parting off

Geometry	Remarks/ application area	Material groups							Main cutting edge section	View of main cutting edge	s [mm]	f [mm]
		P	**M**	**K**	**N**	**S**	**H**	**O**				
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other				
	**GD8** – For DIN 471 circlip grooves with the tolerance class H13 – Fully ground circumference – For precision grooving – Extremely soft cutting action – Light to moderate feeds	●●	●	●	●	●					1	0,03–0,06
											1,5	0,03–0,09
											2	0,04–0,10
											2,5	0,04–0,14
											3	0,04–0,14
	**CF5** – Grooving and parting-off operations – Fully ground circumference – Light to moderate feeds – Excellent chip control – Low burr/pip formation	●●	●●	●	●	●●					1	0,03–0,07
											1,5	0,03–0,10
											2	0,04–0,14
											2,5	0,04–0,16
											3	0,04–0,16
											4	0,10–0,20
											5	0,10–0,25
	**RF5** – For full radius recesses – Fully ground circumference – For light to moderate feeds	●●	●●	●	●	●●					2	0,04–0,14
											2,5	0,04–0,18
											3	0,04–0,20
											4	0,10–0,20
											5	0,10–0,20

MX system: Thread turning

Geometry	Remarks/ application area	P	M	K	N	S	H	O	Main cutting edge section	View of main cutting edge	s [mm]	f [mm]
	**AG60** – For thread turning operations where space is limited – Thread turning with the same basic holder – 60° partial profile external thread – Pitch range 0.5–3.0 mm	●●	●●	●	●	●●					3,35	0,5–1,5
											5,65	0,5–3,0

MX system: Groove turning

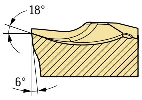
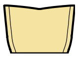
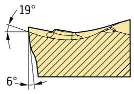
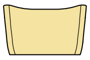
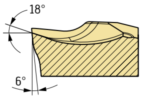
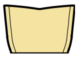
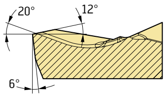
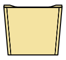
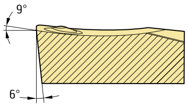
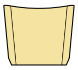
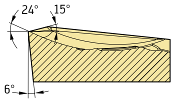
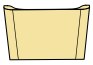
Geometry	Remarks/ application area	Material groups							Main cutting edge section	View of main cutting edge	s [mm]	a_p [mm]	f [mm]
		P	**M**	**K**	**N**	**S**	**H**	**O**					
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other					
	**VG8** – For finishing operations on the rear side of a component, particularly on multi-spindle machines – Fully ground circumference – Enormous savings on material compared to standard ISO indexable inserts	●●	●●	●	●●	●●					2,8	0,2–2,5	0,05–0,25

Additional shapes via Walter Xpress

●● Primary application
● Additional application

Geometry overview of cutting inserts (continued)

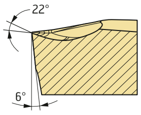
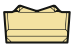
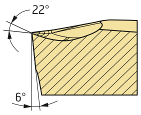
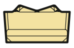
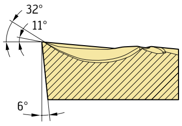
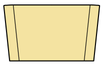
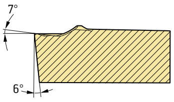
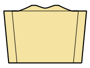
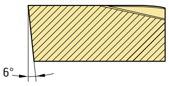
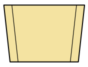
DX system: Grooving and parting off

Geometry	Remarks/ application area	Material groups							Main cutting edge section	View of main cutting edge	s [mm]	f [mm]
		P	M	K	N	S	H	O				
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other				
	**CK8** – Grooving and parting-off operations – Fully ground circumference – Light to moderate feeds – Good chip control – Low burr/pip formation – Polished rake face		●		●●	●					1,5	0,04–0,10
											2	0,04–0,15
	**CF6** – Low feeds – Low burr/pip formation – Low cutting force	●●	●●		●●	●●		●			1,0	0,03–0,10
											1,5	0,03–0,12
											2	0,03–0,14
											2,5	0,03–0,18
											3	0,04–0,23
	**CF5** – Grooving and parting-off operations – Light to moderate feeds – Good chip control – Low burr/pip formation	●●	●●	●	●●	●●		●			1,0	0,03–0,10
											1,5	0,03–0,12
											2	0,04–0,15
											2,5	0,05–0,18
											3	0,08–0,23
	**CE4** – Grooving and parting-off operations – Moderate to high feeds – Good chip constriction – Stable cutting edge	●●	●	●●	●	●	●				1,2	0,04–0,13
											1,5	0,03–0,12
											2	0,06–0,17
											2,5	0,07–0,21
											3	0,09–0,33
	**GD3** – Extremely soft cutting action – Light to moderate feeds – General grooving and parting-off operations	●●	●●	●	●	●		●			2	0,04–0,15
											2,5	0,04–0,17
											3	0,06–0,21
											4	0,10–0,23
	**GD6** – Moderate feeds – Long-chipping materials – Medium machining conditions	●●	●●	●	●	●●					2	0,04–0,14
											2,5	0,06–0,20
											3	0,08–0,21
											4	0,10–0,25

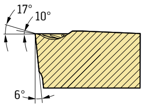
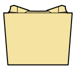
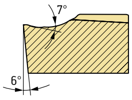
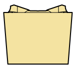
●● Primary application
● Additional application

Geometry overview of cutting inserts (continued)

DX system: Grooving, parting off and groove turning

Geometry	Remarks/ application area	Material groups							Main cutting edge section	View of main cutting edge	s [mm]	a_p [mm]	f [mm]
		P	M	K	N	S	H	O					
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other					
	**UF8** – All grooving operations – Fully ground circumference – Excellent chip control – Low to average feed range – For DIN 471 circlip grooves with the tolerance class H13	●●	●●	●	●●	●●					1,6	0,3–1,0	0,05–0,17
											2	0,3–1,2	0,05–0,22
											3	0,4–1,5	0,07–0,24
											4	0,3–2,2	0,07–0,30
											5	0,3–2,6	0,11–0,35
	**UF7** – All grooving operations – Excellent chip control – Low to average feed range	●●	●●	●	●●	●●					2	0,3–1,2	0,05–0,22
											3	0,4–1,5	0,07–0,24
											4	0,3–2,2	0,07–0,30
	**UF4** – All grooving operations – Good chip control – Average feed range – Positive cut	●●	●●	●●	●	●					2	0,3–1,2	0,10–0,18
											2,5	0,3–1,3	0,10–0,21
											3	0,4–2,0	0,10–0,23
											4	0,3–2,8	0,10–0,33
	**UD4** – Large chip breaking range – Optimum chip breaking when machining forged parts – Stable cutting edge – For moderate to high feeds	●●	●	●●							2	0,3–1,2	0,10–0,18
											3	0,4–2,0	0,10–0,23
											4	0,5–2,8	0,10–0,33
	**UA4** – For cast iron machining – For moderate to high machining parameters – For maximum process reliability in cast iron machining			●●			●				2	0,3–1,2	0,08–0,18
											3	0,4–2,0	0,10–0,25
											4	0,5–2,8	0,10–0,38

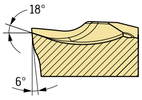
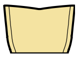
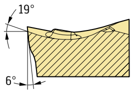
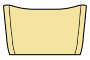
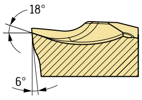
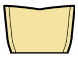
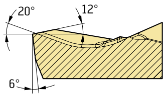
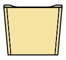
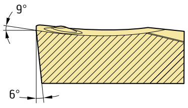
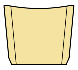
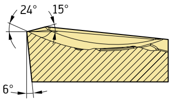
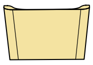
DX system: Full radius cutting inserts for grooving and copy turning

	**RF7** – For copy and relief turning – High surface quality – Stable cutting edge	●●	●●	●	●	●●					2	0,1–1,0	0,08–0,26
											3	0,1–1,5	0,10–0,33
											4	0,1–2,0	0,12–0,48
	**RD4** – For copy turning – Outstanding chip control when grooving – For moderate to high feeds – Fully sintered circumference	●●	●	●●		●					2	0,2–1,0	0,08–0,28
											3	0,5–1,5	0,10–0,38

●● Primary application
● Additional application

Geometry overview of cutting inserts (continued)

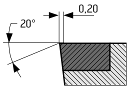
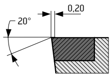
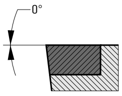
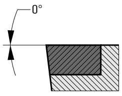
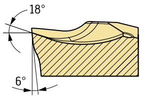
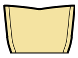
GX system: Grooving and parting off

Geometry	Remarks/ application area	Material groups							Main cutting edge section	View of main cutting edge	s [mm]	f [mm]
		P	M	K	N	S	H	O				
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other				
	**CK8** – Grooving and parting-off operations – Fully ground circumference – Light to moderate feeds – Good chip control – Low burr/pip formation – Polished rake face		●		●●	●					2	0,04–0,15
											2,5	0,05–0,15
											3	0,08–0,20
											4	0,10–0,22
											5	0,10–0,25
	**CF6** – Low feeds – Low burr/pip formation – Low cutting force	●●	●●		●●	●●		●			1,5	0,03–0,10
											2	0,03–0,12
											2,5	0,03–0,15
											3	0,04–0,20
	**CF5** – Grooving and parting-off operations – Light to moderate feeds – Good chip control – Low burr/pip formation	●●	●●	●	●●	●●		●			2	0,04–0,15
											2,5	0,05–0,15
											3	0,08–0,20
											4	0,10–0,22
											5	0,10–0,25
	**CE4** – Grooving and parting-off operations – Moderate to high feeds – Good chip constriction – Stable cutting edge	●●	●	●●	●	●	●				2	0,06–0,15
											2,5	0,07–0,18
											3	0,09–0,30
											4	0,10–0,32
											5	0,12–0,35
											6	0,12–0,40
	**GD3** – Extremely soft cutting action – Light to moderate feeds – General parting-off and grooving operations	●●	●●	●	●	●		●			2	0,04–0,12
											2,5	0,06–0,14
											3	0,06–0,18
											4	0,10–0,20
											5	0,12–0,25
											6	0,14–0,28
	**GD6** – Moderate feeds – Long-chipping materials – Medium machining conditions	●●	●●	●	●	●●					2	0,04–0,12
											2,5	0,06–0,17
											3	0,08–0,18
											4	0,10–0,22
											5	0,12–0,24
											6	0,14–0,30

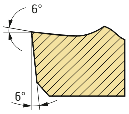
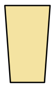
●● Primary application
● Additional application

Geometry overview of cutting inserts (continued)

GX system: Grooving and parting off

Geometry	Remarks/ application area	Material groups							Main cutting edge section	View of main cutting edge	s [mm]	f [mm]
		P	M	K	N	S	H	O				
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other				
	**GX...TM** – Grooving operations – Low feeds – CBN indexable insert with fully ground circumference – CBN insert with chamfered cutting edge						●●				3	0,02–0,10
											4	0,02–0,12
											5	0,02–0,14
											6	0,02–0,15
	**GX...EM** – Grooving operations – Light to moderate feeds – CBN indexable insert with fully ground circumference – CBN insert with rounded cutting edge					●●					3	0,1–0,15
											4	0,1–0,20
											5	0,1–0,25
											6	0,1–0,30
	**GX...F1** – Parting off, grooving – Light to moderate feeds – PCD insert with laser-generated chip former – Effective chip formation in ISO N materials				●●	●					2	0,04–0,12
											3	0,05–0,16
											4	0,06–0,22
											5	0,06–0,25
											6	0,06–0,28

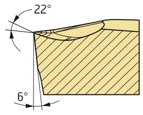
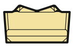
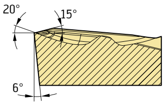
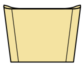
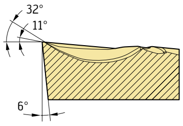
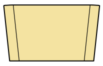
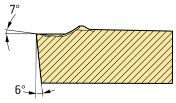
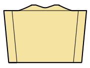
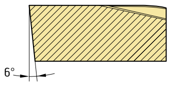
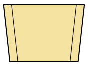
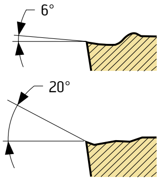
GX system: Grooving of circlip grooves

Geometry	Remarks/ application area	Material groups							Main cutting edge section	View of main cutting edge	s [mm]	f [mm]
		P	M	K	N	S	H	O				
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other				
	**GD8** – For DIN 471 circlip grooves with the tolerance class H13 – Fully ground circumference – For precision grooving – Extremely soft cutting action – Light to moderate feeds	●●	●	●	●	●					1	0,03–0,06
											1,5	0,03–0,09
											2	0,04–0,10
											2,5	0,04–0,14
											3	0,04–0,14

●● Primary application
● Additional application

Geometry overview of cutting inserts (continued)

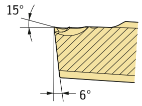
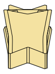
GX system: Grooving, parting off and groove turning

Geometry	Remarks/ application area	Material groups							Main cutting edge section	View of main cutting edge	s [mm]	a_p [mm]	f [mm]
		P	M	K	N	S	H	O					
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other					
	**UF8** – All grooving operations – Fully ground circumference – Excellent chip control – Low to average feed range – For DIN 471 circlip grooves with the tolerance class H13	●●	●●	●	●●	●●					1,6	0,3–1,0	0,05–0,17
											2	0,3–1,2	0,05–0,22
											3	0,4–1,5	0,07–0,24
											4	0,3–2,2	0,07–0,30
											5	0,3–2,6	0,11–0,35
											6	0,3–3,2	0,11–0,35
											8	1,0–4,2	0,13–0,40
	**UD6** – Grooving in stainless steel – Average feed range – Soft cutting action	●	●●		●						2	0,3–2,5	0,06–0,15
											2,5	0,3–2,5	0,08–0,14
											3	0,4–3,0	0,10–0,20
											4	0,5–3,5	0,12–0,25
											5	0,5–3,0	0,12–0,30
											6	0,6–3,5	0,14–0,35
	**UF4** – All grooving operations – Good chip control – Average feed range – Positive cut	●●	●●	●●	●	●					2	0,3–2,5	0,10–0,15
											2,5	0,3–2,5	0,10–0,18
											3	0,4–3,0	0,10–0,20
											4	0,5–3,5	0,10–0,30
											5	0,5–3,5	0,12–0,35
											6	0,6–4,0	0,14–0,40
	**UD4** – Large chip breaking range – Optimum chip breaking when machining forged parts – Stable cutting edge – For moderate to high feeds	●●	●	●●							3	0,4–2,0	0,08–0,20
											4	0,5–2,8	0,10–0,30
											5	0,5–3,0	0,12–0,35
											6	0,6–3,5	0,14–0,40
											8	0,9–4,0	0,14–0,40
	**UA4** – For cast iron machining – For moderate to high machining parameters – For maximum process reliability in cast iron machining			●●			●				2	0,3–2,5	0,08–0,15
											2,5	0,3–2,5	0,10–0,20
											3	0,4–3,0	0,10–0,22
											4	0,5–3,5	0,10–0,35
											5	0,5–3,0	0,12–0,35
											6	0,6–3,5	0,14–0,40
	**VG7** – For finishing operations on the rear side of a component, particularly on multi-spindle machines – Enormous savings on material compared to standard ISO indexable inserts – Optimum chip breaking for finishing operations	●●	●●	●	●●	●●					2,8	0,2–2,5	0,05–0,25

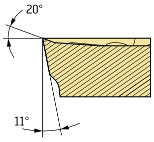
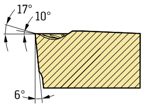
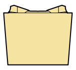
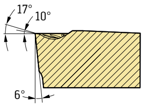
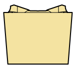
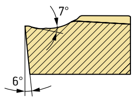
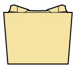
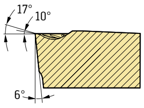
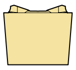
●● Primary application
● Additional application

Geometry overview of cutting inserts (continued)

GX system: Axial grooving and groove turning

Geometry	Remarks/ application area	Material groups P Steel	M Stainless steel	K Cast iron	N NF metals	S Materials with difficult cutting properties	H Hard materials	O Other	Main cutting edge section	View of main cutting edge	s [mm]	a_p [mm]	f [mm]
	**AF5** – Average feed range – Positive cut – Good chip control – Optimum chip breaking during axial grooving due to asymmetric chip formation geometry	●●	●●	●	●	●					5	0,5–2,5	0,15–0,30

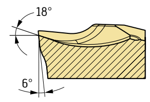
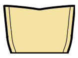
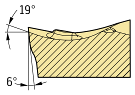
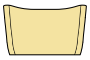
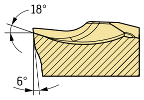
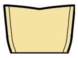
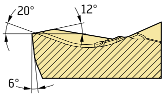
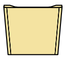
GX system: Full radius cutting inserts for grooving and copy turning

Geometry	Remarks/ application area	P Steel	M Stainless steel	K Cast iron	N NF metals	S Materials with difficult cutting properties	H Hard materials	O Other	Main cutting edge section	View of main cutting edge	s [mm]	a_p [mm]	f [mm]
	**RK8** – Polished rake face – Sharp cutting edge – Fully ground circumference – Extremely positive				●●			●			6	4,0	0,10–0,30
											8	5,0	0,10–0,35
	**RF8** – For copy and relief turning – Fully ground circumference – High surface quality – Stable cutting edge	●●	●●	●	●	●●					2	0,1–1,0	0,08–0,25
											3	0,1–1,5	0,10–0,30
											4	0,1–2,0	0,12–0,45
											5	0,1–2,5	0,15–0,50
											6	0,1–3,0	0,15–0,55
											8	0,2–4,0	0,18–0,60
	**RF7** – For copy and relief turning – High surface quality – Stable cutting edge	●●	●●	●	●	●●					2	0,1–1,0	0,08–0,25
											3	0,1–1,5	0,10–0,30
											4	0,1–2,0	0,12–0,45
											5	0,1–2,5	0,15–0,50
											6	0,1–3,0	0,15–0,55
	**RD4** – For copy turning – Outstanding chip control when grooving – For moderate to high feeds – Fully sintered circumference	●●	●	●●		●					2	0,2–1,0	0,08–0,25
											3	0,5–1,5	0,10–0,35
											4	0,5–2,0	0,15–0,50
											5	0,5–2,5	0,17–0,70
											6	0,5–3,0	0,17–0,70
											8	0,6–4,5	0,17–0,70
	**GX…M1** – Grooving, groove turning – Light to high feeds – PCD insert with laser-generated chip former – Effective chip formation in ISO N materials				●●	●					2	0,1	0,05–0,25
											3	0,1	0,05–0,30
											4	0,1	0,05–0,35
											5	0,1	0,05–0,40
											6	0,1	0,05–0,50
											8	0,1	0,05–0,60

●● Primary application
● Additional application

Geometry overview of cutting inserts (continued)

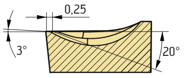
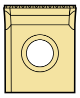
SX system: Grooving and parting off

Geometry	Remarks/ application area	Material groups							Main cutting edge section	View of main cutting edge	s [mm]	f [mm]
		P	**M**	**K**	**N**	**S**	**H**	**O**				
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other				
	**CK8** – Grooving and parting-off operations – Fully ground circumference – Light to moderate feeds – Good chip control – Low burr/pip formation – Polished rake face				●●	●					2	0,04–0,15
											2,5	0,05–0,15
											3	0,08–0,20
											4	0,10–0,22
											5	0,10–0,25
	**CF6** – Low feeds – Low burr/pip formation – Low cutting force	●●	●●		●●	●●		●			1,5	0,03–0,10
											2	0,03–0,12
											3	0,04–0,20
	**CF5** – Grooving and parting-off operations – Light to moderate feeds – Good chip control – Low burr/pip formation	●●	●●	●	●●	●●		●			1,5	0,03–0,13
											2	0,04–0,15
											3	0,08–0,20
											4	0,10–0,20
											5	0,10–0,25
											6	0,12–0,28
	**CE4** – Grooving and parting-off operations – Moderate to high feeds – Good chip constriction – Stable cutting edge	●●	●	●●	●	●	●				1,5	0,05–0,13
											2	0,06–0,15
											3	0,09–0,30
											4	0,10–0,32
											5	0,12–0,35
											6	0,12–0,40
											8	0,20–0,50
											10	0,25–0,55

SX system: Grooving, parting off and groove turning

Geometry	Remarks/ application area	P	M	K	N	S	H	O	Main cutting edge section	View of main cutting edge	s [mm]	f [mm]
	**UF4** – Moderate feeds – Universal inserts for groove turning	●●	●●	●●	●	●					8	0,18–0,55

UX system: Grooving and widening

Geometry	Remarks/ application area	Material groups							Main cutting edge section	View of main cutting edge	s [mm]	f [mm]
		P	**M**	**K**	**N**	**S**	**H**	**O**				
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other				
	**GD2** – Universal chip formation – For grooving and widening wide grooves – Very short chips – Light to high feeds	●●		●●							12	0,2–0,4
											19	0,25–0,60

●● Primary application
● Additional application

Walter Cut product description

Tool families for grooving – GX

G1011 monoblock tool
- For GX cutting inserts
- For grooving, parting off and longitudinal turning
- For all types of lathes
- Access to the screw from above and below; extremely easy tool handling – even in overhead use
- Excellent chip evacuation due to low head height
- Grooving up to a maximum cutting depth of 32 mm
- Insert widths from 2–8 mm
- Shank sizes: 10 × 10 mm, 12 × 12 mm, 16 × 16 mm, 20 × 20 mm, 25 × 25 mm and 32 × 32 mm

G1011-P monoblock tool with precision cooling
- Precision cooling on the rake and flank face
- Can be used from 10 bar up to a maximum coolant pressure of 150 bar
- Longer tool life and higher productivity due to optimum cooling directly in the cutting zone from a coolant pressure as low as 10 bar
- Shank sizes: 12 × 12 mm, 16 × 16 mm, 20 × 20 mm, 25 × 25 mm and 32 × 25 mm
- Walter Capto™ sizes C3–C6
- Individual designs available via Walter Xpress

G1042 deep parting blade
- Stable four-point clamping
- Easy tool handling
- Defined clamping force
- One tooling system for single and double-edged cutting inserts
- Cost-effective, double-edged parting-off solution with cutting depth of up to 23 mm
- Single-edged parting-off solution with cutting depth of up to 60 mm
- Insert widths from 2–6 mm
- Blade heights of 26 and 32 mm

G1041 parting blade, reinforced design
- Maximum process reliability due to stable tool design
- Maximum cost-efficiency due to double-sided cutting inserts for parting-off operations
- Optimum cutting insert retention due to Torx Plus screw clamping and insert seat design
- Little tool deflection due to reinforced tool body
- Longer tool life due to reduction in micro vibration
- Insert widths from 1.5–4 mm
- Grooving to a cutting depth of 33 mm and parting off up to a diameter of 65 mm
- Available in right-hand, left-hand and contra versions
- Blade heights of 26 and 32 mm

G1041-P parting blade, reinforced design with precision cooling
- Precision cooling on the rake face and flank face
- Can be used from 10 bar up to a maximum coolant pressure of 80 bar
- Longer tool life and higher productivity due to optimum cooling directly in the cutting zone from a coolant pressure as low as 10 bar

Walter Cut modular
- Two different grooving systems can be used
- For GX and SX cutting inserts
- Maximum grooving flexibility
- Low inventory levels
- Short set-up times
- Insert widths of 0.6–8 mm
- Grooving to a cutting depth of 45 mm and parting off up to a diameter of 90 mm
- In Walter Capto™ C3, C4, C5 and C6
- Shank sizes: 12 × 12 mm, 16 × 16 mm, 20 × 20 mm, 25 × 25 mm and 32 × 32 mm

Walter Cut product description (continued)

Tool families for grooving – GX

G1111 monoblock tool for axial grooving
- For GX24 cutting inserts
- For grooving and groove turning
- Excellent chip evacuation due to low tool head height
- Access to the screw from above and below; extremely easy tool handling – even in overhead use
- Insert widths from 3–6 mm
- Grooving to a cutting depth of up to 25 mm
- Shank size 25 × 25 mm

G1111-P monoblock tool with precision cooling for axial grooving
- For double-edged GX24 cutting inserts
- Axial grooving and groove turning with precision cooling
- Precision cooling on the rake face
- Additional coolant jet aimed at the end face for flushing the chip out of the axial groove
- Clamping screw can be operated from above or below
- Axial grooves from dia. 60 mm
- Cutting depths up to 33 mm
- Insert width 5 mm
- Shank sizes: 25 × 25 mm
- Individual designs available via Walter Xpress

G15.. monoblock tool for shallow cutting depths
- For GX cutting inserts
- For grooving, groove turning and relief turning
- Excellent chip evacuation due to low tool head height
- Access to the screw from above and below; extremely easy tool handling – even in overhead use
- Grooving to a cutting depth of up to 6 mm
- Insert widths of 2–6 mm with a single tool
- Shank sizes: 12 × 12 mm, 16 × 16 mm, 20 × 20 mm and 25 × 25 mm

G1511-P monoblock tool for shallow cutting depths with precision cooling
- Precision cooling on the rake face
- Can be used from 10 bar up to a maximum coolant pressure of 150 bar
- Longer tool life and higher productivity due to optimum cooling directly in the cutting zone from a coolant pressure as low as 10 bar
- Shank sizes: 16 × 16 mm, 20 × 20 mm and 25 × 25 mm

G1221-P grooving bars with precision cooling
- For double-edged GX cutting inserts
- Precision cooling via the top clamp
- Sealable axial coolant bore for blind-hole machining
- Flexible O-ring seal for leak-free coolant transfer
- Internal grooves with a diameter starting from D_{min} = 16 mm
- Grooving to a depth of T_{max} = 12 mm
- Insert widths: 2.0/3.0/4.0/5.0/6.0 mm
- Shank diameter 16–40 mm

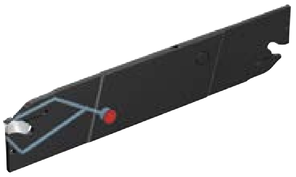
Walter Cut product description (continued)

Tool families for grooving – SX

G2012 monoblock tool
- For SX cutting inserts
- For grooving and parting off
- For all types of lathes
- Stable self-clamping system using top clamp
- Shank sizes: 16 × 16 mm, 20 × 20 mm and 25 × 25 mm

G2012-P monoblock tool with precision cooling
- Precision cooling on the rake and flank face
- Can be used from 10 bar up to a maximum coolant pressure of 150 bar
- Longer tool life and higher productivity due to optimum cooling directly in the cutting zone from a coolant pressure as low as 10 bar
- Insert widths from 2–10 mm
- Grooving to a cutting depth of 45 mm and parting off up to a diameter of 90 mm
- Shank sizes: 12 × 12 mm, 16 × 16 mm, 20 × 20 mm, 25 × 25 mm and 32 × 25 mm

G2042-N deep parting blade
- For SX cutting inserts
- Two insert seats on one tool
- Stable self-clamping system using top clamp
- Easy tool handling
- Insert widths from 2–6 mm
- Cost-effective, single-edged parting-off solution for a cutting depth of up to 80 mm/ a parting-off diameter of up to 160 mm
- Blade heights: 26 mm, 32 mm and 46 mm



G2042-N-P deep parting blade with precision cooling
- Precision cooling on the rake and flank face
- Coolant transfer with no external interference contours
- Can be used from 10 bar up to a maximum coolant pressure of 80 bar
- Longer tool life and higher productivity due to optimum cooling directly in the cutting zone from a coolant pressure as low as 10 bar
- Insert widths from 3–10 mm
- Cost-effective, single-edged parting-off solution for a cutting depth of up to 100 mm/ a parting-off diameter of up to 200 mm
- Blade heights: 26 mm, 32 mm and 52 mm

G2042-R/L parting blade, reinforced design
- For SX cutting inserts
- Maximum process reliability due to stable tool design
- Little tool deflection due to reinforced tool body
- Longer tool life due to reduction in micro vibration
- Insert widths from 2–4 mm
- Available in right-hand/left-hand and contra version
- Blade heights of 26 mm and 32 mm

G2042-R/L-P parting blade, reinforced design with precision cooling
- Precision cooling on the rake and flank face
- Can be used from 10 bar up to a maximum coolant pressure of 80 bar
- Longer tool life and higher productivity due to optimum cooling directly in the cutting zone from a coolant pressure as low as 10 bar

G2016-P monoblock tool with precision cooling
- For UX cutting inserts
- Tangentially mounted cutting inserts for grooving and widening, with precision cooling
- Cutting forces are optimally absorbed thanks to the tangential arrangement
- Widen grooves without "tipping" the cutting insert in the insert seat
- Ideal for machining generator and turbine shafts
- Insert widths: 12 and 19 mm
- Shank sizes: 25 × 25 and 32 × 32 mm

Walter Cut product description (continued)

Tool families for grooving – MX

G3011 monoblock tool
- For MX22
- Four precision-ground cutting edges ±0.02 mm
- Stable, self-aligning, tangential insert clamping
- Cutting depth up to 6 mm
- Grooving, parting off, profiling, groove turning and thread turning
- Insert widths of 0.5–5.56 mm with a single tool
- Shank sizes: 10 × 10, 12 × 12, 16 × 16, 20 × 20, 25 × 25 mm

G3011-P monoblock tool with precision cooling
- Grooving and parting-off tool with precision cooling
- Cutting depth up to 6 mm
- Grooving, parting off, profiling, groove turning and thread turning
- Insert widths of 0.5–5.56 mm with a single tool
- Shank sizes: 12 × 12, 16 × 16, 20 × 20, 25 × 25 mm
- Walter Capto™: C3, C4, C5 and C6
- Individual designs available via Walter Xpress

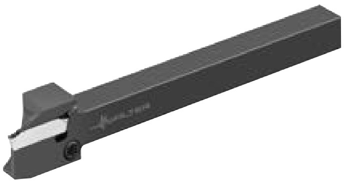
G3021-P monoblock tool with precision cooling, 90° approach angle
- For MX22
- Four precision-ground cutting edges ±0.02 mm
- Stable, self-aligning, tangential insert clamping
- Cutting depth up to 6 mm
- Grooving and parting-off tool with precision cooling
- Grooving, parting off, profiling, groove turning and thread turning
- Insert widths of 0.5–5.56 mm with a single tool
- Shank sizes: 20 × 20, 25 × 25 mm

G3051-P monoblock tool with precision cooling
- For MX22-L/R…-GD8 for shoulder machining
- 3° installation position in the groove turning holder
- Four precision-ground cutting edges ±0.02 mm
- Stable, self-aligning, tangential insert clamping
- Grooving and parting-off tool with precision cooling
- Grooving and parting off – shoulders and large diameters without interference contours; small dia. with high accuracy
- Insert widths of 0.5–3.25 mm with a single tool
- Shank sizes: 12 × 12, 16 × 16, 20 × 20, 25 × 25 mm

G3221-P grooving bars with precision cooling
- For MX22
- Four precision-ground cutting edges ±0.02 mm
- Stable, self-aligning, tangential insert clamping
- Cutting depth up to 4 mm
- Precision cooling via the top clamp
- Sealable axial coolant bore for blind-hole machining
- Internal grooves with a diameter starting from D_{min} = 45 mm
- Insert widths of 0.5–3.25 mm
- All MX22 insert widths (standard and Walter Xpress) can be used in the same tool

Walter Cut product description (continued)

Tool families for grooving – DX



G4014 monoblock tool with SmartLock
- For double-edged DX18 cutting inserts with positive engagement
- For grooving, parting off and longitudinal turning
- Innovative new positive engagement on the rear insert locating surface
- Screw clamping on the side for easy insert indexing
- New clamping method: 30% higher clamping forces compared to conventional tools on the market
- Grooving and parting off along the main or counter-spindle up to dia. 35 mm for flexible use
- For replaceable components (as tool operation can be modified)
- Insert widths: 1.5/2.0/2.5/3.0 mm
- Shank sizes: 10 × 10, 12 × 12, 16 × 16, 20 × 20 mm

G4014-P monoblock tool with SmartLock and precision cooling
- Precision cooling on the rake and flank face
- Can be used from 10 bar up to a maximum coolant pressure of 150 bar
- Longer tool life and higher productivity due to optimum cooling directly in the cutting zone from a coolant pressure as low as 10 bar
- Insert widths: 2.0/2.5/3.0 mm
- Shank sizes: 12 × 12, 16 × 16, 20 × 20 mm

G4011 monoblock tool
- For double-edged DX18 cutting inserts with positive engagement
- For grooving, parting off and longitudinal turning
- Innovative new positive engagement on the rear insert locating surface
- Access to the screw from above and below; extremely easy tool handling – even in overhead use
- Parting off up to a maximum diameter of 35 mm
- Insert widths: 2.0/2.5/3.0/4.0 mm
- Shank sizes: 16 × 16 mm, 20 × 20 mm, 25 × 25 mm
- Individual designs available via Walter Xpress

G4011-P monoblock tool with precision cooling
- Precision cooling on the rake and flank face
- Can be used from 10 bar up to a maximum coolant pressure of 150 bar
- Longer tool life and higher productivity due to optimum cooling directly in the cutting zone from a coolant pressure as low as 10 bar
- Insert widths: 2.0/2.5/3.0/4.0 mm
- Shank sizes: 16 × 16 mm, 20 × 20 mm, 25 × 25 mm
- Individual designs available via Walter Xpress
- Walter Capto™ sizes C3–C4

G4511 / G4551 / G4521 . . monoblock tools for shallow cutting depths
- For double-edged DX18 cutting inserts with positive engagement
- For grooving, groove turning and relief turning
- Access to the screw from above and below; extremely easy tool handling – even in overhead use
- G4511 – 0° approach angle; G4551 – 45° approach angle; G4521 – 90° approach angle
- Grooving to a cutting depth of up to 5 mm
- Insert widths of 2–6 mm with a single tool
- Shank sizes: 12 × 12 mm, 16 × 16 mm, 20 × 20 mm and 25 × 25 mm
- Individual designs available via Walter Xpress

Walter Cut product description (continued)

Tool families for grooving – DX

G4041 parting blade, reinforced design
- For double-edged DX18 cutting inserts with positive engagement
- Innovative new positive engagement on the rear insert locating surface
- Parting off up to a maximum diameter of 42 mm
- Maximum cost-efficiency due to double-sided cutting inserts for parting-off operations
- Insert widths: 1.5/2.0/2.5/3.0 mm
- Blade height: 26–32 mm
- Available in right-hand, left-hand and contra versions

G4041-P parting blade, reinforced design with precision cooling
- Precision cooling on the rake and flank face
- Can be used from 10 bar up to a maximum coolant pressure of 80 bar
- Parting off up to a maximum diameter of 42 mm
- Insert widths: 2.0/3.0 mm
- Blade height: 26–32 mm
- Available in right-hand, left-hand and contra versions

G4042 deep parting blade
- For double-edged DX18 cutting inserts with positive engagement
- Innovative new positive engagement on the rear insert locating surface
- Innovative new self-clamping system: Perfect four-point retention in the insert seat
- Parting off with long tool overhangs
- Parting-off diameter: 35–80 mm
- Insert widths: 1.5/2.0/3.0/4.0 mm
- Blade height: 26–32 mm

G4042-P deep parting blade with precision cooling
- Precision cooling on the rake and flank face
- Can be used from 10 bar up to a maximum coolant pressure of 80 bar
- Parting-off diameter: 35–80 mm
- Insert widths: 3.0/4.0 mm
- Blade height: 26–32 mm

G4221-P grooving bars with precision cooling
- For double-edged DX18 cutting inserts with positive engagement
- Innovative new positive engagement on the rear insert locating surface
- Precision cooling via the top clamp
- Sealable axial coolant bore for blind-hole machining
- Flexible O-ring seal for leak-free coolant transfer
- Internal grooves with a diameter starting from D_{min} = 25 mm
- Grooving to a depth of T_{max} = 10 mm
- Insert widths: 2.0/3.0/4.0 mm
- Shank dia. 25–32 mm
- Individual designs available via Walter Xpress

G4221-Q-P QuadFit quick-change heads with precision cooling
- For double-edged DX18 cutting inserts with positive engagement
- Innovative new positive engagement on the rear insert locating surface
- Precision cooling via the top clamp
- Sealable axial coolant bore for blind-hole machining
- Internal grooves with a diameter starting from D_{min} = 50 mm
- Grooving to a depth of T_{max} = 21 mm
- Insert widths: 3.0/4.0 mm
- QuadFit interfaces: Q32/Q40/Q50 mm
- Can be used in conjunction with vibration-damped Accure·tec® boring bars

Walter Cut product description (continued)

Tool adaptors for parting blades

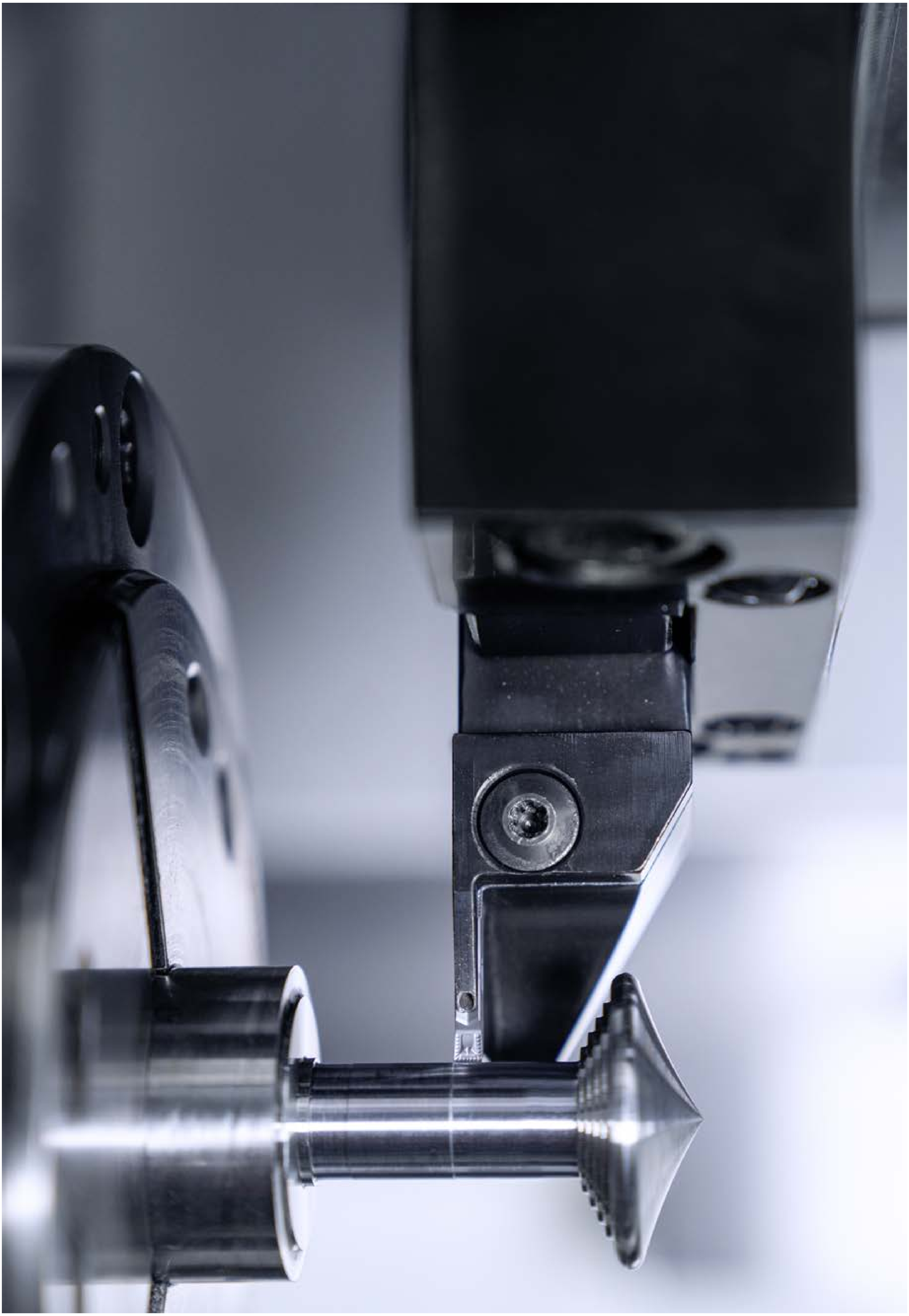
SBN clamping block
- One-piece clamp
- Left-hand/right-hand variant in one block
- Blade heights: 26 mm, 32 mm and 46 mm
- Shank dimensions: 20 × 20 mm, 25 × 20 mm, 32 × 29 mm and 40 × 37 mm

G2661-P clamping block for parting blades with precision cooling
- Easy handling of the clamping block due to inclined clamping screw and split clamp
- Left-hand/right-hand variant in one block
- Clamping blocks with direct coolant transfer for precision-cooled parting blades
- No vibration due to stable toolholder design with rigid clamping
- Can be used from 10 bar up to a maximum coolant pressure of 80 bar
- Blade heights: 26 mm, 32 mm and 52 mm
- Shank dimensions: 20 × 20 mm, 25 × 25 mm, 32 × 25 mm and 40 × 32 mm

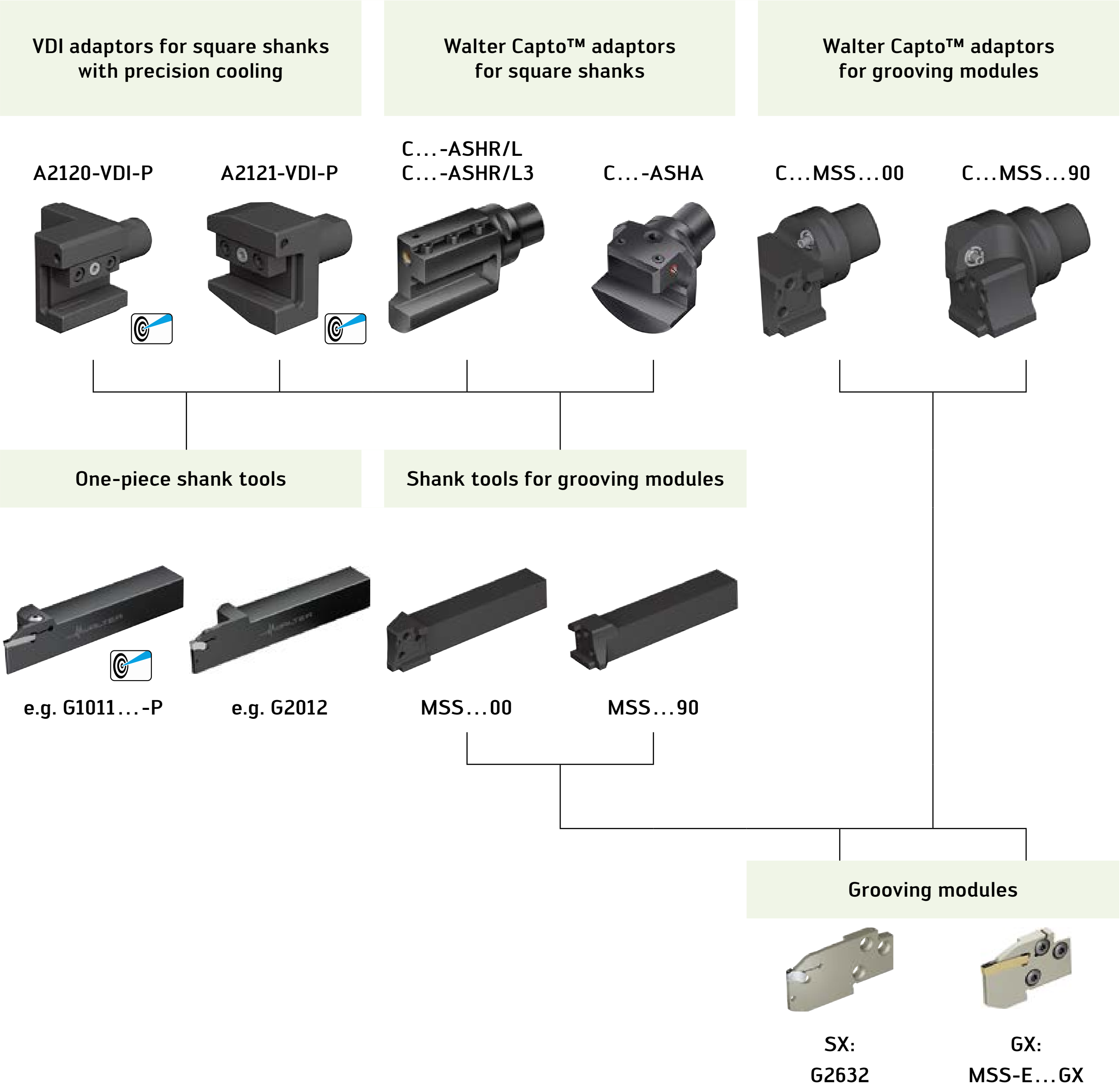
A2110-P VDI axial adaptor for parting blades with precision cooling
- VDI25/30/40 for star turret
- For grooving and parting off with internal coolant
- Transfer of the coolant directly through the VDI interface into the precision-cooled parting blade
- Flexibility: One toolholder for standard and overhead installation positions
- Short chips, meaning no downtime for removing accumulated chips
- O-ring seal for reliable coolant transfer in the 10–80 bar range with no loss of pressure
- Precise centre position due to easily adjustable centre height in a range ±0.5 mm
- Blade heights of 26 mm and 32 mm

A2111-P VDI radial adaptor for parting blades with precision cooling
- VDI30/40 for disc turrets
- For grooving and parting off with internal coolant
- Transfer of the coolant directly through the VDI interface into the precision-cooled parting blade
- O-ring seal for reliable coolant transfer in the 10–80 bar range with no loss of pressure
- No vibration thanks to tough holder design, adjustable to every machining position
- Flexibility: One toolholder for standard and overhead installation positions
- Precise centre position due to easily adjustable centre height in a range ±0.5 mm
- Blade heights of 26 mm and 32 mm

A2110-P BMT/Doosan axial adaptors for parting blades with precision cooling
- BMT45/55/65 and Doosan interface for bolt-on turrets
- For grooving and parting off with internal coolant
- Transfer of the coolant directly through the adaptor into the precision-cooled parting blade
- Flexibility: One toolholder for standard and overhead installation positions
- O-ring seal for reliable coolant transfer in the 10–80 bar range with no loss of pressure
- Precise centre position due to easily adjustable centre height in the ±0.5 mm range
- Blade heights of 26 mm and 32 mm
- Additional machine-specific interfaces are available on request



Walter Cut system overview – External machining



VDI adaptors for square shanks with precision cooling

Walter Capto™ adaptors for square shanks

Walter Capto™ adaptors for grooving modules

A2120-VDI-P ◎

A2121-VDI-P ◎

C…-ASHR/L
C…-ASHR/L3

C…-ASHA

C…MSS…00

C…MSS…90

One-piece shank tools

Shank tools for grooving modules

e.g. G1011…-P ◎

e.g. G2012

MSS…00

MSS…90

Grooving modules

SX:
G2632

GX:
MSS-E…GX

◎ = Precision cooling

Walter Cut system overview – Parting blades

VDI adaptors for parting blades with precision cooling

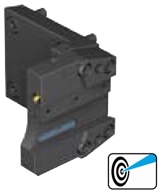
BMT or Doosan adaptors for parting blades with precision cooling

Clamping blocks for parting blades


A2110...-P


A2111...-P


A2110-BT...-P


A2110-DO...-P


SBN


G2661...-P

Neutral parting blades

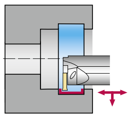
Reinforced parting blades


e.g. G1042


e.g. G2042...N...-P


e.g. G2042...R/L...-P

◎ = Precision cooling



Walter Cut system overview – Internal machining

Accure·tec® system overview – Internal machining

Accure·tec® A3000
Vibration-damped boring bars/adaptors –
QuadFit interface

Accure·tec® A3001
Vibration-damped boring bars/adaptors –
QuadFit Large interface

A3000… A3000-C… A3000-HSK-T… A3001… A3001-C… A3001-HSK-T…

QuadFit Large intermediate adaptor

A2201…

QuadFit quick-change heads

Internal machining
Negative basic shape

e.g. Q40-DCLN…

Internal machining
Positive basic shape

e.g. Q40-SDXC…

Grooving
Internal machining

G4221-Q…-P

Threading
Internal machining

T1820-Q…-P

Application information: Assembly instructions for Walter Cut

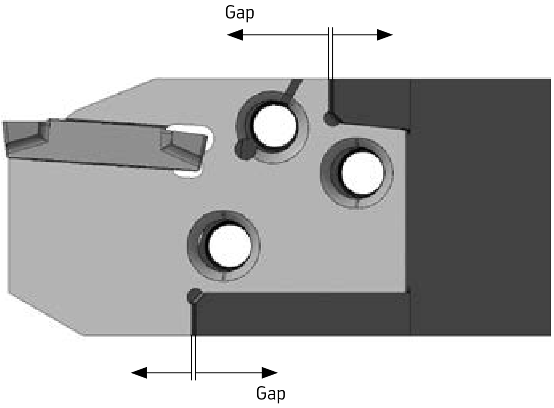
Walter Cut – the strong connection

The axial clamping with support face that occurs between the module and the basic holder when the clamping screws are tightened provides a backlash-free connection that ensures maximum stability.

The graphics show the module when unclamped and clamped, and the forces acting between the module and the tool.

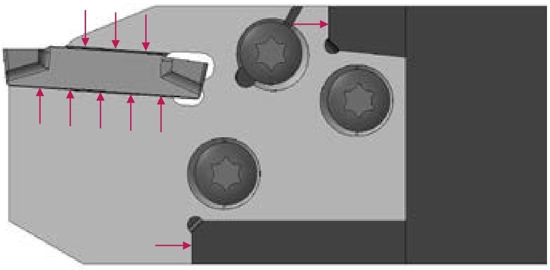
Unclamped module

Gap between the module and the support face for axial clamping



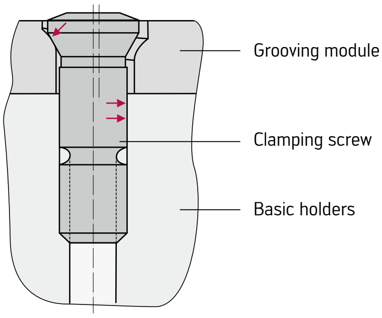
Clamped module

Axial clamping with support face
Backlash-free connection ensuring maximum stability

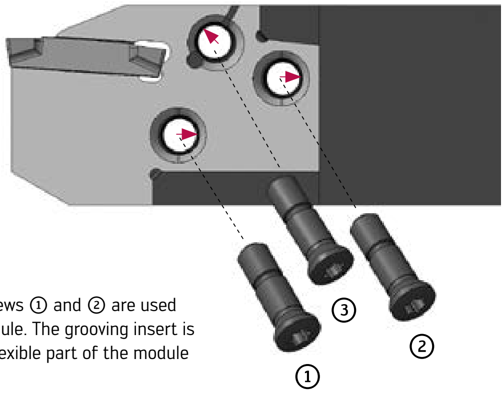


Clamping screw (clamped)

Section A–A:
Clamping screw with high clamping force



GX: For grooving and turning

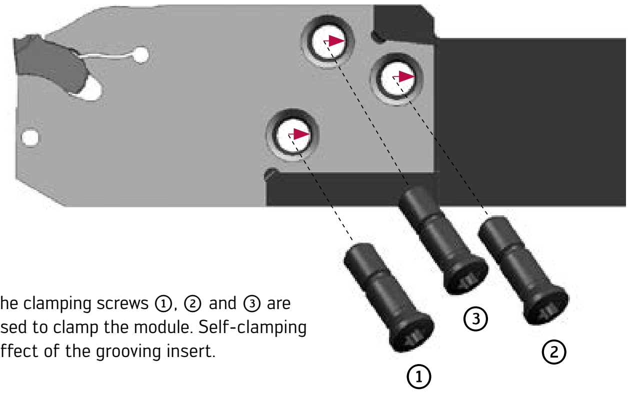


The clamping screws ① and ② are used to clamp the module. The grooving insert is clamped by the flexible part of the module using a screw ③.

Important:
Follow the sequence for clamping the module.

Step	Operation	Screw no.
A	Pre-tension the module	① – ② (② – ①)
B	Re-tension the module	① – ② (② – ①)
C	Clamp the GX grooving insert	③

SX: For parting off and deep grooving



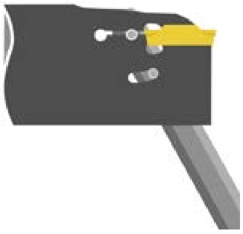
The clamping screws ①, ② and ③ are used to clamp the module. Self-clamping effect of the grooving insert.

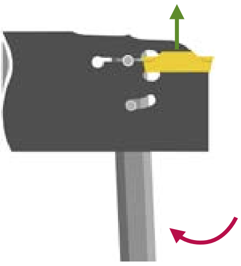
Important:
Follow the sequence for clamping the module.

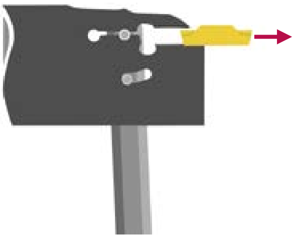
Step	Operation	Screw no.
A	Pre-tension the module	① – ② – ③
B	Re-tension the module	① – ② – ③
C	Clamp the SX grooving insert	Mounting wrench

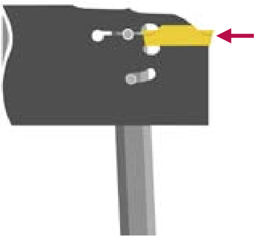
Application information:
Replacing the cutting edge on Walter Cut tools using the self-clamping system

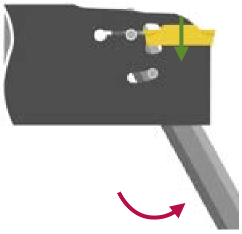
Installing DX cutting inserts


1. Insert the key


2. Open the clamping

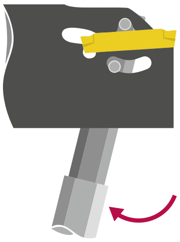

3. Remove the cutting insert

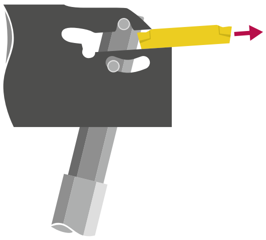

4. Insert the new cutting insert

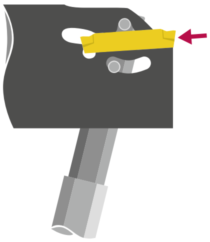

5. Close the clamping

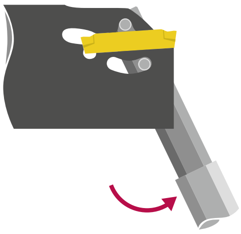
Installing GX cutting inserts


1. Insert the key


2. Open the clamping

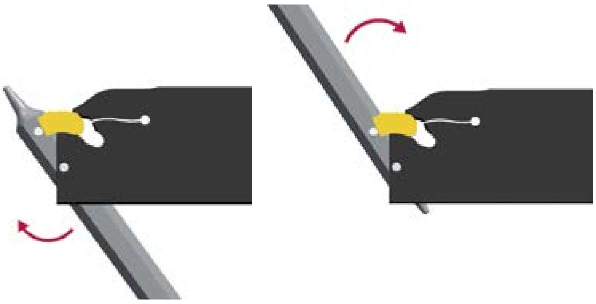

3. Remove the
old cutting insert


4. Insert the
new cutting insert

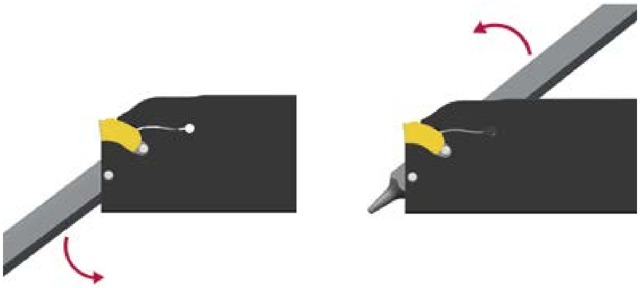

5. Close the clamping

Installing SX cutting inserts

Fitting the cutting insert

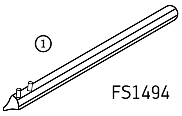
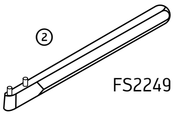
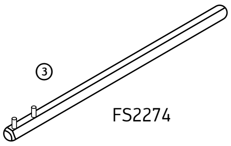


Removing the cutting insert



Application information:
Replacing the cutting edge on Walter Cut tools using the self-clamping system
(continued)

Mounting wrench for GX / SX self-clamping system

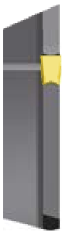
	Family	Insert width s [mm]	Shank/blade h = h_1 [mm]	Mounting wrench	
	G1042	2–6	26–32	FS1494 ①	
	G4042 / G4042-P	1,5–4			
	G2012	1,5	12–20	FS2249 ②	
		2–3	12–16	FS2249 ②	
		2–6	20–25	FS1494 ①	
		8–10	25–32	FS2274 ③	
	G2042-N G2042-R/L G2042-R/L-C	1,5	26–32	FS2249 ②	
		2–6	26–32	FS1494 ①	
		8–10	52	FS2274 ③	

Remark:
The same key is used for the precision-cooled tools (-P).

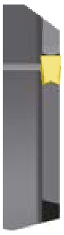
Application information:
Walter Cut tool standard/contra version

G1041R/L... / G1041R/L...C G2042R/L... / G2042R/L...C G4041R/L... / G4041R/L...C

Right-hand version

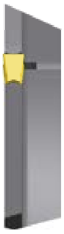


Standard
Example: G1041 . 32R–3T32GX24

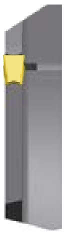


Contra
Example: G1041 . 32R–3T32GX24C

Left-hand version



Standard
Example: G1041 . 32L–3T32GX24



Contra
Example: G1041 . 32L–3T32GX24

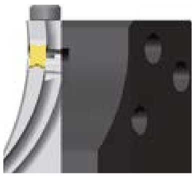
G1111 / MSS

Right-hand version

Standard
Example: MSS-E25R00-2525L
and
MSS-E25R25-GX24-4C100150
or
G1111 . 2525R3T22–067GX24

Contra
Example: MSS-E25R00-2525L
and
MSS-E25L25-GX24-4C100150

Left-hand version



Standard
Example: MSS-E25L00-2525L
and
MSS-E25L25-GX24-4C100150
or
G1111 . 2525L3T22–067GX24

Contra
Example: MSS-E25L00-2525L
and
MSS-E25R25-GX24-4C100150

Assembly instructions for Walter Cut DX

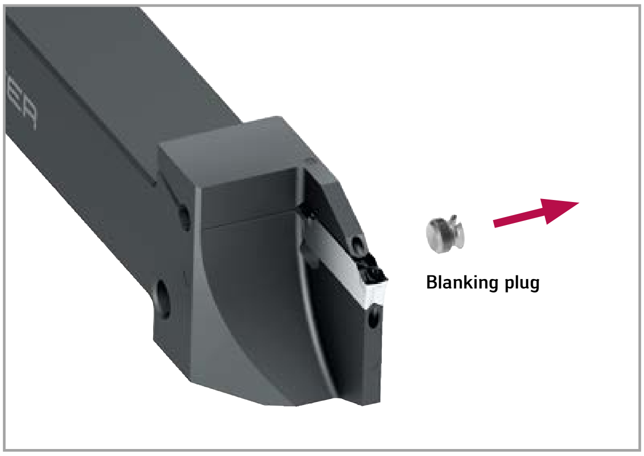
SmartLock

Purpose: The tool activation side can be converted as required.

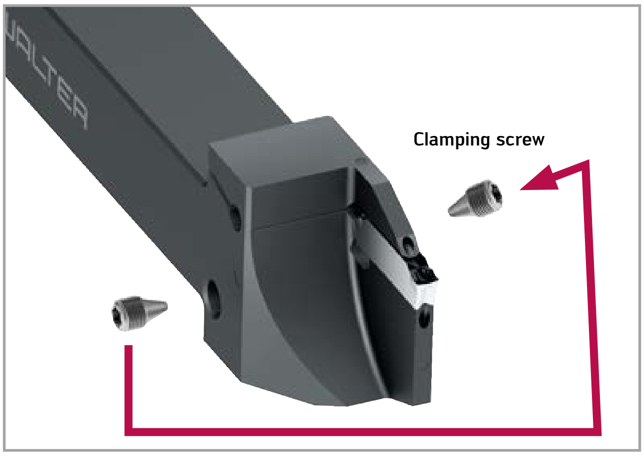
The Torx 15IP clamping screw is delivered fitted on the left-hand side of the toolholder. To fit this screw on the other side, follow the instructions below:

Important: Conversion is only possible when the indexable insert is fitted.

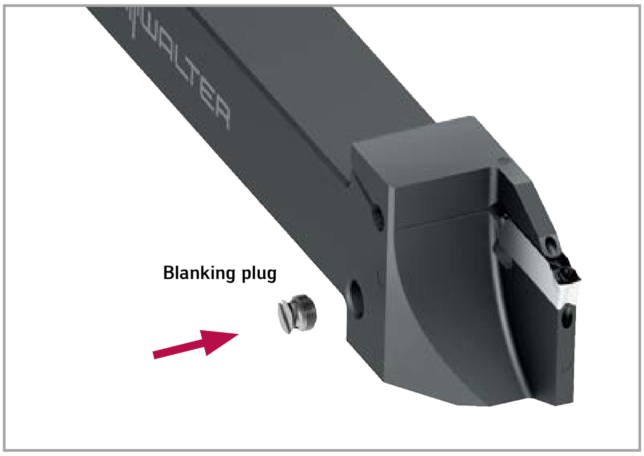
1. Remove the blanking plug on the right-hand side of the toolholder using a slotted screwdriver.



2. Unscrew the Torx 15IP clamping screw from the left-hand side and screw it into the right-hand side at the prescribed torque.



3. Screw the blanking plug back into the left-hand side of the toolholder, which is now free, to protect against contamination.

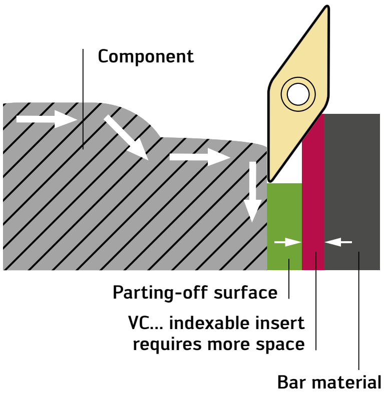


Link to the video with conversion instructions

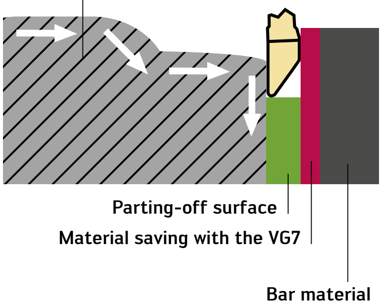
Application information: Reverse turning with Walter Cut GX-VG7

Comparison of material savings with the VG7 geometry when reverse turning instead of using a VC.. finishing insert

Example of a VC... indexable insert (35°)

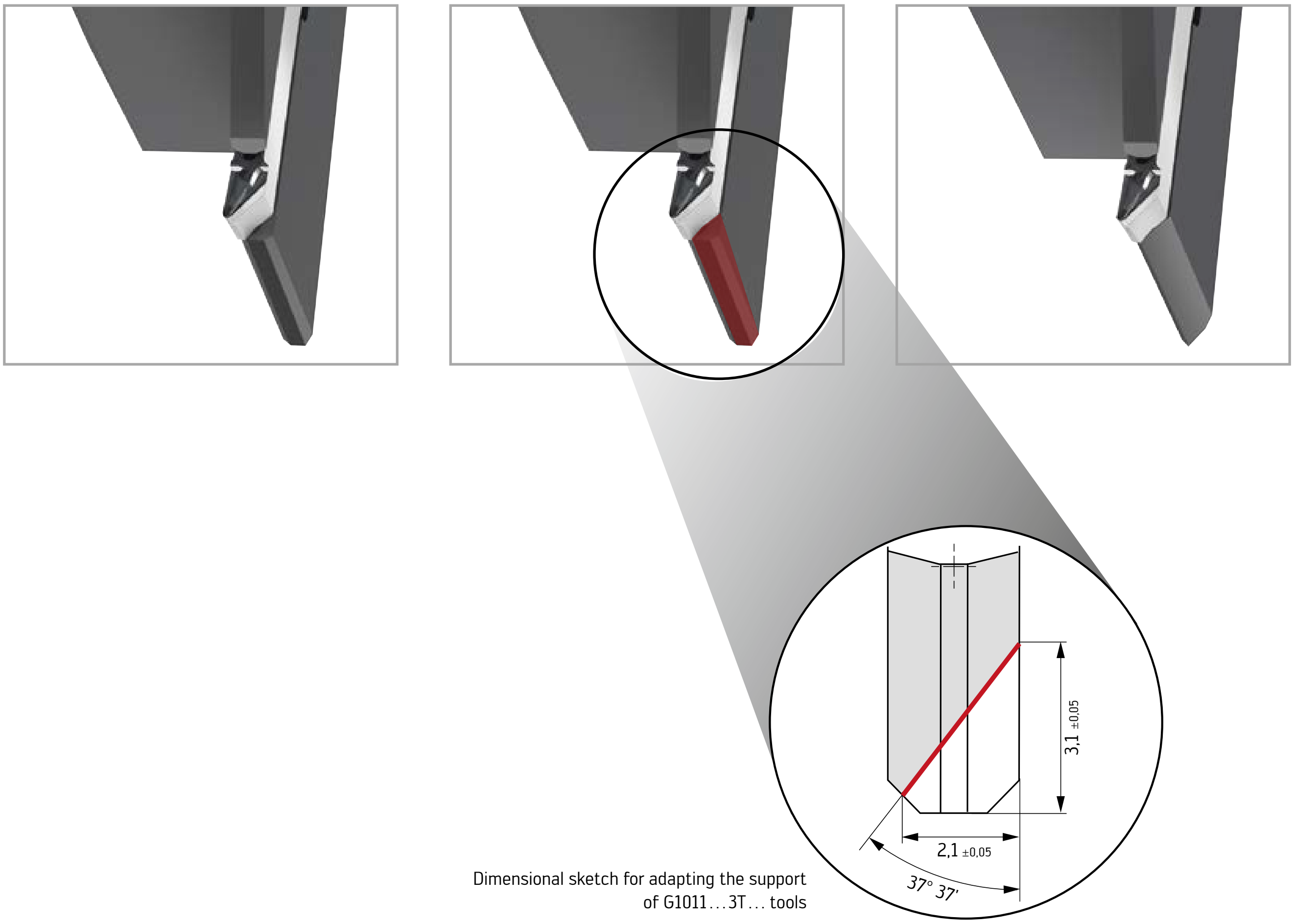


GX24-2E280R02-VG7 WSM33S



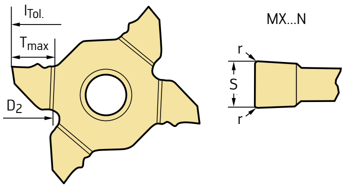
Modification of grooving tools for VG7 cutting inserts

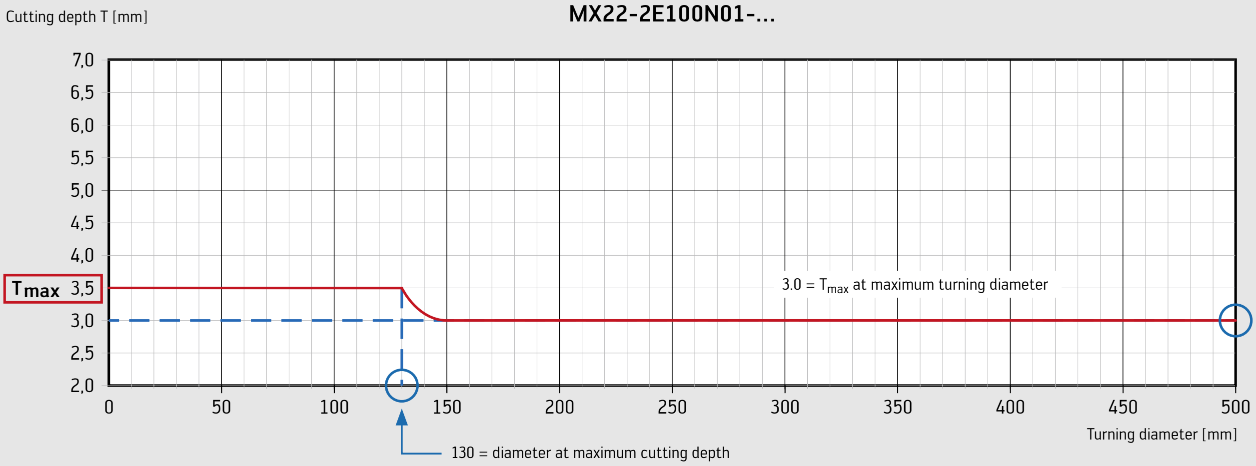
Cutting inserts can be used in G15…/NCCE/NCNE/NCCI tools
With other tools, e.g. G1011, adapt support to the cutting insert profile.



Dimensional sketch for adapting the support of G1011…3T… tools

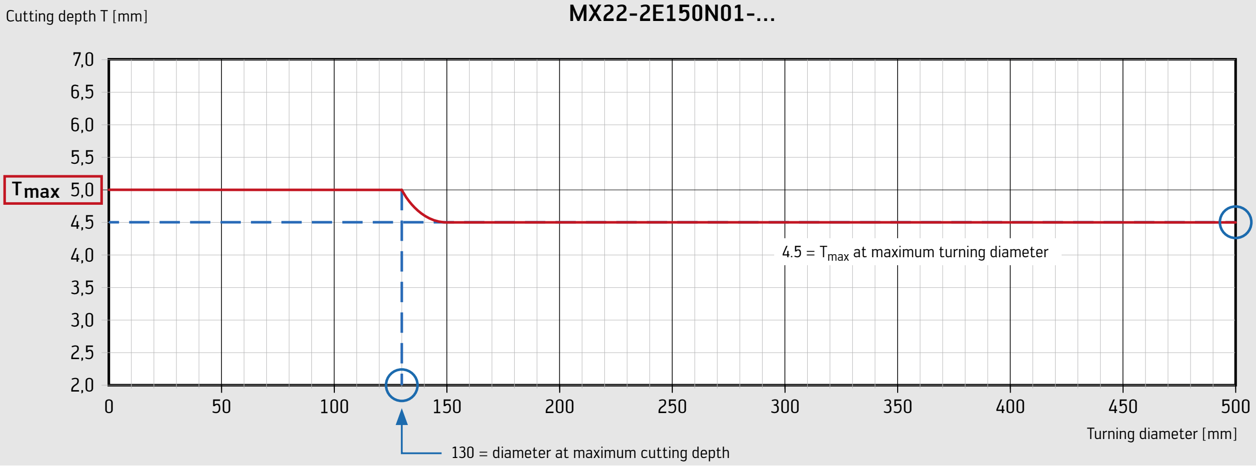
Application information:
Cutting depths depending on turning diameter




MX22-2E100N01-...

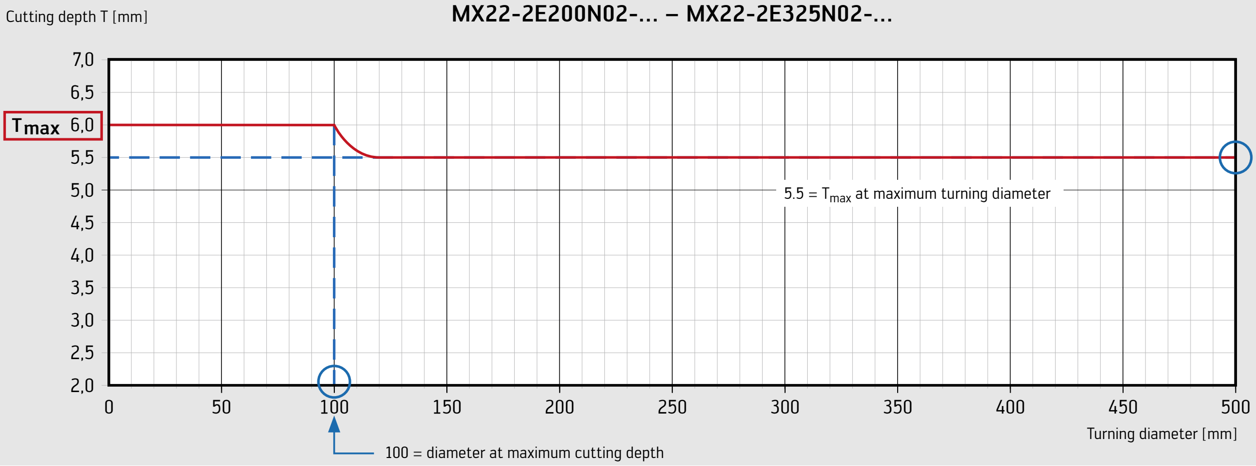
3.0 = T$_{max}$ at maximum turning diameter

130 = diameter at maximum cutting depth


MX22-2E150N01-...

4.5 = T$_{max}$ at maximum turning diameter

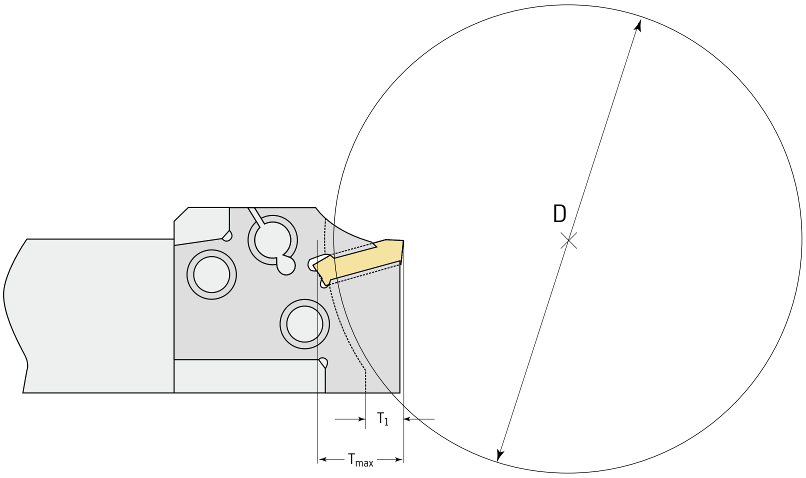
130 = diameter at maximum cutting depth


MX22-2E200N02-... – MX22-2E325N02-...

5.5 = T$_{max}$ at maximum turning diameter

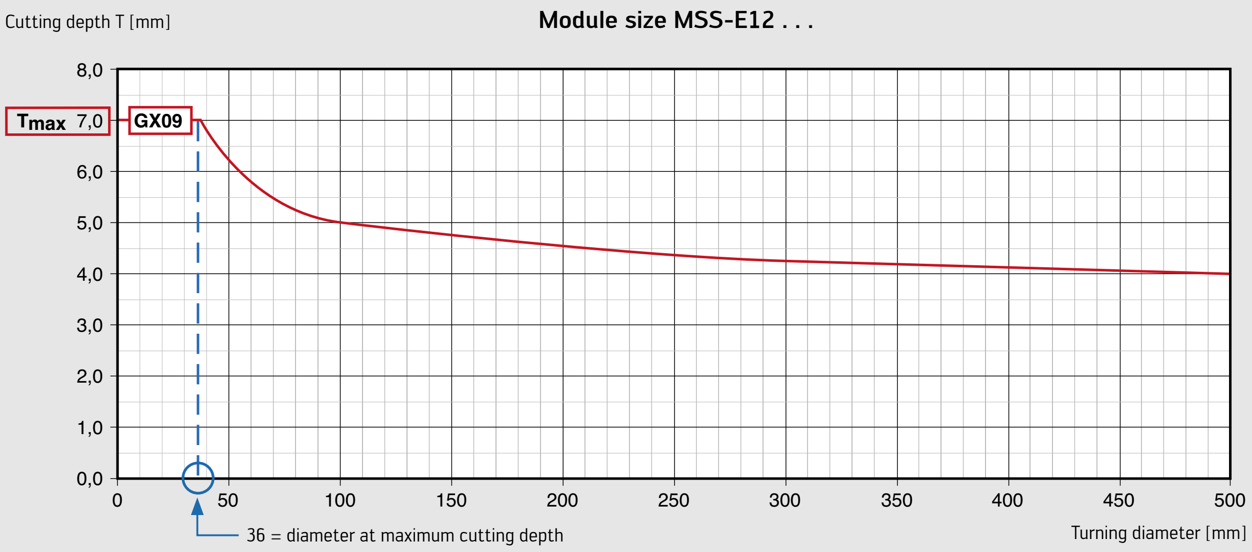
100 = diameter at maximum cutting depth

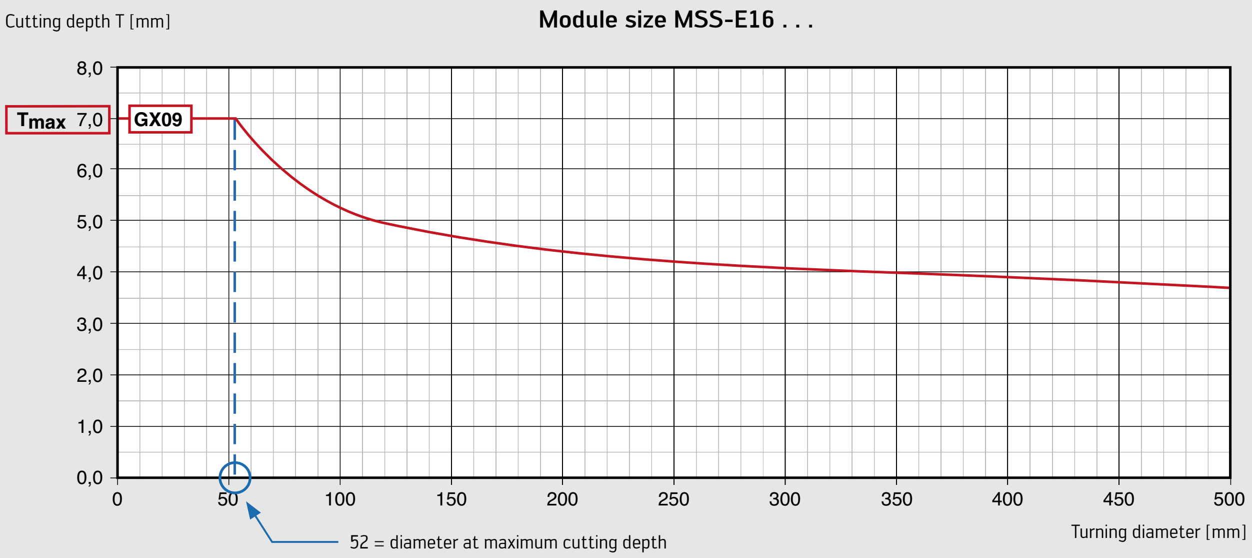
Application information:
Cutting depths depending on turning diameter (continued)



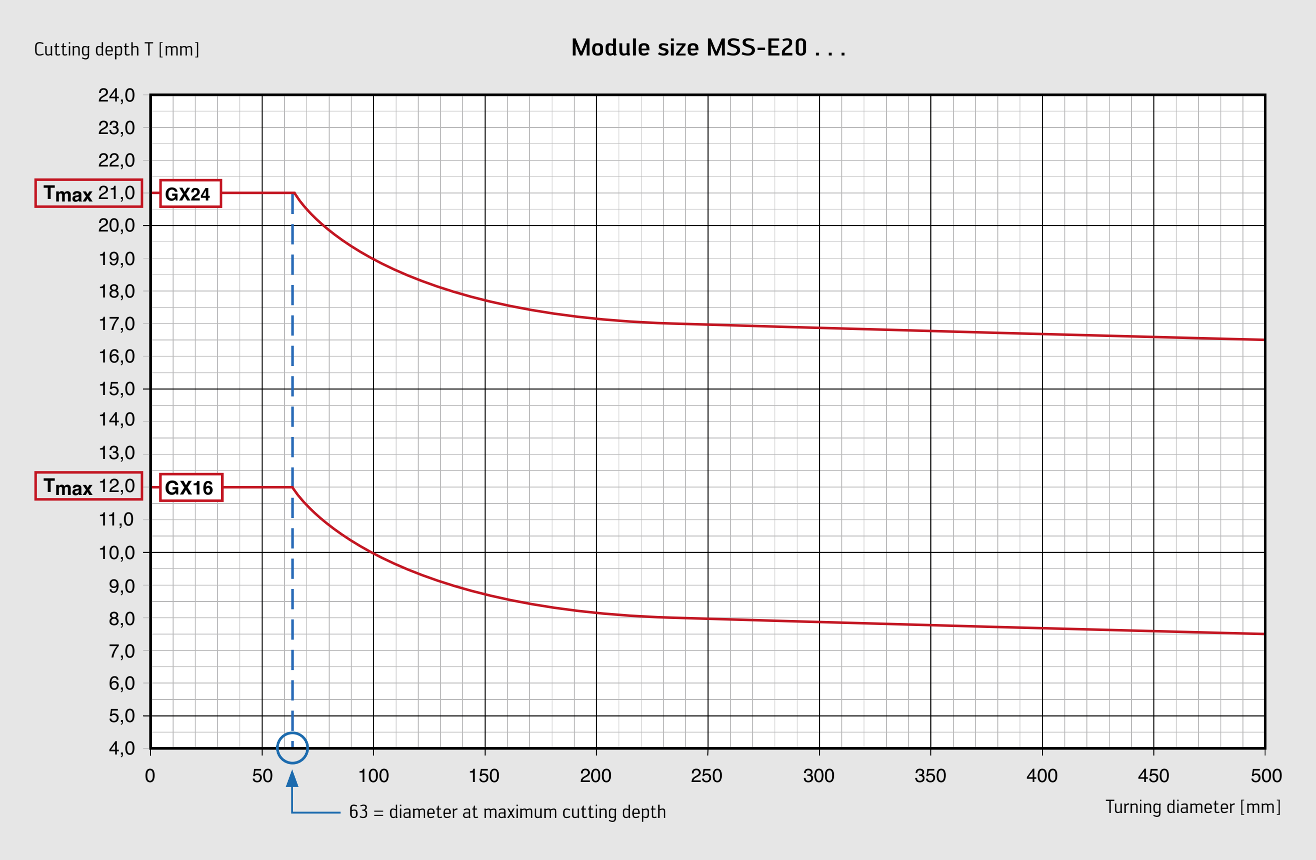
T_{max} = Maximum cutting depth **depending** on turning diameter D

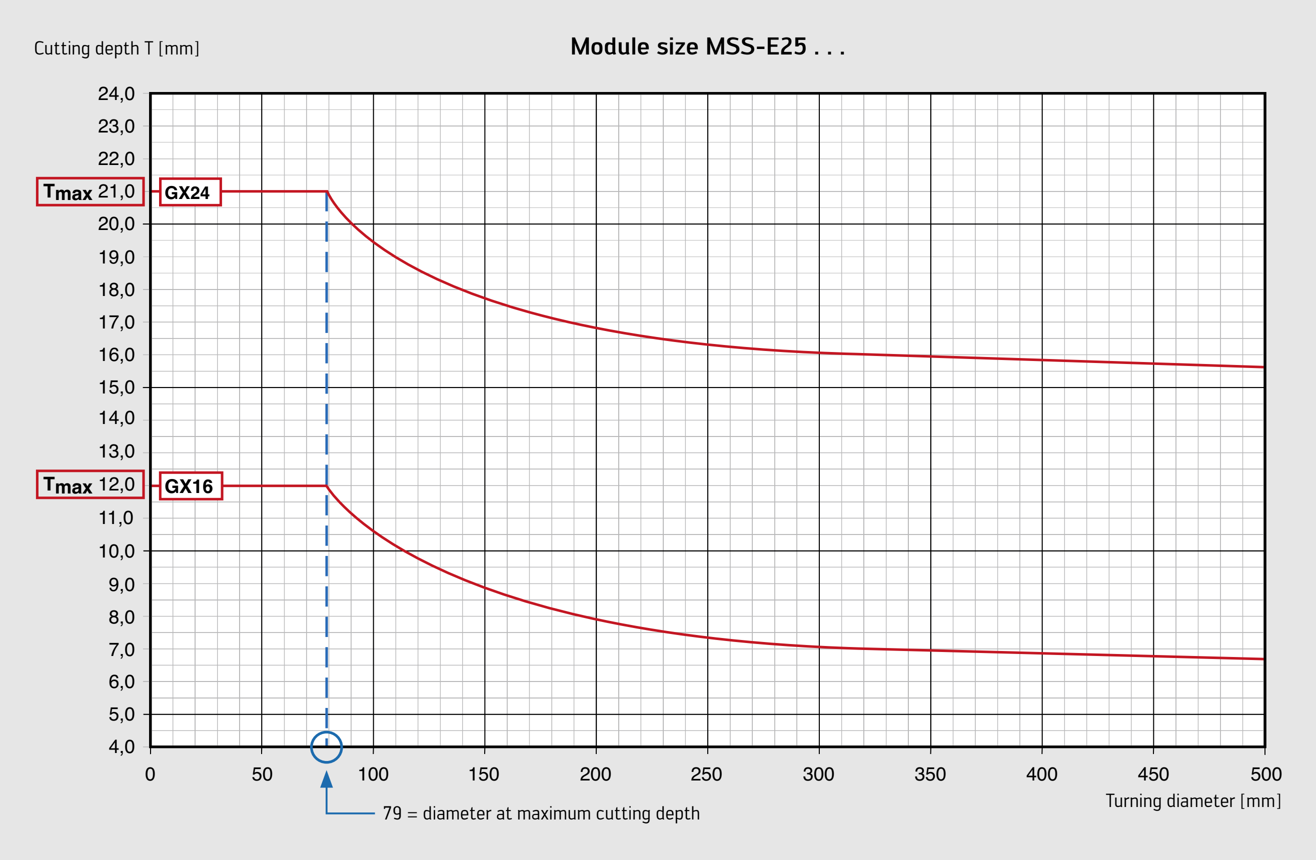
T_1 = Cutting depth **independent** of turning diameter D



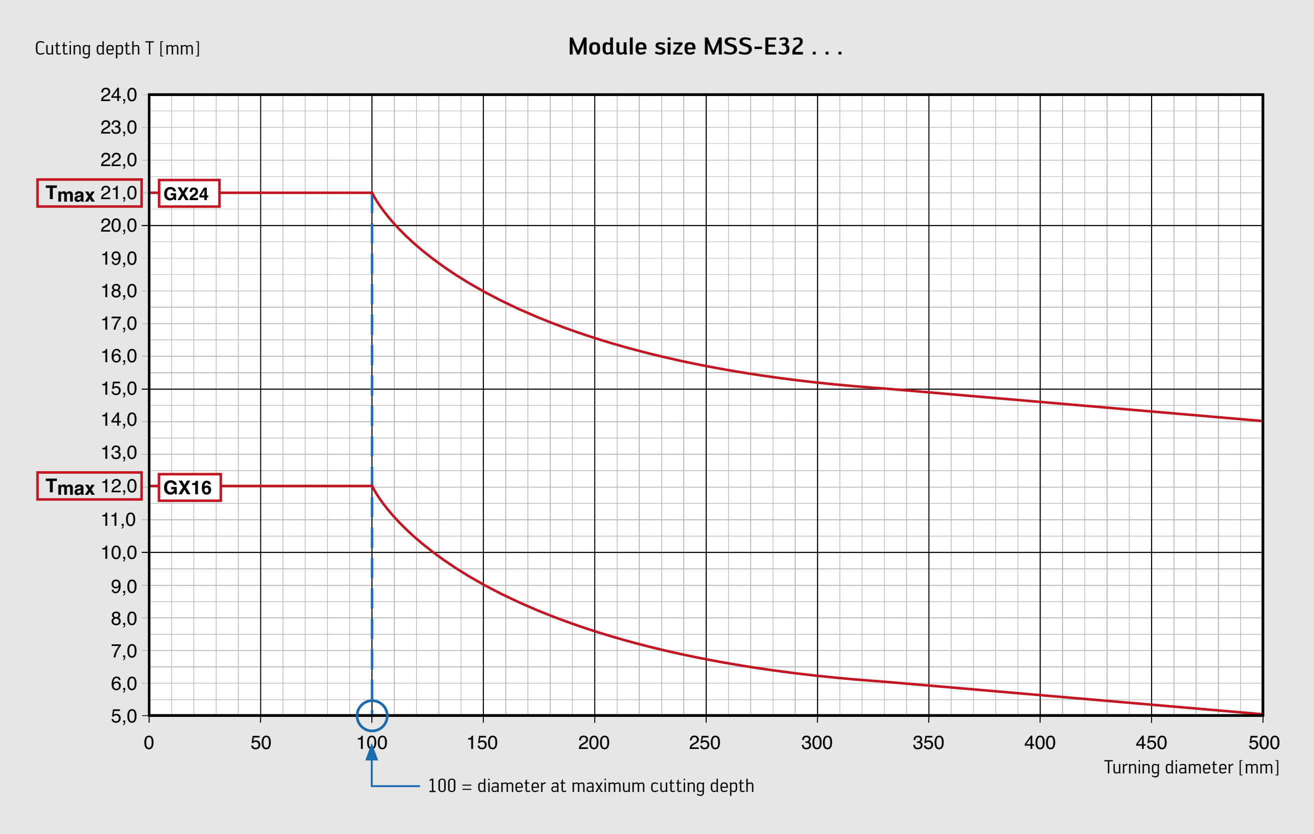


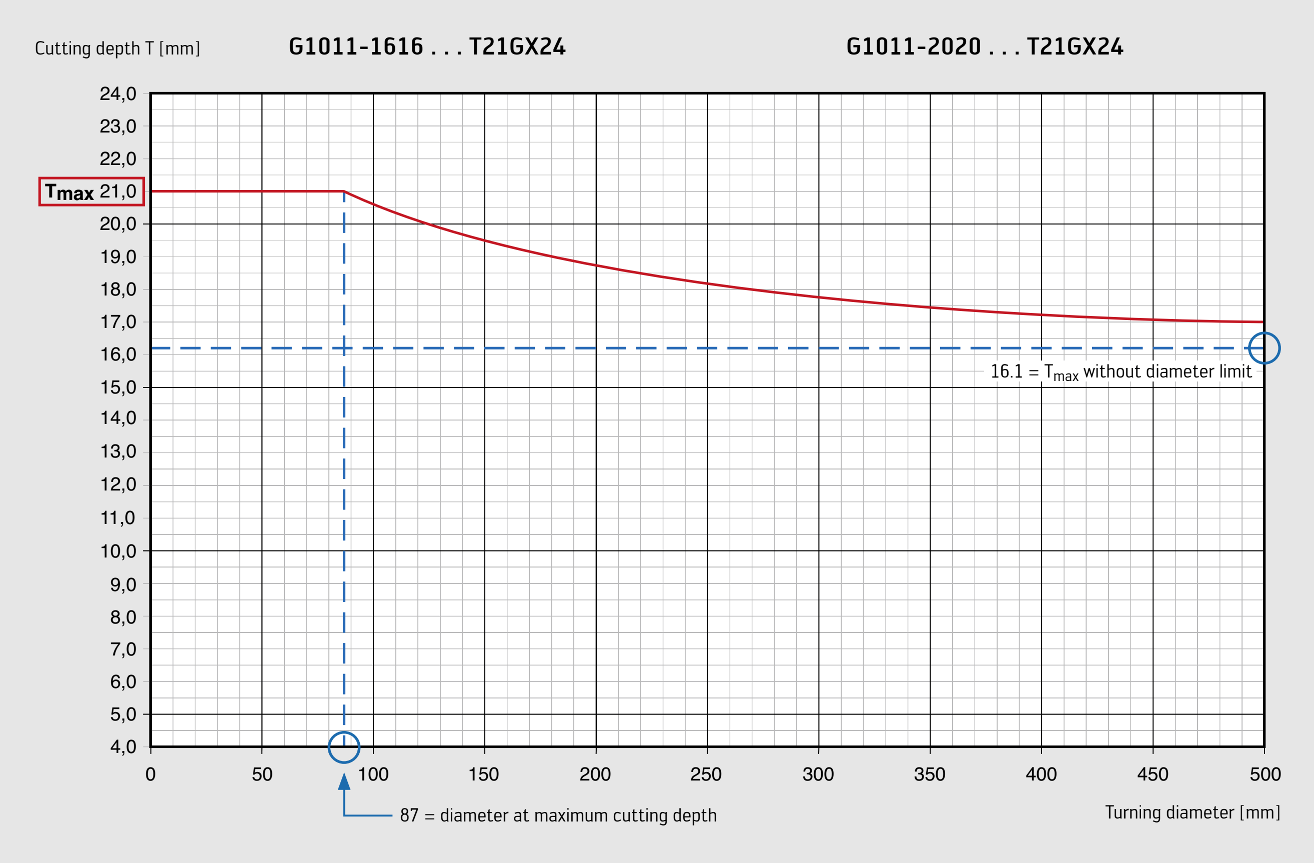
Application information:
Cutting depths depending on turning diameter (continued)



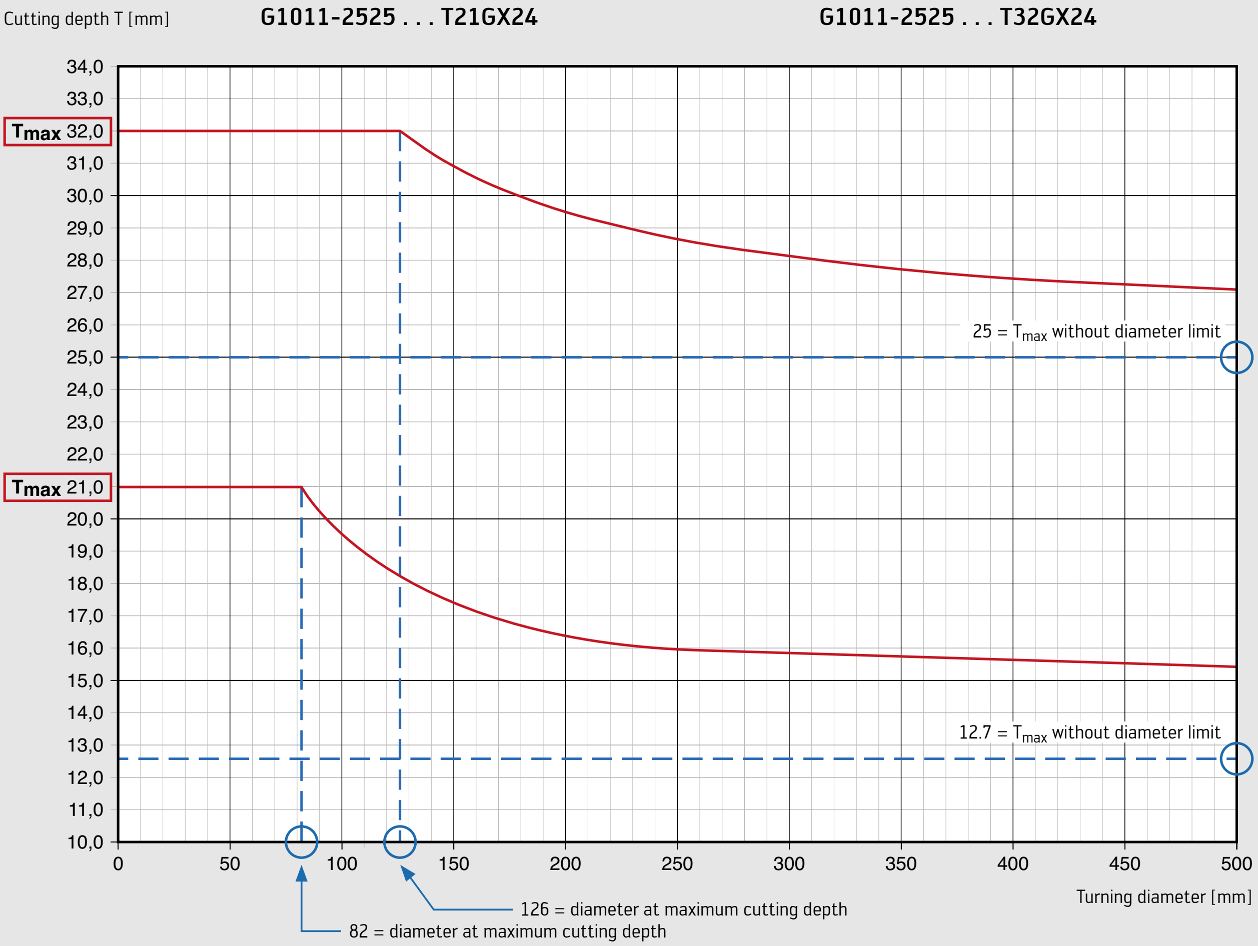


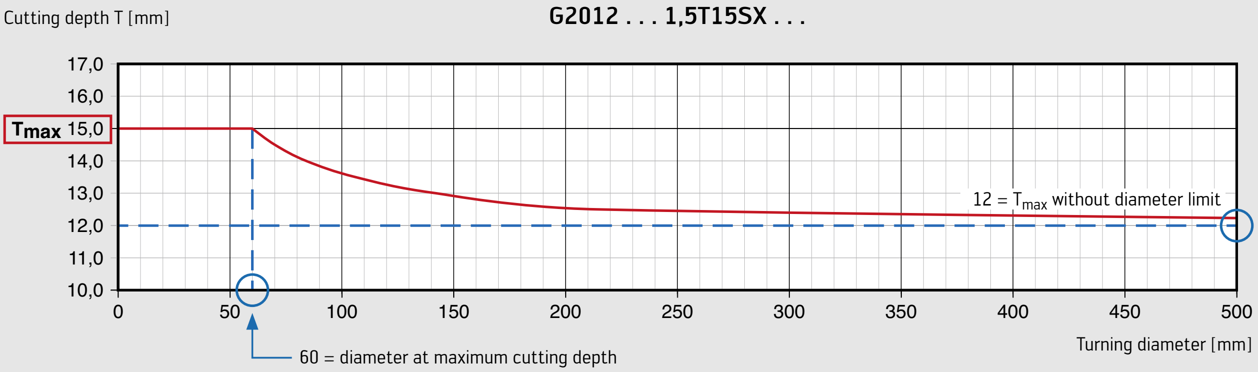
Application information:
Cutting depths depending on turning diameter (continued)



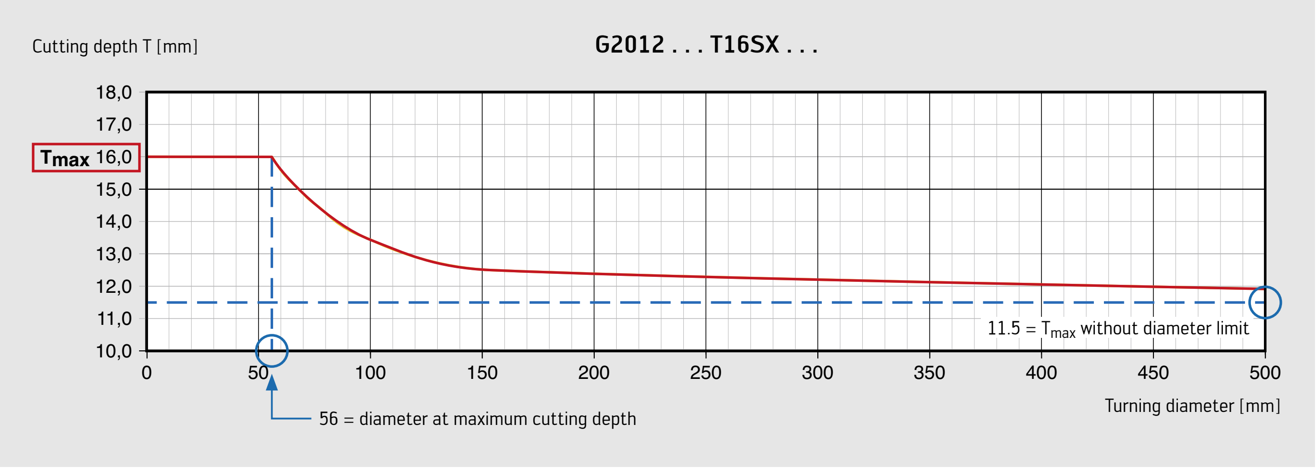


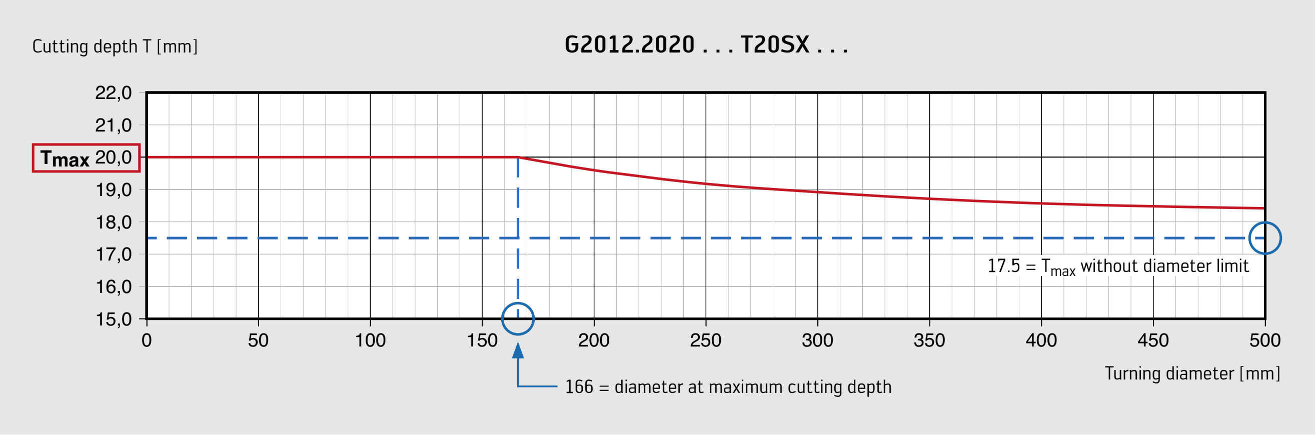
Application information:
Cutting depths depending on turning diameter (continued)

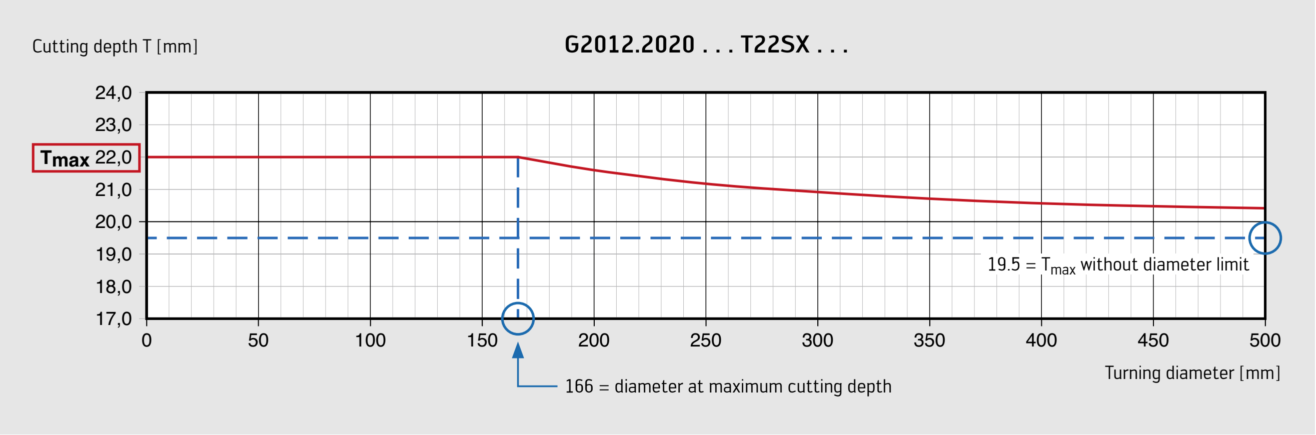




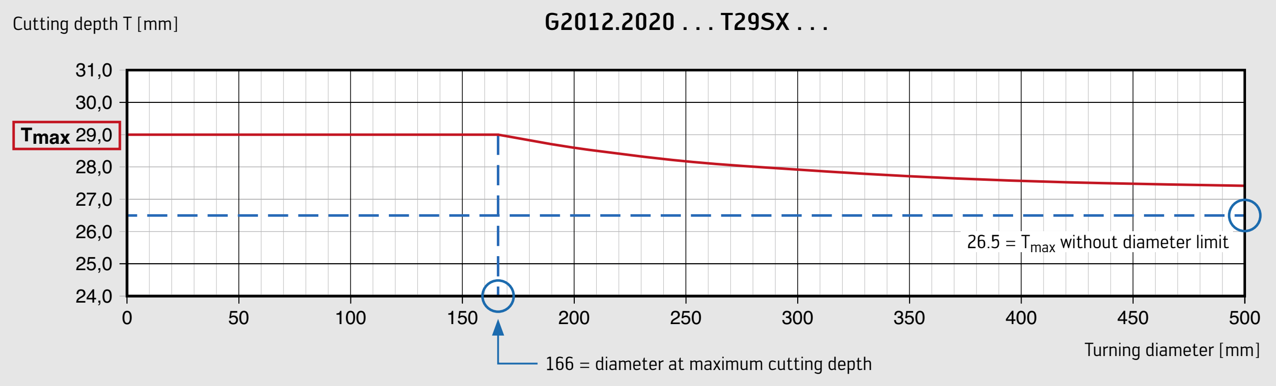
Application information:
Cutting depths depending on turning diameter (continued)

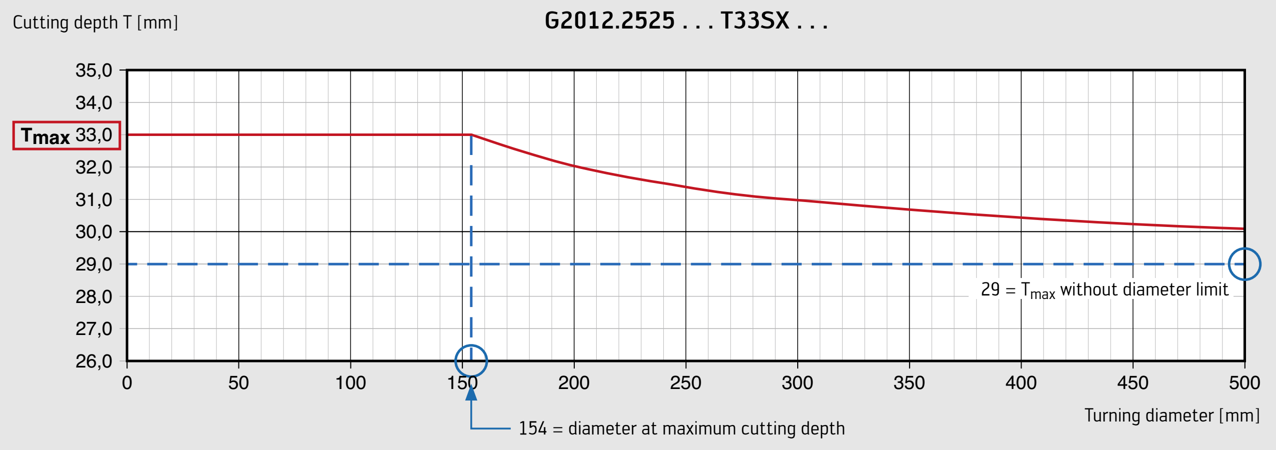


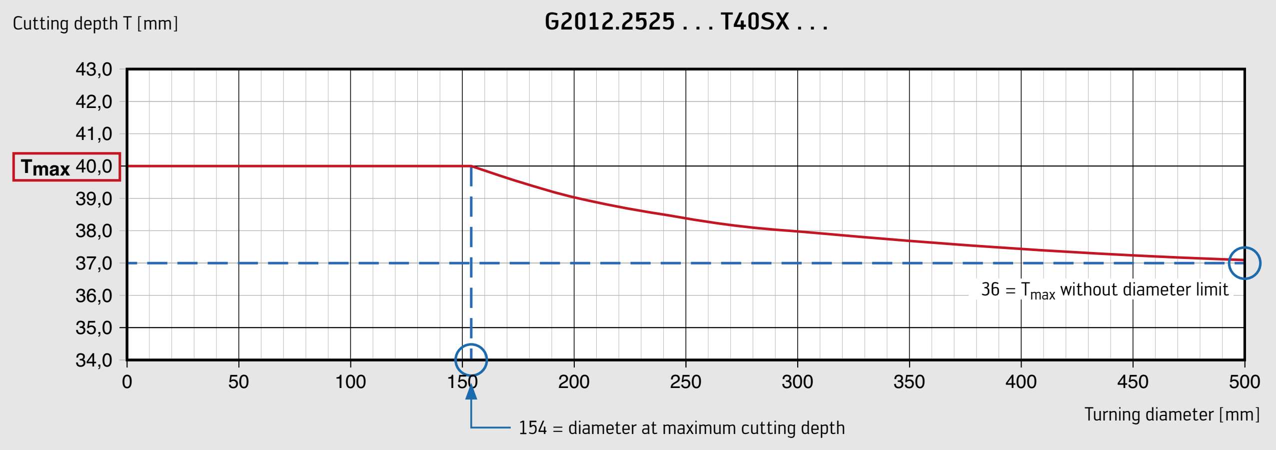




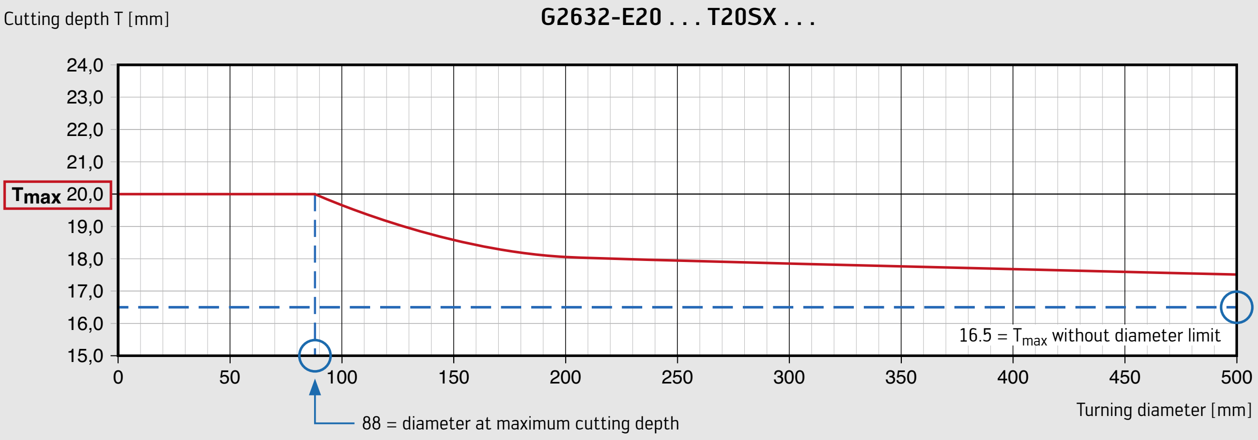
Application information:
Cutting depths depending on turning diameter (continued)

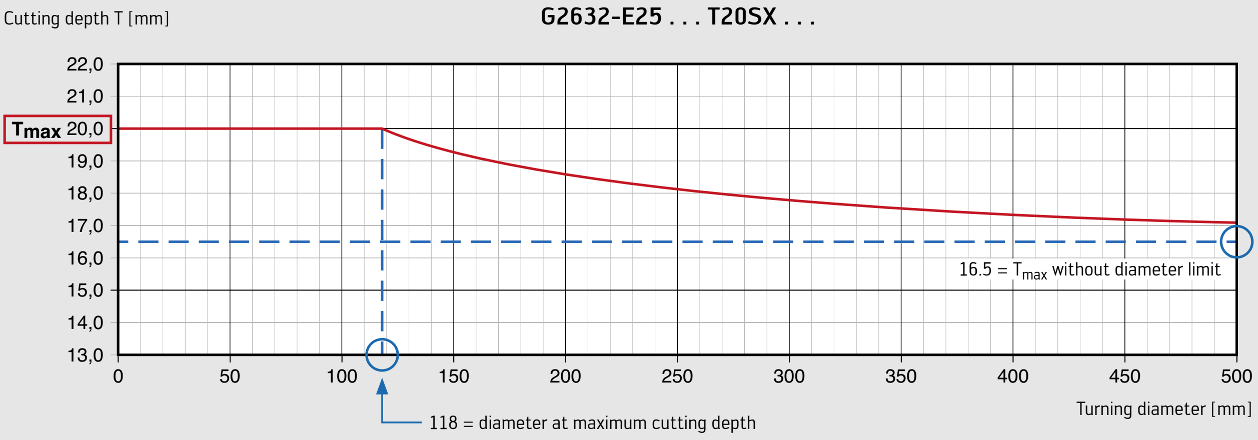


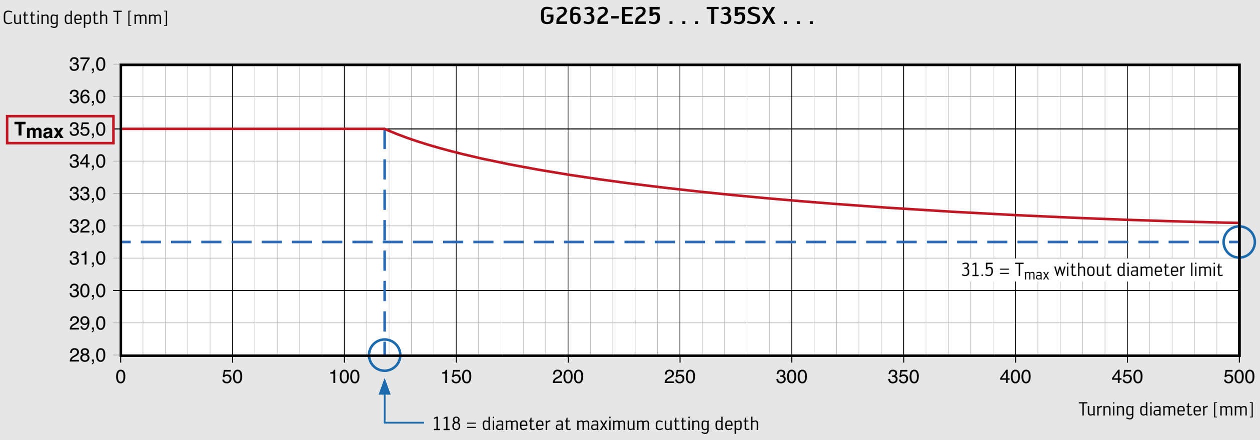




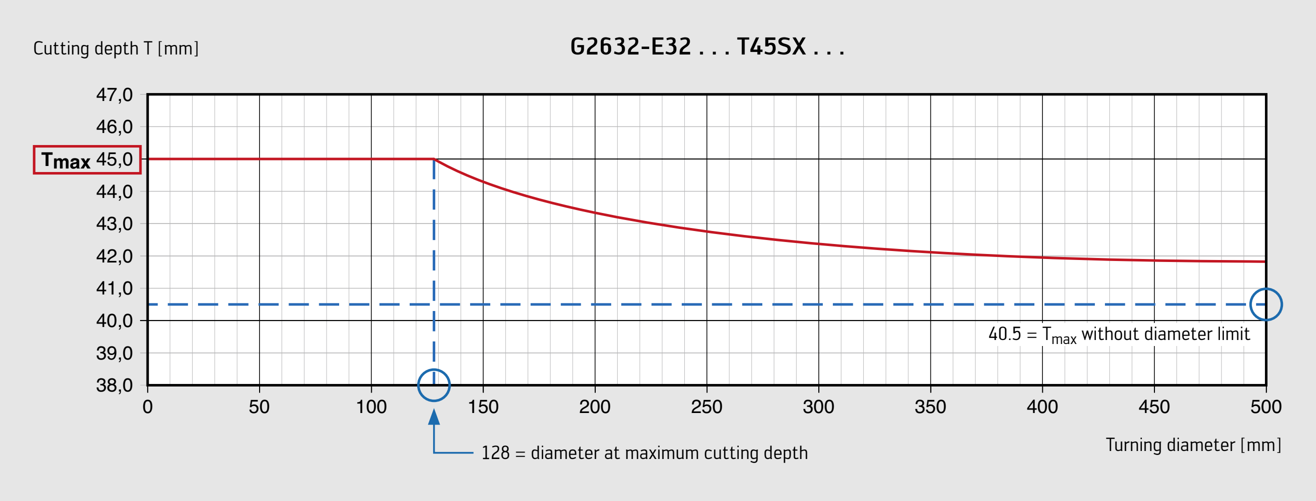
Application information: Cutting depths depending on turning diameter (continued)





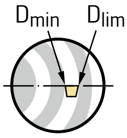


Application information:
Cutting depths depending on turning diameter (continued)



Application information:
Diameter range when using the G1511/G1521 tools for axial grooving

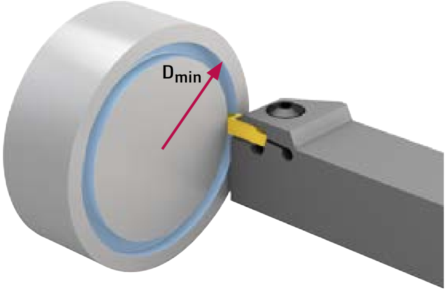
Diameter range



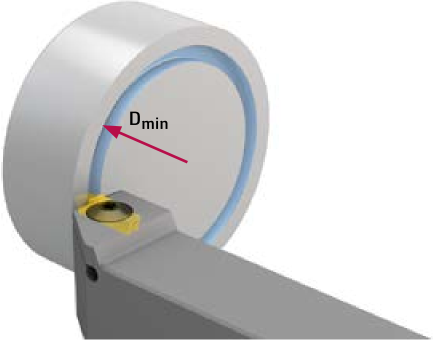
Grooving insert width s [mm]	Minimum axial groove D_{lim} [mm]	
	GX16	GX24
2	112	120
2,5	92	240
3	81	65
4	75	62
5	63	51
6	53	43

$D_{min} = D_{lim} - 2 \times s$

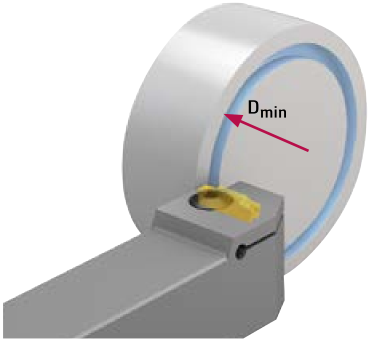
Application information:
Tool versions for axial grooving when using G4511/G4521 tools



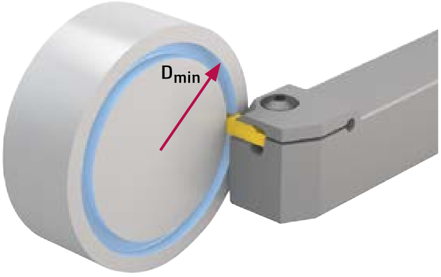
Right-hand tool G4511...R
Shank design 0°



Left-hand tool G4511...L
Shank design 0°



Right-hand tool G4521...R
Shank design 90°

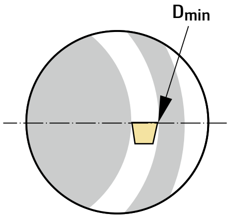


Left-hand tool G4521...L
Shank design 90°

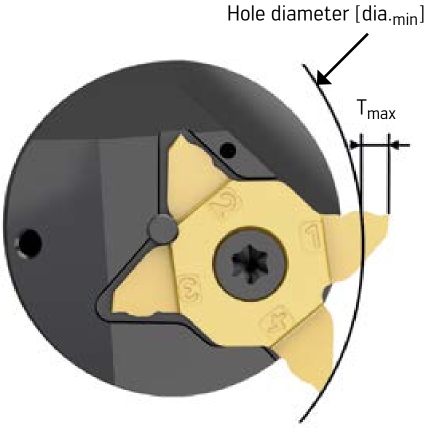
Application information:
Diameter ranges for axial grooving when using G4511/G4521 tools

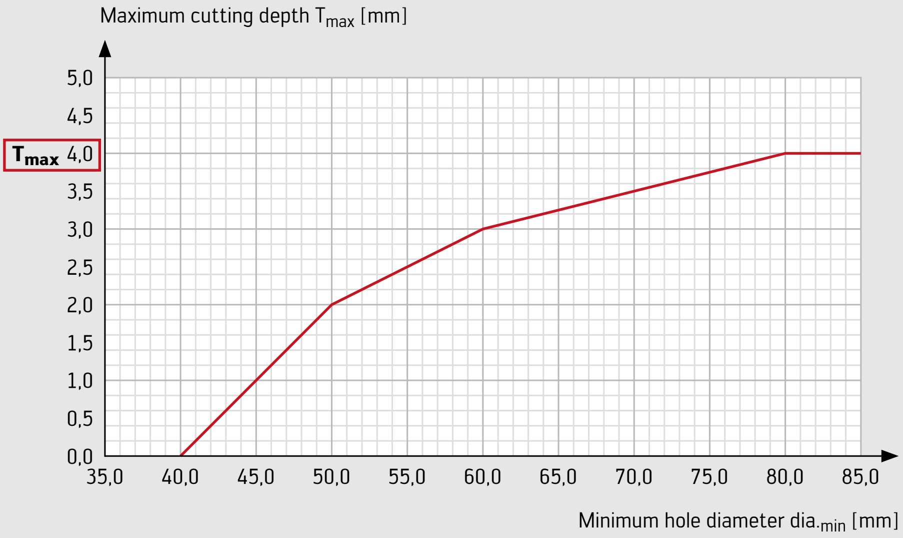
Diameter range

Grooving insert width s [mm]	Minimum axial groove D_{min} [mm] DX18 D_{min}
2	100
2,5	100
3	80
4	70
5	70
6	70



Application information:
Cutting depths depending on the component diameter G3221



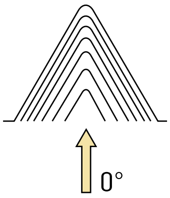


Application information:
Standard values for thread turning with Walter Cut MX

Feed types and their influence on machining

Radial feed

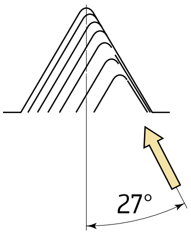
Recommended for:
- Short-chipping materials
- Hard materials



- Formation of V-shaped chips
- Both cutting edges engaged
- High cutting temperature
- Even indexable insert wear on both flanks
- Suitable for small pitches

Feed via flank 27°–29°

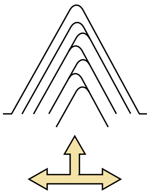
Recommended for:
- Pitches greater than 1.5 mm or 16 TPI
- The manufacture of trapezoidal threads



- Good chip formation
- Formation of helical chips
- One cutting edge engaged
- Chips are guided away from the thread
- Thread flanks with excellent surface quality

Alternating feed

Recommended for:
- Steep pitches
- Long-chipping materials



- Good chip formation
- Formation of flat helical chips
- Both cutting edges are evenly engaged, ensuring even wear

Standard values for the number of radial infeeds for each thread turning pass on manual lathes

The recommended cutting passes are only to be regarded as standard values. They were determined under good application conditions with medium-strength steel materials. In the case of high-strength steel materials, the number of feeds must be increased. It is important to reduce the initial thread cuts in this case.

External machining, metric 60°

No. of feeds	Pitch [mm] 0,5	0,6	0,7	0,75	0,8	1,0	1,25	1,5	1,75	2,0	2,5	3,0
Total depth [mm]	**0,34**	**0,40**	**0,47**	**0,50**	**0,54**	**0,67**	**0,80**	**0,94**	**1,14**	**1,28**	**1,58**	**1,89**
16												
15												
14												
13												
12												0,08
11												0,10
10											0,08	0,11
9											0,11	0,12
8									0,08	0,08	0,11	0,12
7									0,10	0,11	0,12	0,13
6							0,08	0,08	0,10	0,12	0,13	0,14
5						0,08	0,10	0,12	0,12	0,14	0,15	0,16
4	0,07	0,07	0,07	0,07	0,08	0,11	0,11	0,14	0,14	0,16	0,17	0,18
3	0,07	0,08	0,10	0,11	0,12	0,13	0,14	0,17	0,17	0,18	0,20	0,21
2	0,09	0,11	0,14	0,15	0,16	0,16	0,17	0,21	0,21	0,24	0,24	0,26
1	0,11	0,14	0,16	0,17	0,18	0,19	0,20	0,22	0,22	0,25	0,27	0,28

←

Radial infeed [mm]

Reduce the cutting speed

Application information – Parting off

As a general rule:

The most stable tool possible for parting off should always be selected. This prevents vibration and increases the tool life.

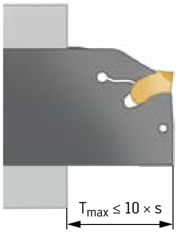
Insert width

The insert width selected should be as narrow as possible, but as wide as necessary.

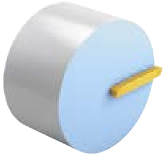
Reducing the insert width reduces the cutting force and saves material.

Cutting depth/clamping length

1. The max. cutting depth [T_{max}] of the tool and the max. clamping length of the insert holder should not exceed 10 × the cutting edge width [s]. The smallest possible cutting depth/clamping length should always be selected.



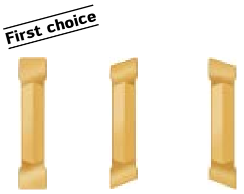
2. If the maximum cutting depth does not exceed the second cutting edge, double-edged Walter Cut GX or DX indexable inserts are the most efficient option. If the cutting depth is greater, single-edged Walter Cut SX cutting inserts are the first choice.



Use a neutral cutting edge for:

- Improved chip formation
- Lower resultant cutting forces
- Longer tool life

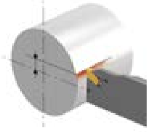
The design of the cutting inserts (right/left) can be determined by viewing the cutting edge from above where the parting-off pip remains, unlike the tools, which are instead viewed from the front.



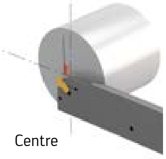
Neutral Right Left

Tip: In general, the following rules apply ...

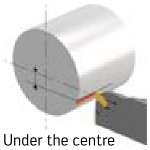
Direction of rotation of the machine spindle:
Clockwise → right cutting insert
Anticlockwise → left cutting insert



Above the centre



Centre



Under the centre

Checking the centre height [f]

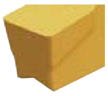
- Longer/more consistent tool life
- Reduced pip/burr formation

If the tool is positioned over or under centre, the effective cutting angles change during machining.

Reducing the feed

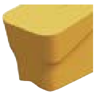
From a diameter of 4 mm, reduce the feed [f] by approx. 50–75 %.
Do not groove past the centre, as this creates a risk of fracture.
It is possible to groove past the centre to a maximum of corner radius +0.1 mm.*
For any further, a constant cutting speed and speed limitation should be used.
This is based on the clamping unit and/or bar loader.

[*] Programming note:
With a corner radius of 0.3 mm, the x measurement should be adjusted in the direction of -0.4 mm.



Smaller corner radius

- Smaller pips
- Better chip control
- Lower feed

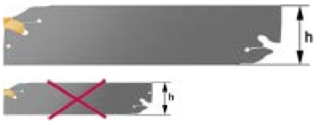


Larger corner radius

- Higher feed
- Longer tool life

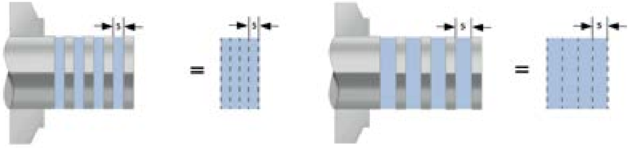
Use the largest tool possible – in relation to the height of the support [h]

- Higher tool rigidity
- Less vibration
- Longer tool life

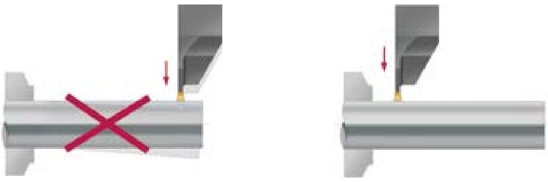


Use the smallest insert width possible

- Lower cutting force
- Reduced material consumption

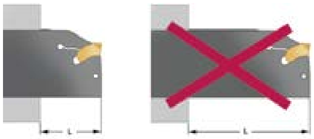


Clamp the workpiece at the shortest length possible and part off as close to the spindle as possible



Mount the tool in the machine with the shortest possible overhang

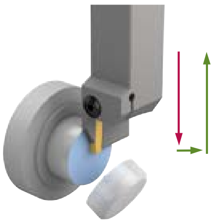
- Better face flatness
- Reduced vibration tendency
- Longer tool life



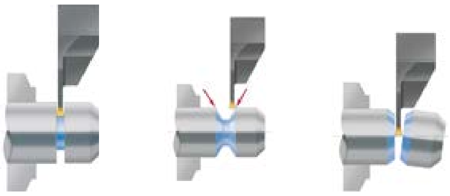
Application information – Parting off (continued)

Retracting the tool

After parting off, do not retract the tool immediately. First, step off axially and then retract.



Chamfering and parting off



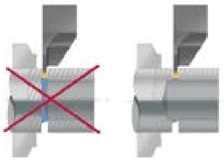
1. Pre-grooving 2. Chamfering 3. Parting off

Internal chamfering before parting off

The peripheral cutting edges of the chamfering tool and parting-off tool must be precisely aligned to achieve the result with the least burrs possible.

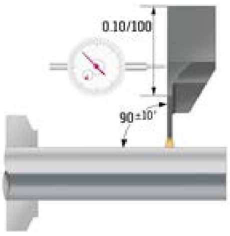
Parting off to a bore

The bore must be pre-bored to be deep enough for the entire cutting edge width of the parting-off tool to exit in the cylindrical section of the bore.



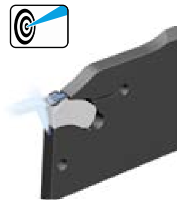
The tool must be aligned 90° to the axis of rotation

- Better face flatness
- Reduced vibration tendency



Precision cooling when parting off

Integrated precision cooling cools both the rake and flank faces exactly where it is needed. Combined with **Tiger·tec® Silver** indexable inserts, the tool demonstrates a two- to four-fold increase in tool life for parting-off operations.

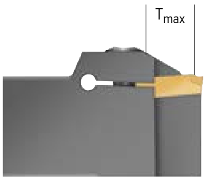


Vibration, chip jams and tool breakage, which would normally be a common occurrence given less than optimal conditions, are now a thing of the past. A higher quality surface finish is another of the benefits of this new design.

A reliable supply of coolant to the cutting edge is always guaranteed. Ensure sufficient filtration of the coolant ≥ 50 µ.

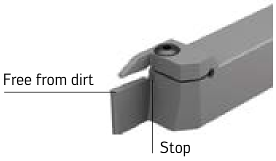
Tool use

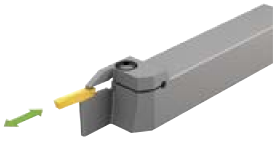
- Use the tool holder with the smallest possible cutting depth (T_{max}) for the application.



Cutting insert change

- When changing the cutting inserts, ensure that the new cutting insert lies securely against the tool holder stop.
- Before inserting the cutting insert, it is important to check to ensure that the insert seat is free from dirt and damage.
- Insert the cutting insert along the prismatic surfaces and into the insert seat, and watch out for resistance.
- Never tighten the clamping screw if there is no cutting insert in the insert seat.
- Tighten the clamping screw to the recommended torque.





Tool	Tightening torque
G15…/G45…	5,0 Nm
G1011…/G4011…	5,0 Nm
G1111	4,0 Nm
G1221/G3221/G4221	5,0 Nm
G1041/G4041	3,5 Nm
G30..	5,0 Nm
G4014	≤ 12 mm 2,0 Nm
G4014	≥ 12 mm 3,0 Nm
XLDE	3,5 Nm

Application information – Parting off with inclined cutting edges

When parting off solid material, the use of cutting inserts with lead angles reduces the formation of residual pips on the component that has been parted off.

Left-hand cutting insert:
Pips on the bar

Neutral cutting insert:
Pips on the workpiece

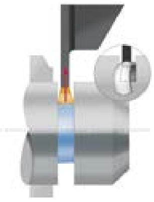
Right-hand cutting insert:
Pips on the workpiece

When parting off tubular material, the use of inclined cutting inserts prevents rings from forming. These rings could otherwise remain on the parted-off component and interfere with the rest of the manufacturing process. It also leads to reduced burr formation.

Left-hand cutting insert:
Burr on the left of the tube

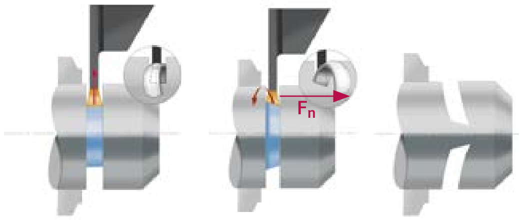
Neutral cutting insert:
Burr on the right of the tube

When inclined cutting inserts are used for parting off, the lead angle is likely to be detrimental to chip formation. The chip rolls at 90° to the main cutting edge, preventing it from forming a watch spring shape (as with a neutral cutting insert), and instead causing it to form a helical shape.

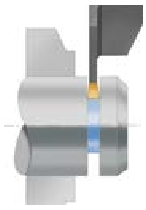
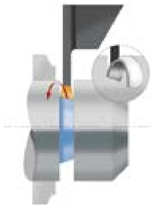


TIP:
One option for breaking the chamfer chip is to interrupt cutting briefly once a cutting depth of 1–2 × s is reached. Once cutting resumes, the chip flows in the existing groove and breaks.

TIP:
The feed values must be reduced by approximately 30% because the tool tends to run off-centre as a result of the axial force generated [F_n]. This can lead to vibration and convex parted-off surfaces.



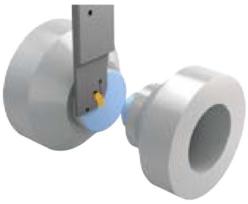
Effects on machining

	Neutral cutting insert 	Inclined cutting insert 
Stability and tool life	✓ good	✗ poor
Radial cutting forces (positive)	✗ high	✓ low
Axial cutting forces (negative)	✓ low	✗ high
Residual pip/burr formation	✗ large	✓ small
Risk of vibration	✓ low	✗ high
Surface quality and flatness	✓ good	✗ poor
Chip flow	✓ good	✗ poor

The use of inclined cutting inserts always has a negative effect on the cutting insert tool life (see table).
If possible, neutral cutting inserts should be used.
This statement applies particularly for machines with counter-spindles.

Application conditions – Reinforced blades

"Overhead" installation position
Contra blade

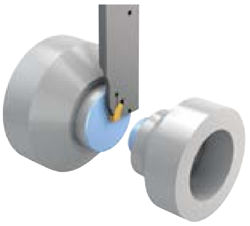


Main spindle Counter-spindle

M3 clockwise rotation

G2042.32R-..T.. SX-C
G1041.32R-..T.. GX..-C

"Normal" installation position



Main spindle Counter-spindle

M4 anticlockwise rotation

G2042.32R-..T.. SX
G1041.32R-..T.. GX..

"Normal" installation position
Contra blade

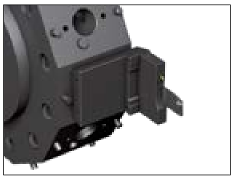
Main spindle Counter-spindle

M4 anticlockwise rotation

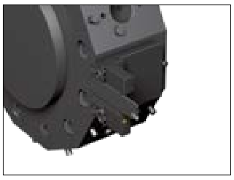
G2042.32L-..T.. SX-C
G1041.32L-..T.. GX..-C

Range of applications with VDI double serrations

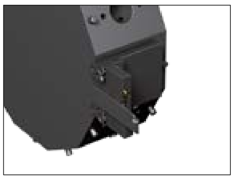
A2110-P blade adaptors – Star turrets



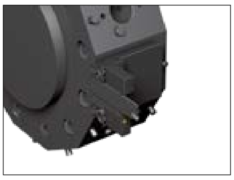
A2110…32R…P



A2110…32R…P
Overhead installation position

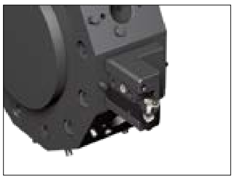


A2110…32L…P

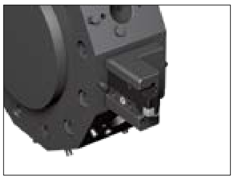


A2110…32L…P
Overhead installation position

A2110-P square shank adaptors – Star turrets



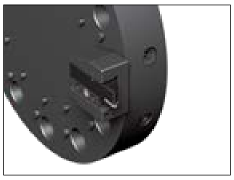
A2120…25N…P



A2120…25N…P
Overhead installation position

A2121-P square shank adaptors – Disc turrets

A2121…25R…P



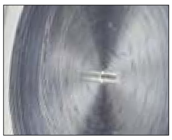
A2121…25L…P
Overhead installation position

Fault analysis – Parting off

Large residual pip/burr
- Reduce the feed value by 50–75% at a diameter of 4 mm or above
- Use a cutting insert with a lead angle
- Use a narrower insert (reduction of the cutting forces)
- Choose a smaller corner radius
- Choose a more positive geometry
- Check the centre height

Poor surface/vibration
- Use a more stable tool
- Clamp the tool at a shorter length
- Check whether the insert seat is damaged
- Choose a more positive geometry
- Increase the feed

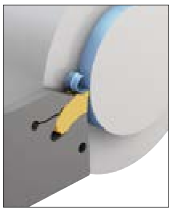
Damage caused by chips
- Use a chip formation with greater chip constriction
- Reduce the cutting speed
- Use a straight cutting insert
- Optimise the cooling (use of precision cooling tools)
- Increase the feed



Poor chip formation
- Reduce the cutting speed
- Improve the cooling (use of precision cooling tools)
- Check the chip formation
- Increase the feed

Poor face flatness
- Use a cutting insert with as small a lead angle as possible or no lead angle at all
- Use a tool with the smallest possible cutting depth
- Reduce the feed for cutting inserts with a lead angle
- Choose a smaller corner radius
- Choose a more positive geometry
- Align the tool correctly

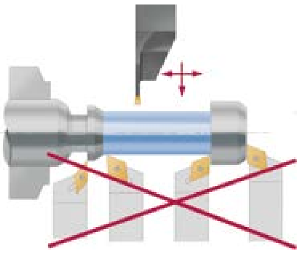
Chip formation when parting off
- Chip constriction inhibits friction on the side walls of the tool and reduces chip accumulation
- Enables higher feed values
- No damage to parted-off surfaces
- Chips are rolled up helically and broken short, so that they can exit the groove with ease – "watch spring chip"
- Chip width measured at approx. 0.05–0.10 mm smaller than the insert width [s]



Application information – Groove turning

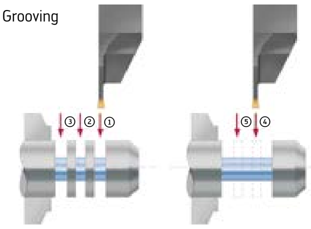
General

The use of groove turning tools allows machining steps to be grouped together, saving on the number of tools used – in particular for machining operations between shoulders or when a limited number of tool spaces are available.

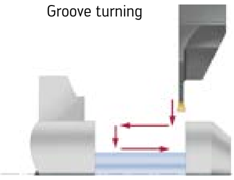


There are two different production strategies

For **grooving**, the feed moves in only one direction. Longitudinal turning with low material removal (approx. 0.1–0.3 mm) can only be carried out as a finishing operation. Grooving is effective when the groove depth is 1.5 times greater than the groove width.



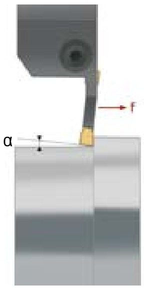
Groove turning is a combination of grooving and longitudinal turning movements. It is used when the groove width is 1.5 times greater than the groove depth.



Positive engagement

A precise positive-locking connection between the cutting insert and the insert seat enables both radial and axial forces to be absorbed.

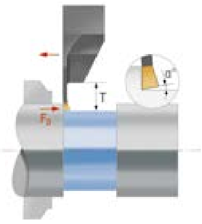
The longitudinal movement deflects the cutting insert [α].



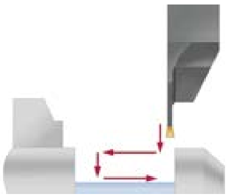
Deflection

Deflection means the deformation of the cutting insert support caused by a force [F_p]. This is necessary to create a minor clearance angle [α] during longitudinal turning. The following factors influence the degree of deflection:

- Depth of cut [a_p]
- Feed [f]
- Cutting speed [v_c]
- Corner radius [r]
- Material to be machined
- Cutting depth of the tool [T]
- Width of the cutting insert support



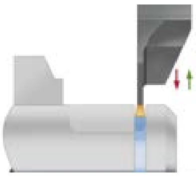
This enables groove turning and longitudinal turning operations when using special chip forming geometries. Universal geometries are ideally suited for use (e.g. UD4, UF4).



Diameter compensation

The deflection produces different longitudinal ratios on the tool. In order to create an even diameter during a finishing operation, diameter compensation must take place when transitioning from the grooving movement to the longitudinal turning movement:

① Pre-machine the component up to the finishing operation
② Groove to the final diameter
③ Retract by 0.1 mm
④ Turn longitudinally
⑤ Measure the grooving diameter and longitudinal turning diameter; correct the retraction dimension (0.1 mm) by the difference in diameter

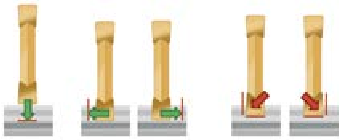


① Groove (a_p longitudinal turning movement)
② Retract by 0.1 mm

Machining

Certain tool paths must be adhered to in order to ensure a reliable machining process: For example, a tool must not be subjected to strain in two directions at the same time. Therefore, the cutting edge must be relieved after grooving before you start the longitudinal turning operation – the same is true when moving from longitudinal turning into grooving operations.

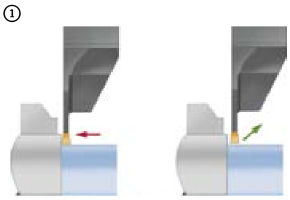
Rule of thumb – Groove turning:	
f_{start}	0,05 × s
f_{max}	0,07 × s
$a_{p\ min}$	r + 0,1 mm
$a_{p\ max}$	0,7 × s

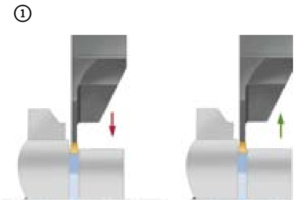


Machining sequence – Retracting

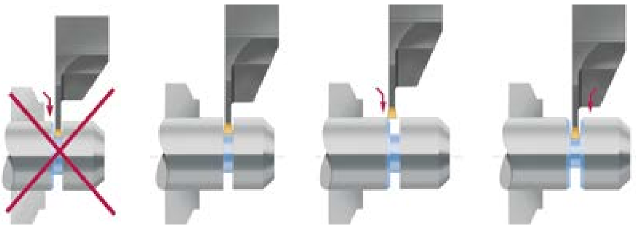
At the end of a longitudinal turning operation, retract by min. 0.1 mm: In the opposite direction to the direction of feed and away from the machined diameter, such that the cutting edge returns to its original position and the next grooving operation can take place.

Before you transition to the longitudinal turning operation, retract by approx. 0.1 mm again.





Producing a narrow recess with chamfer



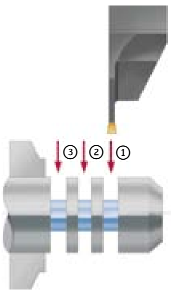
Grooving with 0.1 mm material removal on the diameter

Turn the chamfer and finish the first flank

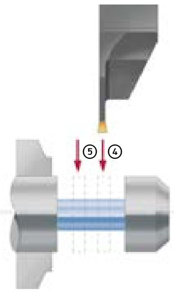
Turn the chamfer and finish the second flank

Application information – Groove turning (continued)

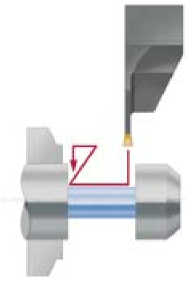
Producing a wide recess via multiple grooving passes



Pre-grooving
Web width = s − 2 × r



Pre-grooving

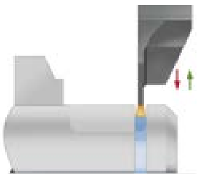


Finishing
$a_{p\ max} = r$

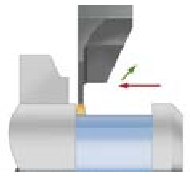
s = cutting edge width/r = corner radius/$a_{p\ max}$ = max. depth of cut

Producing a recess via groove turning

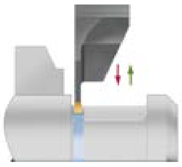
1. Roughing



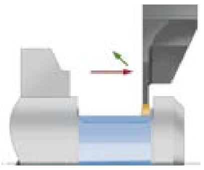
① Groove
② Retract by 0.1 mm



③ Turn longitudinally
④ Retract by 0.1 mm in two directions (in x and z direction)

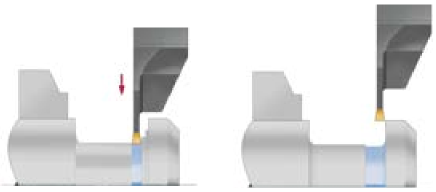


⑤ Groove
⑥ Retract by 0.1 mm

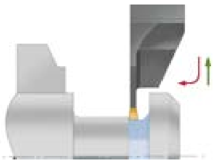


⑦ Turn longitudinally to approximately 0.5 mm before the shoulder
⑧ Retract by 0.1 mm in two directions (in x and z direction)

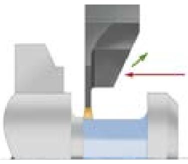
2. Finishing



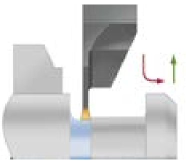
① Pre-groove at the radius tangent point to the required finished diameter



② Finish the first shoulder and copy turn the radius
③ Retract by the diameter compensation dimension



④ Turn longitudinally up to the radius tangent point
⑤ Retract by 0.1 mm in two directions (in x and z direction)



⑥ Finish the second shoulder and copy turn the radius

Surface quality

Groove turning in comparison to ISO turning:
A "wiper effect" is generated by deflecting the cutting insert when groove turning (see figure A).
R_a values under 0.5 µm are attainable. These result in a good load-bearing capacity.

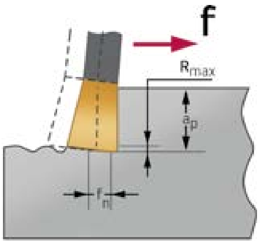


Fig. A

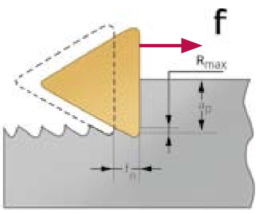
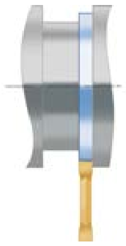


Fig. B

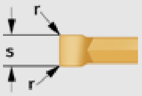
Side offset [s] – [r]

For side offset grooving, a universal "U" geometry should be used. The insert width should be at least the corner radius 0.5 × s and at most the cutting edge width s − 1 × r.

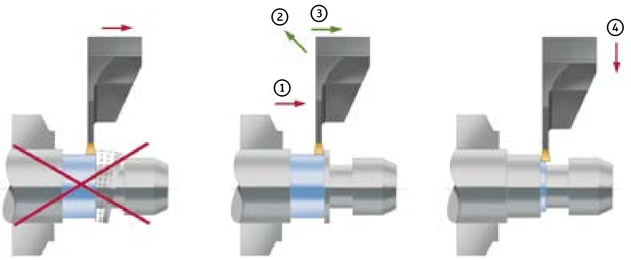


$a_{p\ min}$: 0,5 × s
$a_{p\ max}$: s − r

Example:
s = 3,0 mm; r = 0,2 mm → $a_{p\ min}$: 1,5 mm
$a_{p\ max}$: 2,8 mm



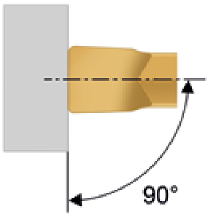
Preventing ring formation



① Turn longitudinally up to approx. 0.5–1.5 mm in front of the tool exit
② Retract at an angle away from the corner
③ Position the tool above the ring
④ Remove the ring in the grooving operation

The tool must be aligned 90° to the axis of rotation.

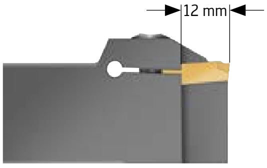
This is the only way to ensure that a clearance angle can be created when the tool is turned in both directions. Poor tool alignment generates vibrations and can lead to tool breakage.



Application information – Copy turning

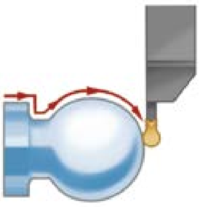
Tool use

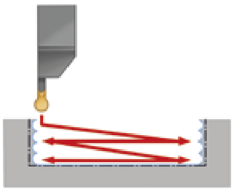
Use the tool holder with the smallest possible cutting depth (T_{max}) for the application.



Cutting inserts for copy turning provide excellent opportunities for efficiency when machining complex workpiece shapes.

- Use cutting inserts for copy turning to achieve outstanding chip control and high surface quality
- With unstable clamping, ramp to avoid vibration

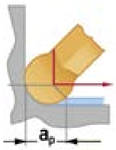




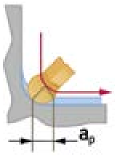
Preventing vibration during copy turning

- The radius of the indexable insert should always be smaller than the workpiece radius to avoid a large wrap angle.
- Reduce the feed in the workpiece radius range by 50% in comparison to the longitudinal cut.

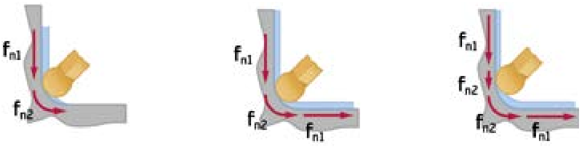
Insert radius = workpiece radius
Not recommended.



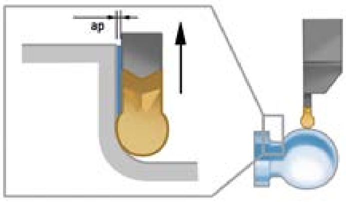
Insert radius < workpiece radius
Recommended.



f_{n1} = longitudinal cuts = max. chip thickness 0.15–0.40 mm
f_{n2} = radius machining = 50% feed



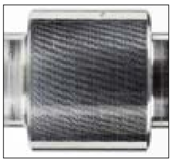
Maximum a_p when cutting with RD4 or RF8 geometries



Insert width s [mm]	$a_{p\ max}$ – RD4 [mm]	$a_{p\ max}$ – RF7 [mm]	$a_{p\ max}$ – RF8 [mm]
2,0	0,10	2,0–0,10	0,10
3,0	0,20	3,0–0,25	0,25
4,0	0,30	4,0–0,30	0,20
5,0	0,35	5,0–035	0,25
6,0	0,45	6,0–0,45	0,30
8,0	0,70	—	0,35

Fault analysis – Groove turning/copy turning

Vibration during turning
- Check the tool alignment
- Deflection of the cutting insert is too low
- Use a narrower insert (deflects more sharply)
- Use a smaller corner radius
- Clamp the workpiece at a shorter length

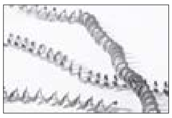


Step in turning diameter
- Correct the retraction dimension before the finishing cut
- Ensure even material removal
- Check whether the insert seat is damaged
- Increase the cutting speed
- Use a more positive geometry

Damage caused by chips
- Use a chip formation with greater chip constriction
- Reduce the cutting speed
- Optimise the cooling (use of precision cooling tools)

Ring formation
- Check the program sequence

Poor chip formation
- Reduce the cutting speed
- Increase the feed
- Improve the cooling (use of precision cooling tools)
- Check the chip formation

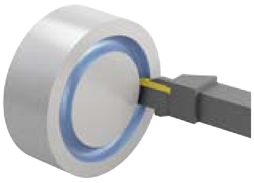


Application information – Axial grooving

Axial grooving operations require application-specific tools.

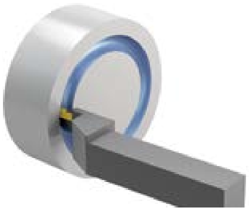
- The tool curvature of the groove turning holder depends on the workpiece radius
- When selecting the tool, take into account the inner and outer diameter of the groove
- Select the largest possible diameter range for the first recess

Standard variant



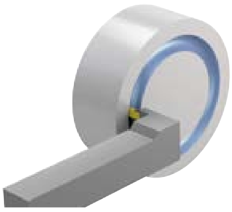
Right-hand axial tool
Shank design 0°
Tool curvature: External position

Standard variant



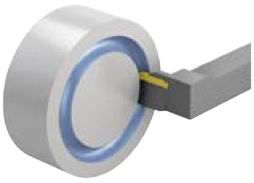
Left-hand axial tool
Shank design 0°
Tool curvature: External position

Standard variant



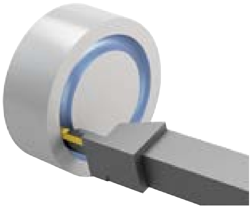
Right-hand axial tool
Shank design 90°
Tool curvature: External position

Standard variant



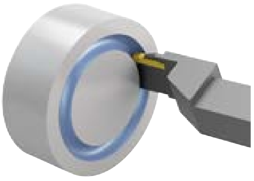
Left-hand axial tool
Shank design 90°
Tool curvature: External position

Contra variant



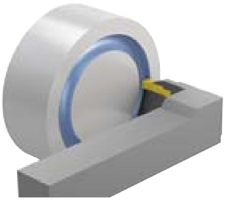
Right-hand axial tool
Shank design 0°
Tool curvature: Internal position

Contra variant



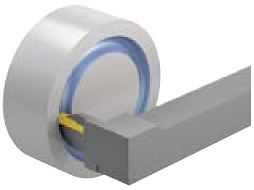
Left-hand axial tool
Shank design 0°
Tool curvature: Internal position

Contra variant



Right-hand axial tool
Shank design 90°
Tool curvature: Internal position

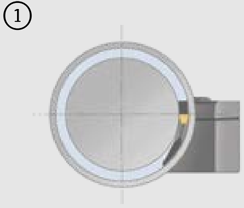
Contra variant



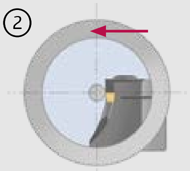
Left-hand axial tool
Shank design 90°
Tool curvature: Internal position

Important:
- The larger the diameter range of the first recess, the better the chip evacuation
- If possible, always begin at the outer diameter ① and work inwards ②

①

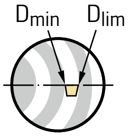


②



Diameter range when using the G1511/G1521 tools for axial grooving

Diameter range

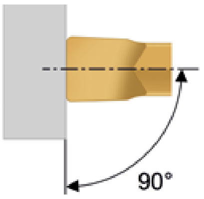


Grooving insert width s [mm]	Minimum axial groove D_{lim} [mm]	
	GX16	GX24
2	112	120
2,5	92	240
3	81	65
4	75	62
5	63	51
6	53	43

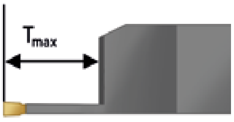
$D_{min} = D_{lim} - 2 \times s$

Application information – Axial grooving (continued)

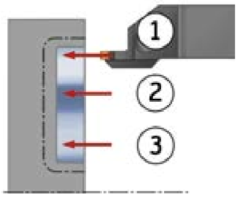
The tool must be aligned 90° to the axis of rotation.
Firstly check the parallelism of the cutting edge and the surface to be machined.
Exact positioning enables good surface quality when facing in both directions.



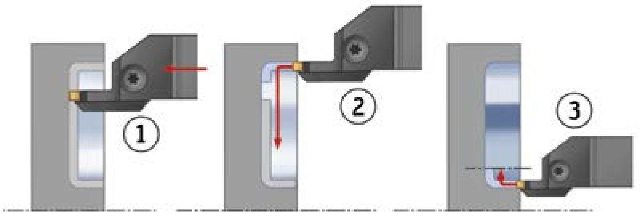
Tool selection
According to the required machining depth:
Choose a short cutting depth T_{max}.
→ This minimises the risk of vibration



Machining sequence – Roughing
- The first recess ① must always be carried out at the largest diameter
- The cuts ② and ③ should be 0.5–0.8 times the width of the cutting insert
- Material removal at the flanks and at the bottom: At least the size of the corner radius

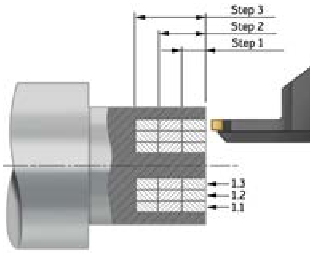


Machining sequence – Finishing

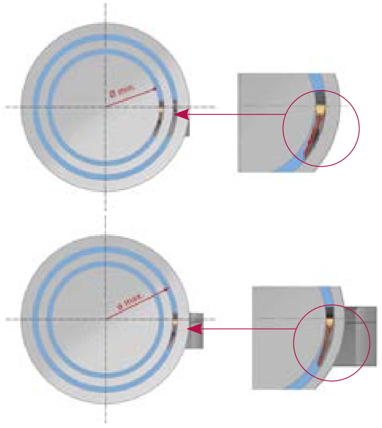


- Start the first finishing cut ① in the specified diameter range directly after the radius
- In cut ②, the outer diameter is finished: Work inwards – until the end of the second radius of the inner diameter
- Finally, carry out cut ③: Finishing of the inner diameter and radius

Deep grooving
With large cutting depths, difficult materials or poor chip breaking, step-by-step grooving is recommend in order to enable chip clearance.

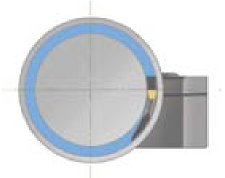


Rule of thumb
The larger the diameter range of the first recess:
- The better the chip evacuation
- The higher the tool stability (see course of the lines of force)



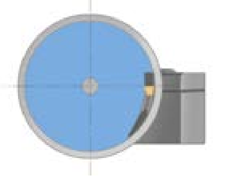
Correct usage

If the tool body is making contact with the workpiece:
- Check the diameter range of the tool
- The tool is possibly not parallel to the axis
- Check the centre height



When approaching the inner diameter:
- Slightly lower the tool to under the centre height

When approaching the outer diameter:
- Place the tool slightly over the centre height

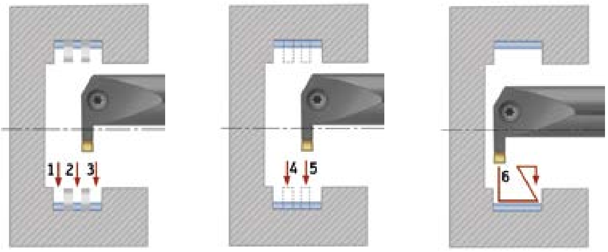


Application information – Internal grooving

Machining sequence – Internal grooving

When internal grooving deep grooves, multiple grooving can be used as a strategy for better chip control.

Producing a wide recess via multiple grooving passes



Pre-grooving
Web width = s – 2 × r

Pre-grooving

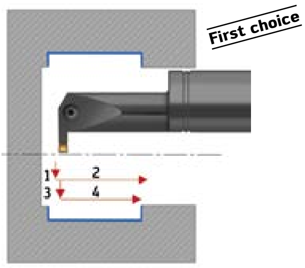
Finishing
$a_{p\ max}$ – r

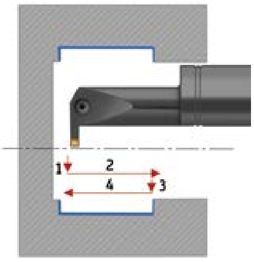
s = cutting edge width/r = corner radius/$a_{p\ max}$ = max. depth of cut

Internal recessing

When groove turning long grooves (as opposed to external groove turning), take into account that material is machined out of the bore in a draw cut in order to ensure chip guidance to the outside.

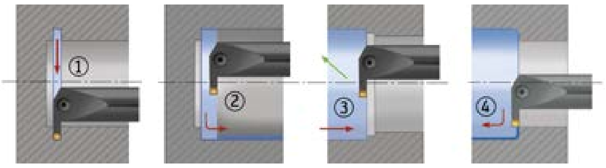
Machining sequence – Roughing





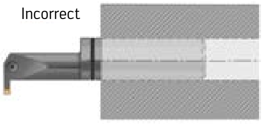
If the chip formation allows, conventional groove turning can also be used as an alternative.

Machining sequence – Finishing

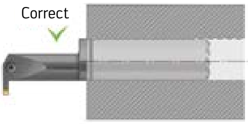


- Start the first finishing cut ① directly after the radius
- In the second cut ②, the left flank is finished
- In the third cut ③, turn in the "Z"+ direction, until the end of the second radius of the right flank
- Finally, carry out cut ④: Finishing of the right flank and radius

Correct use of G1221-P/G3221-P/G4221-P

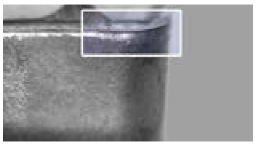
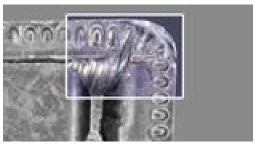
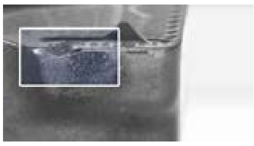
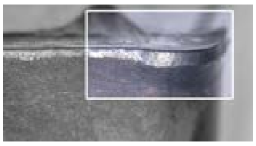


Coolant can exit along the boring bar because the seal in the clamping unit is open.



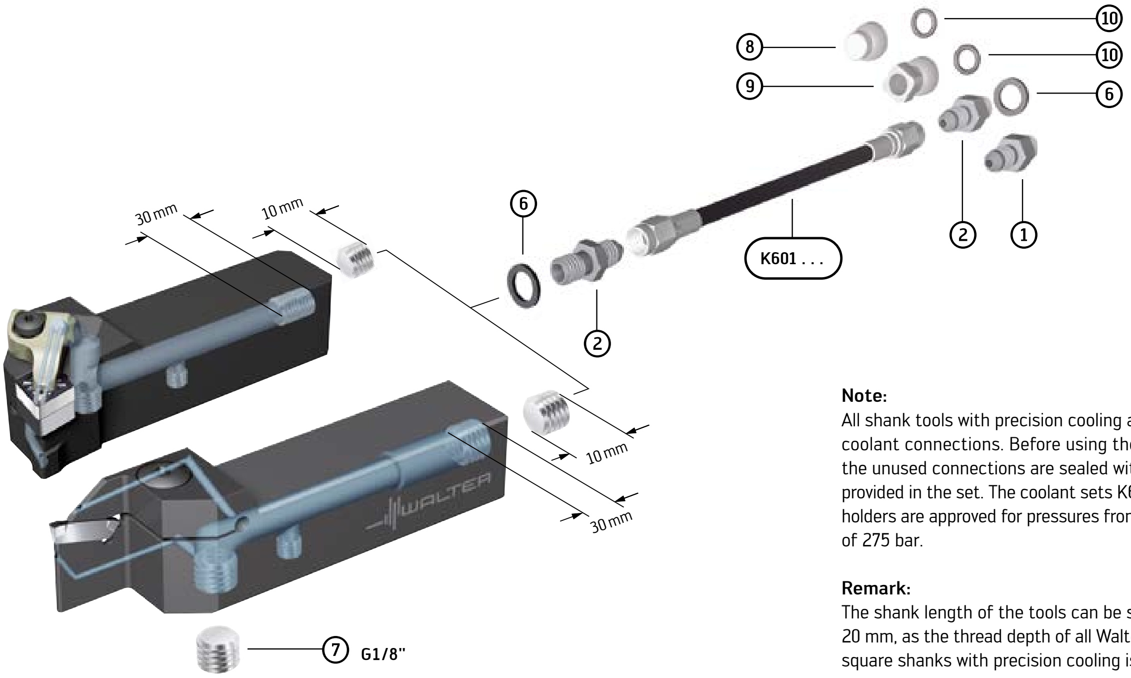
Coolant cannot escape because the seal in the clamping unit is closed.

Application information
Wear analysis and counter-measures

Wear patterns		Cause	Measures
Flank face wear		Flank face wear is caused by abrasion between the workpiece and the tool at the flank face of the indexable insert.	1. Reduce the cutting speed 2. Use a more wear-resistant cutting tool material 3. Increase the feed 4. Increase the coolant pressure/check the alignment
Crater wear		Crater wear is caused by diffusion and abrasion on the rake face.	1. Reduce the cutting speed 2. Use a more wear-resistant cutting tool material 3. Reduce the feed 4. Use a geometry with a greater rake angle 5. Increase the coolant pressure/check the alignment
Micro galling		Micro galling causes parts of the workpiece material to stick to the cutting edge, resulting in a build-up on the cutting edge.	1. Increase/reduce the cutting speed 2. Use an indexable insert with a sharper cutting edge 3. Use a cutting tool material with a treated (smoother) surface 4. Increase the coolant pressure/check the alignment
Fractures		Fractures are caused by vibration, interrupted cuts, chip impacts and thermal shocks in combination with cutting tool material substrates that are too hard.	1. Reduce the cutting speed 2. Use a tougher cutting tool material 3. Reduce the feed 4. Check the tool stability if vibration occurs 5. Use a more stable geometry 6. Use screw clamping instead of a self-clamping system
Plastic deformation		Plastic deformation is caused by excessive heat development combined with excessive mechanical stress.	1. Use a more wear-resistant cutting tool material 2. Reduce the feed 3. Reduce the depth of cut 4. Reduce the cutting speed 5. Increase the coolant pressure/check the alignment
Notch wear		Notch wear often occurs during the machining of workpieces with a hard surface (forged or cast).	1. Reduce the cutting speed 2. Reduce the feed 3. Use a more wear-resistant cutting tool material 4. Use a less sharp indexable insert 5. Program a varying depth of cut 6. Increase the coolant pressure/check the alignment
Thermal cracks		Thermal cracks are caused by fluctuations in temperature (thermal shock).	1. Reduce the cutting speed 2. Reduce the feed 3. Use a tougher cutting tool material 4. Use a less sharp indexable insert 5. Turn off the coolant supply when machining interrupted cuts

Assembly parts and accessories
Coolant hose set for shank tools with precision cooling (-P)

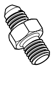
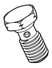
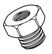
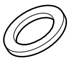
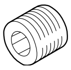
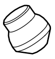
Shank tools -P



Note:
All shank tools with precision cooling are equipped with three coolant connections. Before using the tools, ensure that the unused connections are sealed with the threaded plugs provided in the set. The coolant sets K601 . . . for shank tool holders are approved for pressures from 10 bar to a maximum of 275 bar.

Remark:
The shank length of the tools can be shortened by up to 20 mm, as the thread depth of all Walter Turn and Walter Cut square shanks with precision cooling is 30 mm.

Walter coolant hose set -P

		Individual components	Designation	Length			
				150 mm	**K601.01.150-SET**	**K601.02.150-SET**	**K601.03.150-SET**
				250 mm	**K601.01.250-SET**	**K601.02.250-SET**	**K601.03.250-SET**
				300 mm	**K601.01.300-SET**	**K601.02.300-SET**	**K601.03.300-SET**
						Number per set	
①		M10 connection element	FS2252		1 ×	—	—
		M8×1 connection element	FS2597		—	—	—
		5/16" UNF connection element	FS2595		—	—	—
②		G1/8" double connection element	FS2253		2 ×	1 ×	—
③		M10 angle connection	FS2255		—	1 ×	2 ×
④		G1/8" angle connection	FS2254		—	1 ×	1 ×
		M8×1 angle connection	FS2596		—	—	—
		5/16" UNF angle connection	FS2594		—	—	—
⑤		G1/4"–G1/8" reducer	FS2256		—	1 ×	1 ×
⑥		Copper gasket	FS2257		2 ×	3 ×	4 ×
⑦		G1/8" threaded plug	FS2258		1 ×	1 ×	1 ×
		M8×1 threaded plug	FS2587		—	—	—
		5/16-24 UNF threaded plug	FS2593		—	—	—
⑧		Brass blanking plug	FS2259		1 ×	1 ×	1 ×
⑨		G1/8" brass nozzle	FS2260		1 ×	1 ×	1 ×
⑩		O-ring	FS2261		2 ×	2 ×	2 ×

Designation key for Walter Cut cutting inserts

Example:

GX	24	–	2	E	300	N	03	–	U	F	4
1	2		3	4	5	6	7		8	9	10

1

Insert type

MX

DX

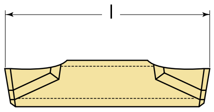
GX

SX

UX

2

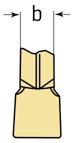
Insert length l [mm]



09	l = 9
16	l = 16
18	l = 18
24	l = 24
30	l = 30
34	l = 34

3

Width category



0

1

2

3

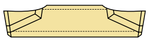
4

5

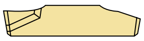
4

Basic shape

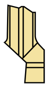
E



F

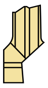


R



Right

L



Left

8

Application

A **“Axial”**
- Axial grooving
- Facing

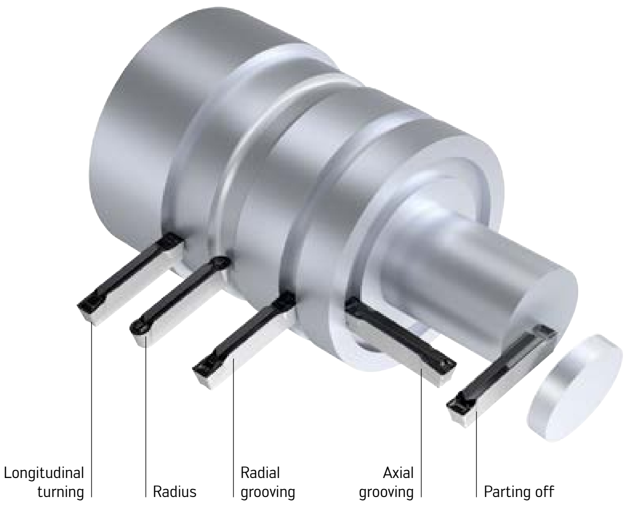
C **“Cut off”**
- Parting off
- Radial grooving

G **“Grooving”**
- Radial grooving
- Axial grooving
- Parting off

R **“Radius”**
- Radial grooving
- Axial grooving
- Longitudinal turning
- Facing

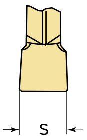
S **“Slitting”**
- Slitting
- Slot milling

U **“Universal”**
- Longitudinal turning
- Radial grooving
- Axial grooving
- Facing
- Parting off



5

Insert width s [mm]

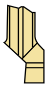
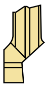
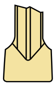
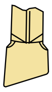
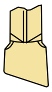


For example:

200	s = 2,0
220	s = 2,2
250	s = 2,5
300	s = 3,0
310	s = 3,1
etc.	

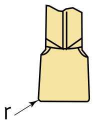
6

Version

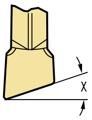
Grooving:	**R**		Right
	L		Left
	N		Neutral
Parting off:	**R**		Right
	L		Left

7

Corner radius r [mm]/ approach angle χ [°]



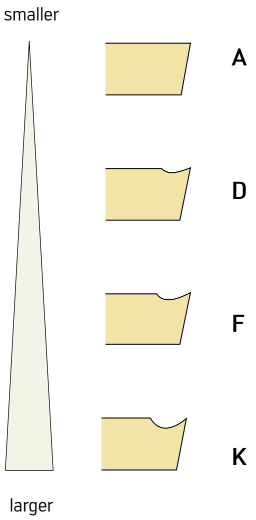
02	r = 0,2
03	r = 0,3
04	r = 0,4
05	r = 0,5
etc.	



00	χ = 0°
6	χ = 6°
7	χ = 7°
15	χ = 15°
etc.	

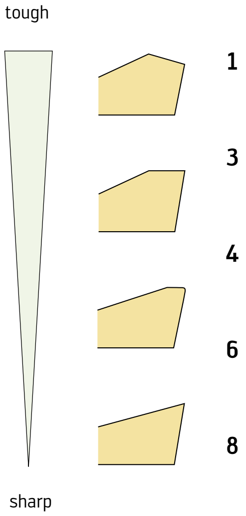
9

Rake angle



10

Cutting edge



Designation key for carbide cutting tool materials – Grooving

Example:

W	S	M	33	S
Walter	**1**	**2**	**3**	**4**

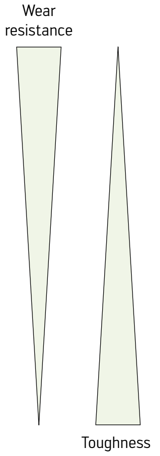
1	
1. Primary application or coating type	
P	Steel
M	Stainless steel
K	Cast iron
N	NF metals
S	Materials with difficult cutting properties
H	Hard materials

2	
2. Primary application	
P	Steel
M	Stainless steel
K	Cast iron
N	NF metals
S	Materials with difficult cutting properties
H	Hard materials

3

ISO application range

01
05
10
20
21
23
30
32
33
43



Cutting tool materials for:

0	ISO turning
1	ISO turning
5	ISO turning
2	Thread turning
3	Grooving

4	
Generation	
G	Tiger·tec® Gold
S	Tiger·tec® Silver

Designation key for Walter Cut grooving tools

Example:

G	1	1	11	–	2020	R	–	3	T33	–	090	GX24	–	C	–	P
1	2	3	4		5	6		7	8		9	10		11		12

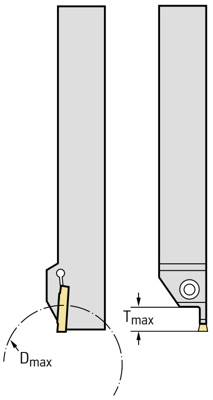
1	
Tool group	
G	Grooving

2	
Generation	
1	GX
2	SX/UX
3	MX
4	DX

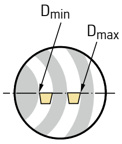
3	
Tool type	
0	Radial grooving tool
1	Axial grooving tool
2	Internal grooving tool
5	Grooving tool without support
6	Modular external radial grooving

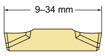
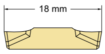
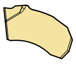
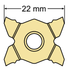
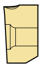
4	
Tool type	
11	Angled at 0°, straight clamping screw
12	Angled at 0°, self-clamping system
14	Angled at 0°, clamping screw from the side (SmartLock)
16	Angled at 0°, clamping screw from the front
21	Angled at 90°, straight clamping screw
22	Angled at 90°, self-clamping system
32	Grooving module, self-clamping system
35	Grooving module, indirect clamping screw
41	Parting blade, clamping screw
42	Parting blade, self-clamping system
51	Angled, straight clamping screw
61	Clamping block/split

8	
Cutting depth/ parting-off diameter	
T06	6 mm
T12	12 mm
T21	21 mm
T32	32 mm
T33	33 mm
T35	35 mm
D16	Ø 16 mm
D32	Ø 32 mm



9	
Minimum axial grooving diameter/ blade height	
Minimum axial grooving diameter	
034	Ø 34 mm
042	Ø 42 mm
054	Ø 54 mm
067	Ø 67 mm
090	Ø 90 mm
130	Ø 130 mm
220	Ø 220 mm
Blade height	
26	26 mm
32	32 mm
52	52 mm



10	
Type of indexable insert	
GX	 9–34 mm
DX	 18 mm
SX	
MX	 22 mm
UX	

5

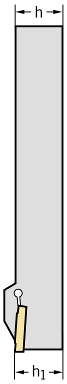
Shank size

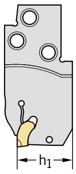
Square shank	
1010	10 × 10 mm
1212	12 × 12 mm
1616	16 × 16 mm
2020	20 × 20 mm
2525	25 × 25 mm
3225	32 × 25 mm
3232	32 × 32 mm
4032	40 × 32 mm

Walter Capto™	
C3	32 mm
C4	40 mm
C5	50 mm
C6	63 mm
C8	80 mm

QuadFit	
Q32	32 mm
Q40	40 mm
Q50	50 mm

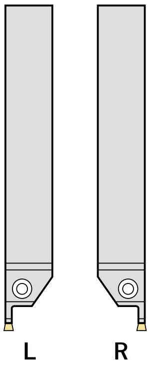
Module size h_1	
E12	12 mm
E16	16 mm
E20	20 mm
E25	25 mm
E32	32 mm





6

Toolholder design

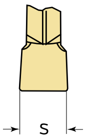


R	Right
L	Left
N	Neutral

7

Cutting edge width

1,5	1,5 mm
2	2 mm
3	3 mm
4	4 mm
5	5 mm
6	6 mm
8	8 mm
10	10 mm



11

Version

–C	Contra

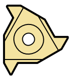
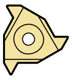
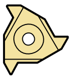
12

Cooling

–P	Precision cooling

Product range overview of indexable inserts and cutting tool materials: Thread turning

Indexable inserts

Application		Thread type	Machining
Partial profile			
	General machining	55° partial profile	Internal thread
		60° partial profile	External thread Internal thread
Full profile			
	General machining	ISO metric 60°	External thread Internal thread
		American UN 60°	External thread Internal thread
	Steam, gas and water lines	Whitworth	External thread Internal thread
		American NPT	External thread Internal thread

Cutting tool materials: Carbide

Application	Coating	01	05	10	15	20	25	30	35	40	45
ISO P	PVD			WXP20	WXP20	WXP20	WXP20	WXP20			
	PVD					WMP32	WMP32	WMP32	WMP32	WMP32	
ISO M	PVD			WXM20	WXM20	WXM20	WXM20	WXM20			
	PVD					WMP32	WMP32	WMP32	WMP32	WMP32	

Application range

← Wear resistance

Toughness →

Cutting data for thread turning
Carbide grades

= Cutting data for wet machining
= Dry machining is possible

Material group	Overview of the main material groups and code letters			Brinell hardness HB	Tensile strength R_m N/mm²	Machining group[1]		
P	Non-alloyed steel	C ≤ 0,25 %	Annealed	125	430	P1	●●	
		C > 0,25… ≤ 0,55 %	Annealed	190	640	P2	●●	
		C > 0,25… ≤ 0,55 %	Heat-treated	210	710	P3	●●	
		C > 0,55 %	Annealed	190	640	P4	●●	
		C > 0,55 %	Heat-treated	300	1010	P5	●●	
		Free-machining steel (short-chipping)	Annealed	220	750	P6	●●	
	Low-alloy steel	Annealed		175	590	P7	●●	
		Heat-treated		285	960	P8	●●	
		Heat-treated		380	1280	P9	●●	
		Heat-treated		430	1480	P10	●●	
	High-alloy steel and high-alloy tool steel	Annealed		200	680	P11	●●	
		Hardened and tempered		300	1010	P12	●●	
		Hardened and tempered		380	1280	P13	●●	
	Stainless steel	Ferritic/martensitic, annealed		200	680	P14	●●	
		Martensitic, heat-treated		330	1110	P15	●●	
M	Stainless steel	Austenitic, quench hardened		200	680	M1	●●	
		Austenitic, precipitation hardened (PH)		300	1010	M2	●●	
		Austenitic/ferritic, duplex		230	780	M3	●●	
K	Malleable cast iron	Ferritic		200	400	K1	●●	
		Pearlitic		260	700	K2	●●	
	Grey cast iron	Low strength		180	200	K3	●●	
		High strength/austenitic		245	350	K4	●●	
	Cast iron with spheroidal graphite	Ferritic		155	400	K5	●●	
		Pearlitic		265	700	K6	●●	
	CGI			230	400	K7		
N	Wrought aluminium alloys	Not hardenable		30	–	N1	●●	
		Hardenable, hardened		100	340	N2	●●	
	Cast aluminium alloys	≤ 12% Si, not hardenable		75	260	N3	●●	
		≤ 12% Si, hardenable, hardened		90	310	N4	●●	
		> 12% Si, not hardenable		130	450	N5		
	Magnesium-based alloys			70	250	N6		
	Copper and copper alloys (bronze/brass)	Non-alloyed, electrolytic copper		100	340	N7	●●	
		Brass, bronze, red brass		90	310	N8	●●	
		Copper alloys, short-chipping		110	380	N9	●●	
		High tensile, Ampco		300	1010	N10		
S	Heat-resistant alloys	Fe-based	Annealed	200	680	S1		
			Hardened	280	940	S2		
		Ni- or Co-based	Annealed	250	840	S3		
			Hardened	350	1180	S4		
			Cast	320	1080	S5		
	Titanium alloys	Pure titanium		200	680	S6		
		α and β alloys, hardened		375	1260	S7		
		β alloys		410	1400	S8		
	Tungsten alloys			300	1010	S9		
	Molybdenum alloys			300	1010	S10		
H	Hardened steel	Hardened and tempered		50 HRC	–	H1		
		Hardened and tempered		55 HRC	–	H2		
		Hardened and tempered		60 HRC	–	H3		
	Hardened cast iron	Hardened and tempered		55 HRC	–	H4		
O	Thermoplastics	Without abrasive fillers				O1		
	Thermosetting plastics	Without abrasive fillers				O2	●	
	Plastic, glass-fibre reinforced	GFRP				O3		
	Plastic, carbon-fibre reinforced	CFRP				O4		
	Plastic, aramid-fibre reinforced	AFRP				O5		
	Graphite (technical)			80 Shore		O6		

●● Recommended application (the specified cutting data is regarded as starting values for the recommended application)
● Possible application

[1] The assignment of the machining groups can be found in the "General" section of the Technical Compendium, page F 7.

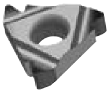
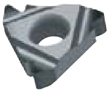
	Cutting material grades					
	Starting values for cutting speed v_c [m/min]					
	HC					
	WXP20		WXM20		WMP32	
Pitch [mm]	0,5–1,25	1,5–3,0	0,5–1,25	1,5–6,0	0,5–1,25	1,5–6,0
Pitch [TPI]	48–19	18–10	48–19	18–5	48–19	18–10
	200	240			180	215
	180	200			160	180
	150	180			135	160
	160	180			145	160
	80	100			70	90
	180	220			160	200
	150	170			135	155
	80	120			70	110
	60	80			55	70
	50	65			45	60
	90	100			80	90
	50	60			45	55
	50	65			45	60
	110	130	150	180	100	115
	40	50	120	150	35	45
			180	220	180	220
			60	70	60	70
			150	190	150	190
	100	120			90	110
	80	100			70	90
	170	200			155	180
	120	150			110	135
	100	120			90	110
	80	90			70	80
			350	400		
			250	300		
			380	400		
			270	320		
			220	250		
			220	250		
			180	200		
			220	250		

HC = Coated carbide

The specified cutting data are average standard values.
For specific applications, adjustment is recommended.

Cutting tool material application charts – Thread turning

Carbide

Walter grade designation	Standard designation	Material groups							Application range										Coating process	Coating compo-sition	Example of indexable insert
		P	M	K	N	S	H	O	01	05	10	15	20	25	30	35	40	45			
		Steel	Stainless steel	Cast iron	NF metals	Materials with difficult cutting properties	Hard materials	Other													
WXP20	HC – P 20	●●									▨	▨	▨	▨	▨				PVD	TiN	
	HC – K 20			●								▨	▨	▨							
WXM20	HC – P 20	●										▨	▨	▨					PVD	TiCN	
	HC – M 20		●●								▨	▨	▨	▨	▨						
	HC – N 20				●							▨	▨	▨							
	HC – O 20							●				▨	▨	▨							
WMP32	HC – P 30	●●											▨	▨	▨	▨	▨		PVD	TiAlN	
	HC – M 30		●●										▨	▨	▨	▨	▨				
	HC – K 30			●										▨	▨	▨					

HC = Coated carbide

●● Primary application
● Additional application

Walter NTS product description

Thread turning tool families – External machining

NTS-SE external thread holder
- Standard inclination angle 1.5°
- Insert sizes: NTS-ER/L-16 ..., NTS-ER/L-22 ...

C...-NTS-SE Walter Capto™ external thread holder
- Standard inclination angle 1.5°
- Insert sizes: NTS-ER/L-16 ..., NTS-ER/L-22 ...

Thread turning tool family – Internal machining

A...-NTS-I/S...-NTS-I internal thread boring bar
- Standard inclination angle 1.5°
- Insert sizes: NTS-IR/L-11 ..., NTS-IR/L-16 ..., NTS-IR/L-22 ...
- Through coolant and non-through coolant versions

C...-NTS-SI Walter Capto™ internal thread boring bar
- Standard inclination angle 1.5°
- Insert sizes: NTS-IR/L-16 ..., NTS-IR/L-22 ...

T1820 – QuadFit quick-change heads for internal thread turning
- QuadFit quick-change heads; 0.002 mm indexing accuracy
- Precision-ground, tetrahedral polygon system – can be rotated 180° for use overhead
- Precision cooling
- Insert sizes: NTS-IR/L-16 . . ., NTS-IR/L-22 . . .

Thread turning system overview – Walter NTS external machining

VDI adaptors for square shanks with precision cooling

A2120-VDI-P

A2121-VDI-P

◎

Walter Capto™ adaptors for square shanks

C...-ASHR/L
C...-ASHR/L3

◎

C...-ASHA

Walter Capto™ thread turning tools

C...NTS-SE

Shank tools

e.g. NTS-SE

Thread turning system overview – Walter NTS internal machining

Adaptors for boring bars

C...-391.20
C...-391.27

Walter Capto™ boring bars for thread turning

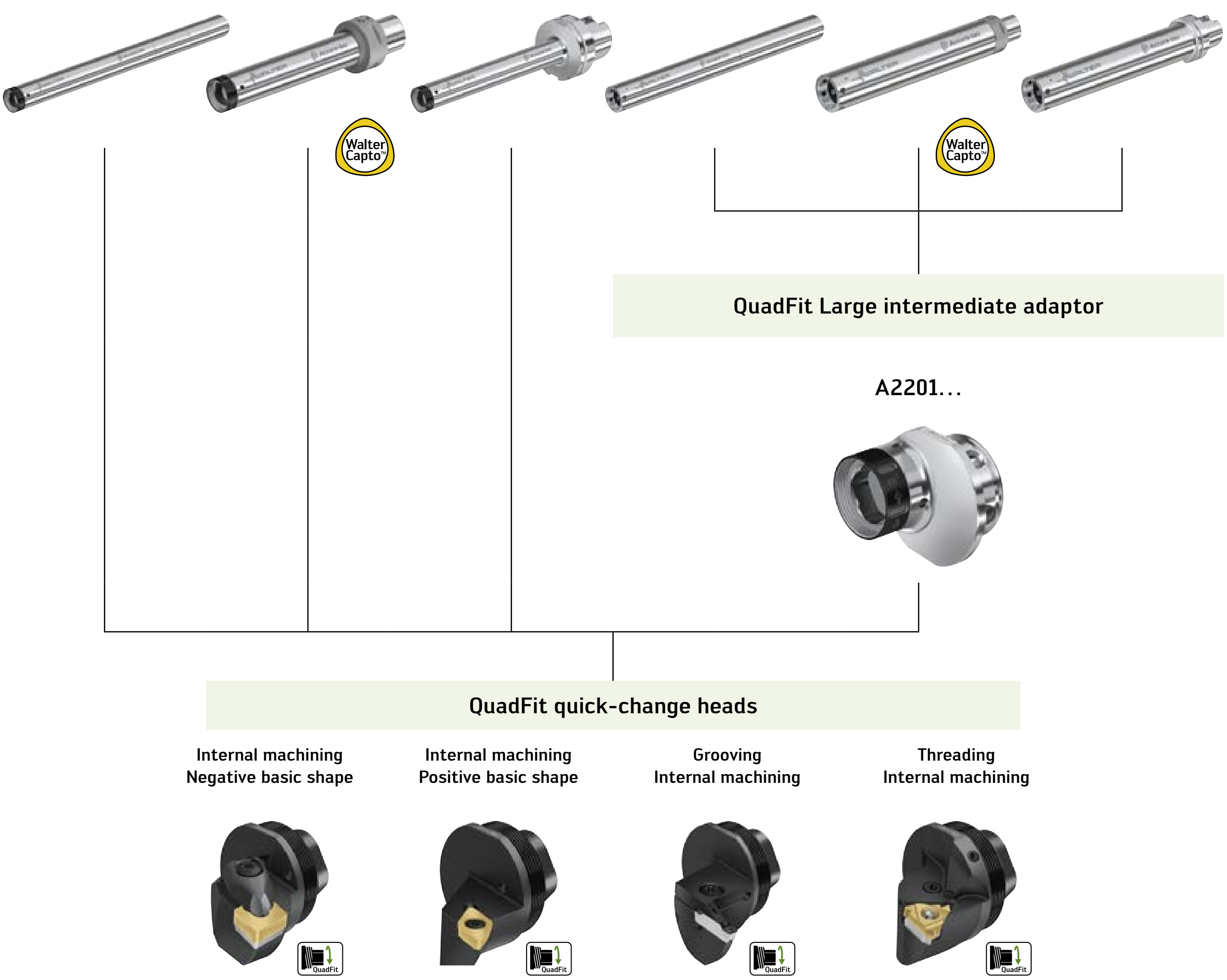
C...NTS-SI

Boring bars

e.g.
A...NTS-I
S...NTS-I

◎ = Precision cooling

Turning system overview – Accure·tec® internal machining



Accure·tec® A3000
Vibration-damped boring bars/adaptors –
QuadFit interface

Accure·tec® A3001
Vibration-damped boring bars/adaptors –
QuadFit Large interface

A3000… | A3000-C… | A3000-HSK-T… | A3001… | A3001-C… | A3001-HSK-T…

QuadFit Large intermediate adaptor

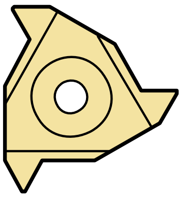
A2201…

QuadFit quick-change heads

Internal machining Negative basic shape	Internal machining Positive basic shape	Grooving Internal machining	Threading Internal machining
e.g. Q40-DCLN…	e.g. Q40-SDXC…	G4221-Q…-P	T1820-Q…-P

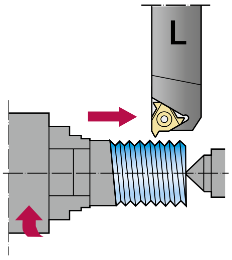
Application information:
Walter NTS thread turning – Application strategy

Performance characteristics



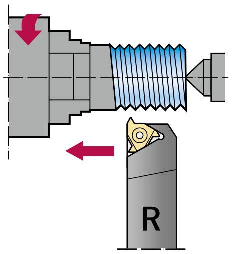
- Precision-ground profile
- Ground-in chip breaker
- Excellent cutting behaviour and reliable chip control thanks to the positive cutting edge shape
- Right-hand and left-hand versions available
- By changing the shim, a thread running in the opposite direction can be produced
- High repeat accuracy
- Extensive profile versatility
- Full profile and partial profile
- PVD-coated carbide grades

External machining

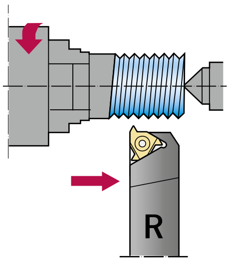


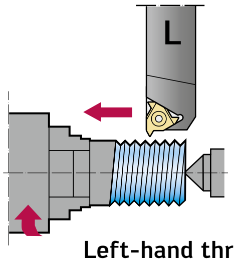
Right-hand thread
Left-hand tool holder
Left-hand insert
Opposite inclination angle

Right-hand thread
Right-hand tool holder
Right-hand insert



Left-hand thread
Right-hand tool holder
Right-hand insert
Opposite inclination angle

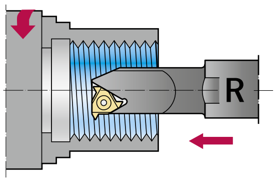




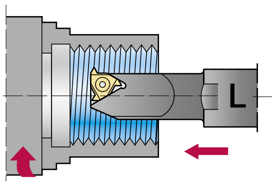
Left-hand thread
Left-hand tool holder
Left-hand insert

Internal machining

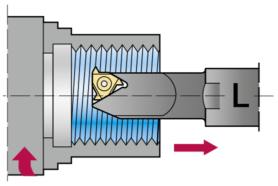
Right-hand thread
Right-hand tool holder
Right-hand insert



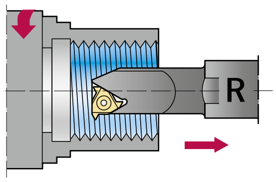
Left-hand thread
Left-hand tool holder
Left-hand insert



Right-hand thread
Left-hand tool holder
Left-hand insert
Opposite inclination angle



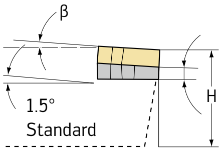
Left-hand thread
Right-hand tool holder
Right-hand insert
Opposite inclination angle



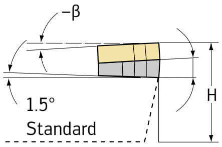
Application information:
Thread turning – Inclination angle correction

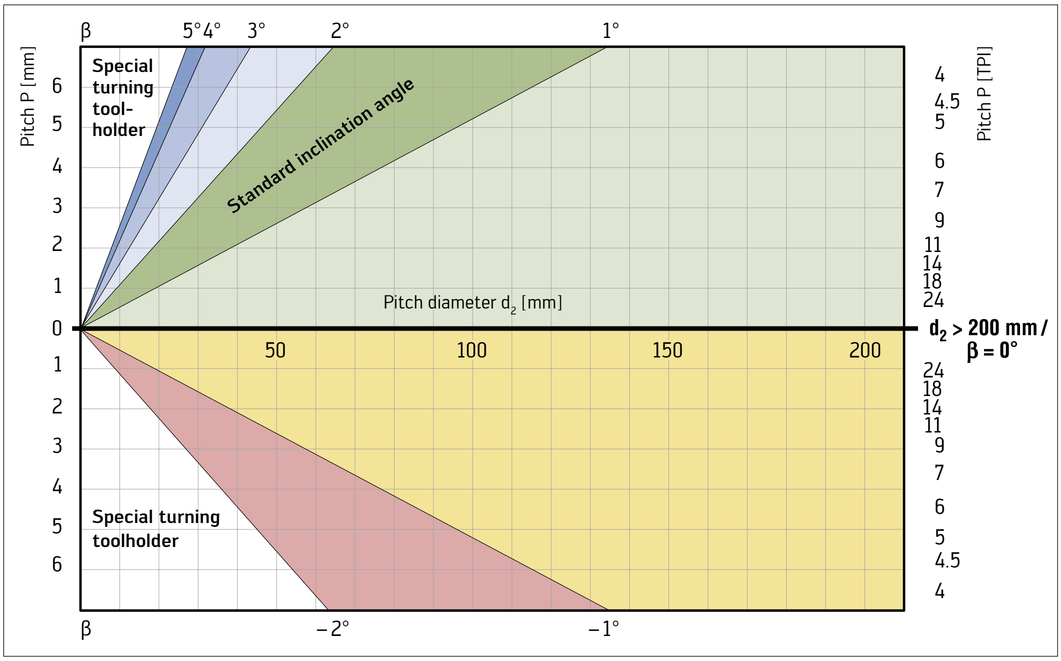
Inclination angle diagram

Standard inclination angle
Feed in the direction of the headstock



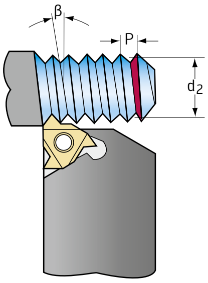
Opposite inclination angle
Feed in the direction of the tailstock





The colours in the inclination angle diagram correspond to the colours in the shim table.
No values must be read off.

Inclination angle calculation



The inclination angle is calculated according to the following formula:

$$\beta = \arctan \frac{P}{\Pi \times d_2}$$

β = inclination angle [°]
P = thread pitch [mm]
d_2 = pitch diameter [mm]

The inclination angle can also be determined using the diagram.
The suitable shim is selected in accordance with the relevant table.

Documents

The external and internal standard tool holders have an inclination angle of β = 1.5°.

With an insert size of 1/4" (11 mm), the inclination angle is corrected via the tool.

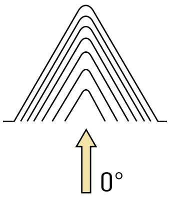
Insert size		Tool holder	Order no.							
IC	L [mm]		β = 4.5°	β = 3.5°	β = 2.5°	β = 1.5°	β = 0.5°	β = 0	β = −0.5°	β = −1.5°
3/8"	16	ER / IL	YE 3–3P	YE 3–2P	YE 3–1P	YE 3	YE 3–1N	YE 3–1.5N	YE 3–2N	YE 3–3N
		EL / IR	YI 3–3P	YI 3–2P	YI 3–1P	YI 3	YI 3–1N	YI 3–1.5N	YI 3–2N	YI 3–3N
1/2"	22	ER / IL	YE 4–3P	YE 4–2P	YE 4–1P	YE 4	YE 4–1N	YE 4–1.5N	YE 4–2N	YE 4–3N
		EL / IR	YI 4–3P	YI 4–2P	YI 4–1P	YI 4	YI 4–1N	YI 4–1.5N	YI 4–2N	YI 4–3N

Application information:
Standard values for thread turning with Walter NTS

Feed types and their influence on machining

Radial feed

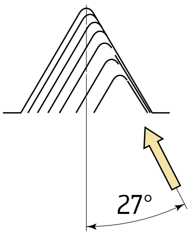
Recommended for:
- Short-chipping materials
- Hard materials



- Formation of V-shaped chips
- Both cutting edges engaged
- High cutting temperature
- Even indexable insert wear on both flanks
- Suitable for small pitches

Feed via flank 27°–29°

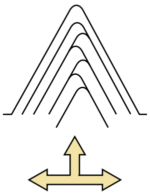
Recommended for:
- Pitches greater than 1.5 mm or 16 TPI
- The manufacture of trapezoidal threads



- Good chip formation
- Formation of helical chips
- One cutting edge engaged
- Chips are guided away from the thread
- Thread flanks with excellent surface quality

Alternating feed

Recommended for:
- Steep pitches
- Long-chipping materials



- Good chip formation
- Formation of flat helical chips
- Both cutting edges are evenly engaged, ensuring even wear

Standard values for the number of radial infeeds for each thread turning pass on manual lathes

The recommended cutting passes are only to be regarded as standard values. They were determined under good application conditions with medium-strength steel materials. In the case of high-strength steel materials, the number of feeds must be increased. It is important to reduce the initial thread cuts in this case.
If the application conditions are different, the feeds should be modified accordingly. This applies to internal thread turning with an overhang of more than 2.5 × the boring bar diameter.

Whitworth (WH), external and internal machining

No. of feeds	Pitch [TPI]														
	28	26	20	19	18	16	14	12	11	10	9	8	7	6	5
Total depth [mm]	**0,64**	**0,68**	**0,87**	**0,91**	**1,07**	**1,12**	**1,23**	**1,42**	**1,54**	**1,69**	**1,87**	**2,09**	**2,41**	**2,80**	**3,34**
16															
15															
14														0,10	0,10
13														0,12	0,12
12												0,08	0,08	0,14	0,15
11											0,08	0,12	0,12	0,14	0,17
10										0,08	0,12	0,12	0,14	0,15	0,18
9									0,08	0,12	0,12	0,13	0,15	0,16	0,19
8						0,08	0,08	0,08	0,12	0,13	0,13	0,14	0,16	0,17	0,20
7					0,08	0,10	0,11	0,13	0,13	0,13	0,14	0,15	0,18	0,19	0,22
6			0,08	0,08	0,11	0,10	0,12	0,14	0,14	0,15	0,15	0,16	0,19	0,20	0,24
5	0,08	0,08	0,11	0,12	0,13	0,12	0,13	0,15	0,16	0,16	0,17	0,18	0,21	0,21	0,27
4	0,11	0,11	0,13	0,13	0,14	0,14	0,15	017	0,18	0,18	0,19	0,20	0,23	0,24	0,30
3	0,12	0,14	0,15	0,16	0,17	0,16	0,18	0,21	0,21	0,21	0,22	0,23	0,27	0,28	0,36
2	0,15	0,16	0,19	0,20	0,21	0,20	0,22	0,26	0,25	0,26	0,27	0,28	0,33	0,34	0,41
1	0,18	0,19	0,21	0,22	0,23	0,22	0,24	0,28	0,27	0,27	0,28	0,30	0,35	0,36	0,43

Radial infeed [mm] ←

Reduce the cutting speed

Application information: Standard values for thread turning with Walter NTS

(continued)

External machining, metric 60°

No. of feeds	Pitch [mm]																	
	0,5	**0,6**	**0,7**	**0,75**	**0,8**	**1,0**	**1,25**	**1,5**	**1,75**	**2,0**	**2,5**	**3,0**	**3,5**	**4,0**	**4,5**	**5,0**	**5,5**	**6,0**
Total depth [mm]	**0,34**	**0,40**	**0,47**	**0,50**	**0,54**	**0,67**	**0,80**	**0,94**	**1,14**	**1,28**	**1,58**	**1,89**	**2,20**	**2,50**	**2,80**	**3,12**	**3,41**	**3,72**
16																	0,10	0,10
15																	0,12	0,12
14														0,08	0,10	0,10	0,13	0,14
13														0,11	0,12	0,12	0,13	0,15
12												0,08	0,08	0,12	0,13	0,15	0,15	0,16
11												0,10	0,11	0,12	0,14	0,16	0,16	0,18
10											0,08	0,11	0,12	0,13	0,15	0,17	0,17	0,19
9											0,11	0,12	0,14	0,14	0,16	0,18	0,18	0,20
8									0,08	0,08	0,11	0,12	0,14	0,15	0,17	0,19	0,19	0,21
7									0,10	0,11	0,12	0,13	0,15	0,16	0,18	0,20	0,20	0,22
6							0,08	0,08	0,10	0,12	0,13	0,14	0,17	0,17	0,20	0,22	0,22	0,24
5						0,08	0,10	0,12	0,12	0,14	0,15	0,16	0,18	0,19	0,22	0,24	0,24	0,27
4	0,07	0,07	0,07	0,07	0,08	0,11	0,11	0,14	0,14	0,16	0,17	0,18	0,21	0,22	0,24	0,27	0,27	0,30
3	0,07	0,08	0,10	0,11	0,12	0,13	0,14	0,17	0,17	0,18	0,20	0,21	0,25	0,25	0,28	0,32	0,32	0,35
2	0,09	0,11	0,14	0,15	0,16	0,16	0,17	0,21	0,21	0,24	0,24	0,26	0,31	0,32	0,34	0,39	0,40	0,43
1	0,11	0,14	0,16	0,17	0,18	0,19	0,20	0,22	0,22	0,25	0,27	0,28	0,34	0,34	0,37	0,41	0,43	0,46

Radial infeed [mm]

← Reduce the cutting speed

Internal machining, metric 60°

No. of feeds	Pitch [mm]																	
	0,5	**0,6**	**0,7**	**0,75**	**0,8**	**1,0**	**1,25**	**1,5**	**1,75**	**2,0**	**2,5**	**3,0**	**3,5**	**4,0**	**4,5**	**5,0**	**5,5**	**6,0**
Total depth [mm]	**0,34**	**0,38**	**0,44**	**0,48**	**0,51**	**0,63**	**0,77**	**0,90**	**1,07**	**1,20**	**1,49**	**1,77**	**2,04**	**2,32**	**2,62**	**2,89**	**3,20**	**3,46**
16																	0,10	0,10
15																	0,12	0,12
14														0,08	0,10	0,10	0,12	0,13
13														0,10	0,11	0,12	0,13	0,14
12												0,08	0,08	0,10	0,12	0,14	0,14	0,15
11												0,09	0,10	0,11	0,12	0,14	0,14	0,15
10											0,08	0,10	0,11	0,12	0,13	0,15	0,15	0,16
9											0,10	0,10	0,12	0,12	0,14	0,15	0,16	0,18
8									0,08	0,08	0,10	0,11	0,13	0,13	0,15	0,16	0,17	0,19
7									0,09	0,10	0,11	0,12	0,14	0,14	0,16	0,17	0,18	0,20
6							0,08	0,08	0,09	0,11	0,12	0,13	0,15	0,15	0,19	0,20	0,20	0,22
5						0,08	0,09	0,11	0,10	0,12	0,13	0,14	0,17	0,18	0,21	0,22	0,22	0,24
4	0,07	0,07	0,07	0,07	0,07	0,09	0,10	0,13	0,13	0,14	0,15	0,16	0,19	0,21	0,23	0,25	0,26	0,28
3	0,07	0,08	0,08	0,10	0,11	0,11	0,13	0,15	0,15	0,17	0,18	0,20	0,23	0,24	0,27	0,30	0,32	0,35
2	0,09	0,11	0,13	0,14	0,15	0,16	0,17	0,21	0,21	0,23	0,25	0,26	0,30	0,31	0,33	0,38	0,38	0,41
1	0,11	0,12	0,16	0,17	0,18	0,19	0,20	0,22	0,22	0,25	0,27	0,28	0,32	0,33	0,36	0,41	0,41	0,44

Radial infeed [mm]

← Reduce the cutting speed

Application information: Standard values for thread turning with Walter NTS

(continued)

External machining, UN 60°

No. of feeds	Pitch [TPI]															
	32	28	24	20	18	16	14	13	12	11	10	9	8	7	6	5
Total depth [mm]	**0,52**	**0,62**	**0,71**	**0,83**	**0,93**	**1,03**	**1,17**	**1,26**	**1,36**	**1,48**	**1,63**	**1,79**	**2,01**	**2,28**	**2,66**	**3,19**
16																
15																
14															0,10	0,10
13															0,11	0,12
12													0,08	0,08	0,12	0,15
11												0,08	0,11	0,11	0,13	0,17
10											0,08	0,11	0,12	0,12	0,14	0,18
9										0,08	0,11	0,12	0,12	0,14	0,15	0,19
8							0,08	0,08	0,08	0,11	0,12	0,12	0,13	0,15	0,16	0,19
7						0,08	0,10	0,11	0,12	0,12	0,13	0,13	0,14	0,16	0,17	0,20
6				0,08	0,08	0,11	0,11	0,12	0,13	0,13	0,14	0,14	0,15	0,17	0,18	0,22
5		0,08	0,08	0,10	0,12	0,12	0,12	0,13	0,14	0,15	0,15	0,16	0,17	0,19	0,20	0,24
4	0,08	0,10	0,12	0,12	0,13	0,13	0,14	0,15	0,16	0,17	0,17	0,18	0,19	0,22	0,23	0,28
3	0,12	0,12	0,15	0,14	0,16	0,16	0,17	0,18	0,20	0,20	0,20	0,21	0,22	0,26	0,27	0,32
2	0,15	0,15	0,17	0,19	0,21	0,21	0,22	0,24	0,26	0,25	0,26	0,26	0,28	0,33	0,34	0,40
1	0,17	0,17	0,19	0,20	0,23	0,22	0,23	0,25	0,27	0,27	0,27	0,28	0,30	0,35	0,36	0,43

Radial infeed [mm]

← Reduce the cutting speed

Internal machining, UN 60°

No. of feeds	Pitch [TPI]															
	32	28	24	20	18	16	14	13	12	11	10	9	8	7	6	5
Total depth [mm]	**0,49**	**0,59**	**0,66**	**0,78**	**0,86**	**0,95**	**1,10**	**1,17**	**1,26**	**1,38**	**1,49**	**1,66**	**1,86**	**2,11**	**2,44**	**2,93**
16																
15																
14															0,10	0,10
13															0,11	0,12
12													0,08	0,08	0,11	0,14
11												0,08	0,10	0,11	0,12	0,14
10											0,08	0,09	0,10	0,12	0,12	0,15
9										0,08	0,10	0,10	0,11	0,12	0,13	0,16
8							0,08	0,08	0,08	0,10	0,10	0,11	0,11	0,13	0,14	0,17
9						0,08	0,09	0,10	0,10	0,11	0,11	0,12	0,12	0,14	0,15	0,18
6				0,08	0,08	0,09	0,10	0,11	0,11	0,12	0,12	0,13	0,13	0,15	0,16	0,20
5		0,08	0,08	0,09	0,10	0,10	0,11	0,12	0,13	0,13	0,13	0,14	0,15	0,17	0,18	0,22
4	0,08	0,10	0,10	0,11	0,12	0,12	0,13	0,13	0,15	0,15	0,15	0,16	0,17	0,20	0,20	0,25
3	0,10	0,10	0,14	0,13	0,14	0,14	0,15	0,16	0,18	0,18	0,18	0,19	0,21	0,23	0,24	0,30
2	0,14	0,14	0,16	0,17	0,19	0,20	0,21	0,22	0,24	0,24	0,25	0,26	0,28	0,28	0,32	0,38
1	0,17	0,17	0,18	0,20	0,23	0,22	0,23	0,25	0,27	0,27	0,27	0,28	0,30	0,34	0,35	0,42

Radial infeed [mm]

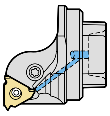
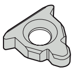
← Reduce the cutting speed

Application information:
Thread turning with Walter NTS / Q...-T1820

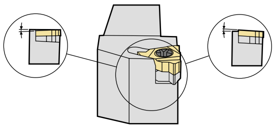
Thread turning – Shims

Shims fitted in the tool holder exchangeable head

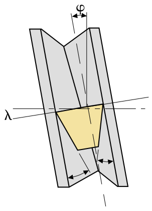
The table shows the shims that are fitted in the tool holder as standard and are used when cutting in the direction of the headstock.

Tool adaptor		**Q...-T1820... QuadFit exchangeable head with precision cooling**
Tool adaptor		 Internal thread
Type of indexable insert		Single-tooth indexable insert
Shim		
Indexable insert size	16	GXA 16-1
	22	NXA 22-1

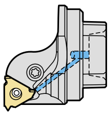
By replacing the shim, the inclination angle can be selected between +5 and -2. The same shims should be used for right-hand and left-hand threads. The centre height dimension always remains constant.



To achieve the best possible profile accuracy and even wear, the indexable insert inclination angle (λ) must be correspond to the thread inclination angle (φ) as closely as possible.

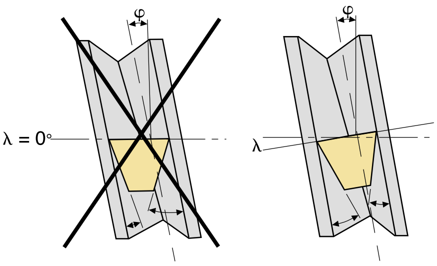


Selecting a shim

Tool adaptor		**Q...-T1820... QuadFit exchangeable head with precision cooling**	
Tool adaptor		 Internal thread	
Type of indexable insert		Single-tooth indexable insert	
Shim		 Direction of cut towards the headstock	 Direction of cut towards the tailstock
Indexable insert size	16	GXA16-0, -1, -2, -3, -4	GXA16-0, -99, -98
	22	NXA22-0, -1, -2, -3, -4	NXA22-0, -99, -98

Selecting a shim

Use the diagram below to select the right shim. The diagram shows you the last digit in the shim designation.
Example: GX16-1



Production method

Direction of cut towards the headstock = see right-hand triangle on the diagram
Direction of cut towards the tailstock = see left-hand triangle on the diagram

Vertical rows – Pitch

Single-start thread, pitch height (Ph) = pitch (P)
Multi-start thread, pitch height (Ph) = pitch (P) x number of starts

Application information: Thread turning with Walter NTS / Q...-T1820

(continued)

Horizontal rows = thread diameter [D_2]

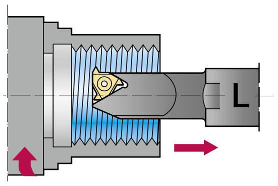
		Pitch diameter D_2 [mm] – feed in the direction of the tailstock																																						TPI	P_h [mm]
		5	15	20	25	30	40	45	50	60	65	70	75	85	90	95	100	110	115	120	130	135	140	150	155	160	165	170	180	190	200	225	250	300									
–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	98	98	98	98	98	98	98	98	98	99	99	99	99	99	99	99	99	99	99					0	0	1	80	–
–	3	–	–	–	–	–	–	–	–	–	98	98	98	98	98	98	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99				0	0	0	1	72	–
8,0	–	–	–	–	–	–	–	–	–	98	98	98	98	98	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	0			0	0	0	0	1	64	–
–	4	–	–	–	–	–	–	–	98	98	98	98	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	0			0	0	0	0	1	2	56	–
6,0	–	–	–	–	–	–	–	98	98	98	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	0				0	0	0	0	1	2	–	0,5
–	5	–	–	–	–	–	98	98	98	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	0	0				0	0	0	0	0	1	2	48	–
5,0	–	–	–	–	–	–	98	98	98	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	0				0	0	0	0	0	1	1	2	44	–
	6	–	–	–	–	–	98	98	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	0	0	0	0	0				0	0	0	0	0	0	1	1	2	40	–
4,0	–	–	–	–	–	98	98	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	0	0	0	0	0				0	0	0	0	0	1	1	1	3	36	–
–	7	–	–	–	–	98	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	0	0	0	0	0	0				0	0	0	0	0	0	1	1	1	3	–	0,75
3,5	–	–	–	–	–	98	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99	0	0	0	0	0	0				0	0	0	0	0	0	0	1	1	1	3	32	–
–	8	–	–	–	98	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99	0	0	0	0	0	0	0			0	0	0	0	0	0	0	1	1	1	1	3	28	–
3,0	–	–	–	–	98	98	99	99	99	99	99	99	99	99	99	99	99	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	1	1	1	1	4	–	1,0
–	9	–	–	–	98	98	99	99	99	99	99	99	99	99	99	99	99	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	1	1	1	1	4	24	–
–	10	–	–	98	98	98	99	99	99	99	99	99	99	99	99	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	1	1	1	1	2	5	–	1,25
2,5	–	–	–	98	98	98	99	99	99	99	99	99	99	99	99	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	1	1	1	1	2	5	20	–
–	11	–	–	98	98	99	99	99	99	99	99	99	99	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	5	18	–
–	12	–	–	98	98	99	99	99	99	99	99	99	99	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	5	–	1,5
2,0	–	–	98	98	99	99	99	99	99	99	99	99	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	–	16	–
–	13	–	98	98	99	99	99	99	99	99	99	99	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	2	–	–	1,75
–	14	–	98	98	99	99	99	99	99	99	99	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	2	2	–	14	–
1,75	–	–	98	98	99	99	99	99	99	99	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	–	13	–
–	16	–	98	99	99	99	99	99	99	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	–	–	2,0
1,5	–	–	98	99	99	99	99	99	99	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	3	–	12	–
–	18	–	98	99	99	99	99	99	99	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	3	–	11	–
–	20	–	98	99	99	99	99	99	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	3	–	–	2,5
1,25	–	–	98	99	99	99	99	99	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	3	–	10	–
–	24	–	99	99	99	99	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	2	3	3	–	9	–
1,0	–	–	99	99	99	99	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	2	3	4	–	–	3,0
–	28	–	99	99	99	99	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	4	–	8	–
–	32	–	99	99	99	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	4	–	–	3,5
0,75	–	–	99	99	99	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	4	–	7	–
–	36	–	99	99	0	0	0	0	0	0	0				0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	4	5	–	–	4,0
–	40	98	99	99	0	0	0	0	0	0				0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3	4	5	–	6	–
–	44	98	99	0	0	0	0	0	0				0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	4	5	–	–	–	5,0
–	48	98	99	0	0	0	0	0				0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	4	5	–	–	5	–
0,5	–	98	99	0	0	0	0				0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	4	4	5	–	–	–	6,0
–	56	98	99	0	0	0	0			0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	4	5	–	–	–	4	–
–	64	99	0	0	0	0			0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	4	5	–	–	–	–	–	8,0
–	72	99	0	0					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	4	5	–	–	–	–	3	–
–	80	99	0						1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3	3	3	3	4	4	5	5	–	–	–	–	–	–	2	–
P_h [mm]	TPI								300	250	225	200	190	180	170	165	160	155	150	140	135	130	120	115	110	100	95	90	85	75	70	65	60	50	45	40	30	25	20	15	5		
									Pitch diameter D_2 [mm] – feed in the direction of the headstock																																		

Feed in the direction of the tailstock – Internal thread

Feed in the direction of the headstock – Internal thread

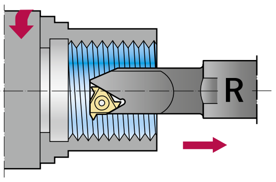
Right-hand thread

Left-hand tool holder
Left-hand insert
Opposite inclination angle



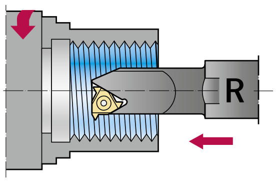
Left-hand thread

Right-hand tool holder
Right-hand insert
Opposite inclination angle



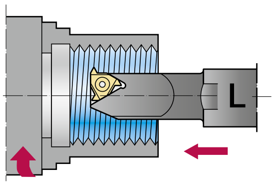
Right-hand thread

Right-hand tool holder
Right-hand insert



Left-hand thread

Left-hand tool holder
Left-hand insert



Designation key
for thread turning inserts

Example:

NTS	–	E	R	–	16	0.50	ISO
Walter Thread System		1	2		3	4	5

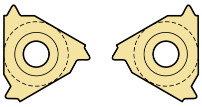
1	
Machining	
E	External thread
I	Internal thread

2

Insert design

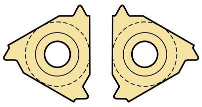
External thread

R L



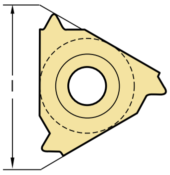
Internal thread

R L



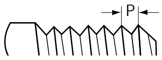
3

Cutting edge length l



4

Pitch P



Full profile pitch range		
	[mm]	[TPI]
	0,35–12,0	72–2
Partial profile pitch range		
	[mm]	[TPI]
A	0,5–1,5	48–16
AG	0,5–3,0	48–8
G	1,75–3,0	14–8
N	3,5–5,0	7–5
U	5,5–8,0	4½–3½
Q	5,5–6,0	4½–4
U	6,5–9,0	4–2¾
V	6,0–10,0	4–2½

5	
Standard	
55	Partial profile 55°
60	Partial profile 60°
ISO	ISO metric 60°
UN	American UN 60°
UNJ	American UNJ 60°
W	Whitworth
NPTF	NPTF
NPT	NPT
ACME	ACME
STACME	Stub ACME

Designation key
for carbide cutting tool materials – Thread turning

Example:

W	M	P	32
Walter	**1**	**2**	**3**

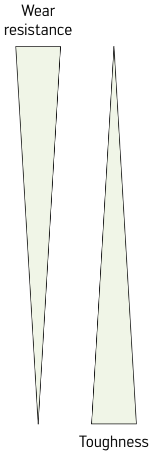
1	
1. Primary application or coating type	
P	Steel
M	Stainless steel
K	Cast iron
N	NF metals
S	Materials with difficult cutting properties
H	Hard materials
X	PVD coating

2	
2. Primary application	
P	Steel
M	Stainless steel
K	Cast iron
N	NF metals
S	Materials with difficult cutting properties
H	Hard materials

3

ISO application range

01
05
10
20
21
23
30
32
33
43



Cutting tool materials for:

0	ISO turning
1	ISO turning
5	ISO turning
2	Thread turning
3	Grooving

Designation key for Walter NTS thread turning tools

Example for external machining:

NTS	S	E	L	–	16	16	–	16
1	2	3	4		5	6		7

Example for internal machining:

S	32	S	–	NTS	I	R	–	16	–	16
11	12	13		1	3	4		7		10

1

Tool range

NTS = Walter Thread System

2

Tool position

S	Standard position
O	Overhead position

3

Tool version

E	External
I	Internal

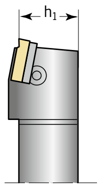
4

Shank version

R	Right
L	Left

5

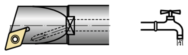
Toolholder height h_1 [mm]

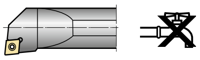


11

Shank design

A	Solid steel design **with** internal coolant supply
S	Solid steel design **without** internal coolant supply

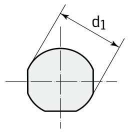


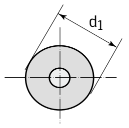


12

Boring bar diameter d_1 [mm]

Shank diameter in mm. Figures after the decimal point are ignored. Single-digit numbers are preceded by a "0".

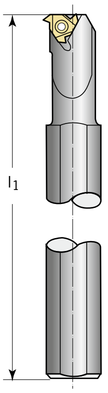




13

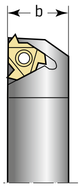
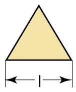
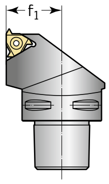
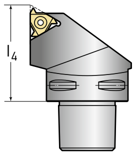
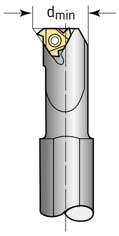
Tool length l_1 [mm]

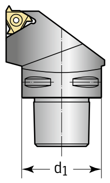
A	32	P	170
B	40	Q	180
C	50	R	200
D	60	S	250
E	70	T	300
F	80	U	350
G	90	V	400
H	100	W	450
J	110	X	Custom
K	125	Y	500
L	140		
M	150		
N	160		



Example: Walter Capto™

C4	–	NTS	S	E	R	–	27	050	–	16
14		1	2	3	4		8	9		7

6	7	8	9	10
Toolholder width b [mm]	Cutting edge length l [mm]	f_1 dimension [mm]	Tool length l_4 [mm]	d_{min} dimension [mm]
	 l = 11 l = 16 l = 22			

14
Coupling size d_1 [mm]
C = Walter Capto™ ISO 26623 **C3** $d_1 = 32$ **C4** $d_1 = 40$ **C5** $d_1 = 50$ **C6** $d_1 = 63$


Designation key for QuadFit thread turning tools

Example:

T	1	8	20	–	Q	40	L	–	16	L	–	P
1	2	3	4	5	6	7	8		9	10		11

1

Tool group

T	Threading

2

Generation

1	NTS

3

Tool type

7	Indexable insert thread milling cutter
8	Thread turning

4

Tool type

20	Internal thread – screw clamping

5

1. Delimiters

–	Metric
.	Inch

6

Adaptor type

W	Weldon shank
C	Walter Capto™
Q	QuadFit

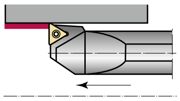
7

Size of tool-side version

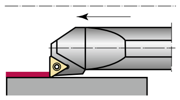
25	25 mm	Q
32	32 mm	
40	40 mm	
50	50 mm	

8

Version



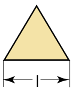
L Left



R Right

9

Cutting edge length l [mm]



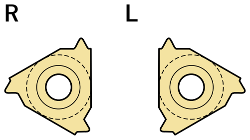
l = 16

l = 22

10

Insert design

Internal thread

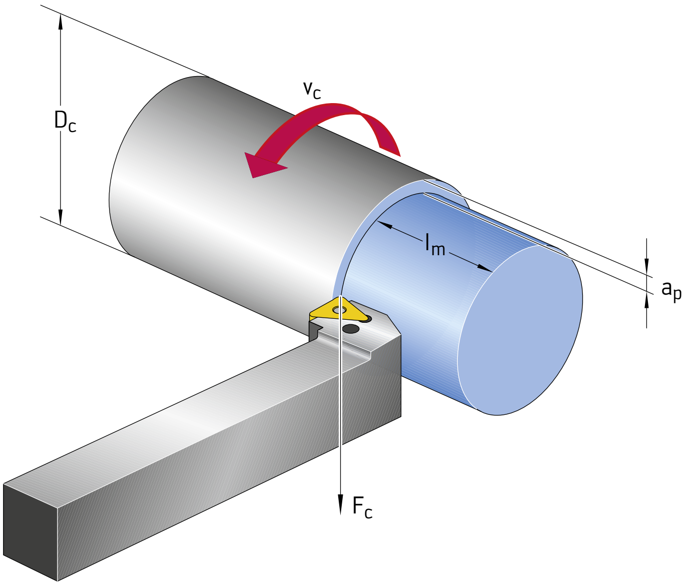


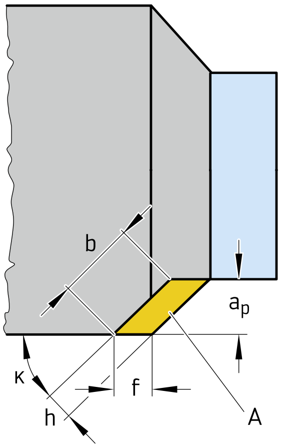
11

Cooling

–P	Precision cooling

Calculation formulae for turning





Speed

$$n = \frac{v_c \times 1\,000}{D_c \times \pi} \qquad [\text{min}^{-1}]$$

Cutting speed

$$v_c = \frac{D_c \times \pi \times n}{1\,000} \qquad [\text{m/min}]$$

Feed rate

$$v_f = n \times f \qquad [\text{mm/min}]$$

Metal removal rate

$$Q = v_c \times a_p \times f \times \left(1 - \frac{a_p}{D_c}\right) \qquad [\text{cm}^3/\text{min}]$$

Chip cross section

$$A = h \times b = a_p \times f \qquad [\text{mm}^2]$$

Chip width, chip thickness

$$b = \frac{a_p}{\sin\kappa} \qquad [\text{mm}] \qquad h = f \times \sin\kappa \qquad [\text{mm}]$$

Main cutting force

$$F_c = A \times k_{c1.1} \times h^{-mc} \qquad [\text{N}]$$

Specific cutting force

$$k_c = \frac{k_{c1.1}}{h^{m_c}} \qquad [\text{N/mm}^2]$$

Power requirement

$$P_{mot} = \frac{Q \times k_c}{60\,000 \times \eta} \qquad [\text{kW}]$$

Cutting time

$$t_h = \frac{l_m}{f \times n} \qquad [\text{min}]$$

Roughness profile depth

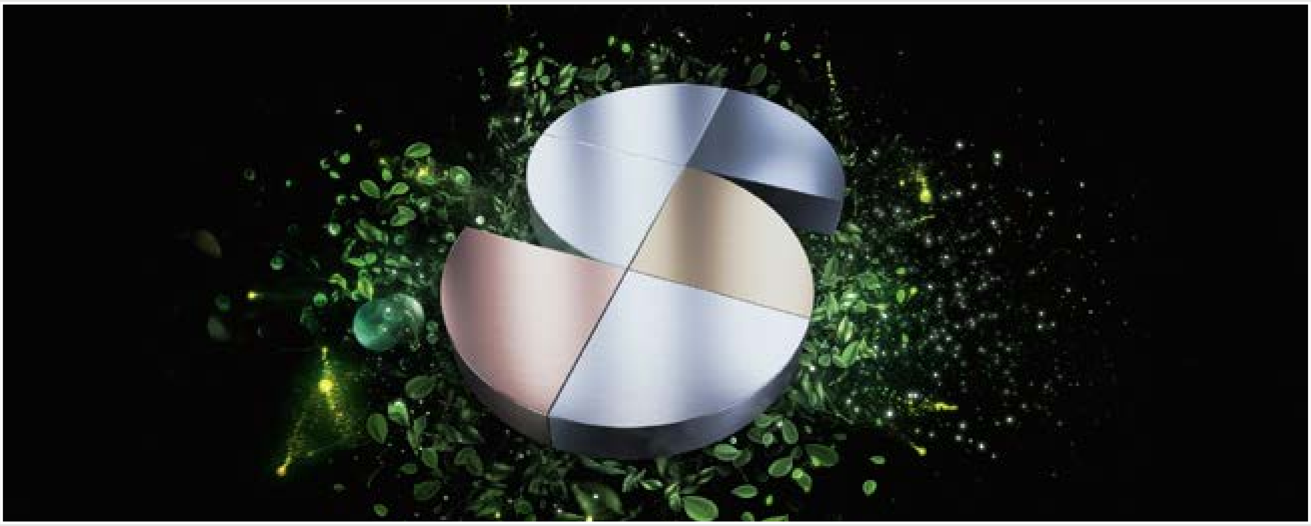
$$R_{max} = \frac{f^2}{8 \times r} \times 1\,000 \qquad [\mu\text{m}]$$

Unrolled turning length

$$l_c = \frac{D_c \times \pi}{1\,000} \times \frac{l_m}{f} \qquad [\text{m}]$$

n	Speed	rpm
D_c	Cutting diameter	mm
v_c	Cutting speed	m/min
v_f	Feed rate	mm/min
f	Feed per revolution	mm
Q	Metal removal rate	cm^3/min
a_p	Depth of cut	mm
A	Chip cross section	mm^2
h	Chip thickness	mm
b	Chip width	mm
κ	Lead angle	°
F_c	Main cutting force	N
$k_{c1.1}$*	Specific cutting force for 1 mm^2 chip cross section	N/mm^2
m_c*	Increase in the k_c curve	
P_{mot}	Power requirement	kW
t_h	Cutting time	min
l_m	Machining length	mm
l_c	Unrolled turning length	m
R_{max}	Roughness profile depth	µm
r	Corner radius of the indexable insert	mm
η	Machine efficiency	(0,75 – 0,9)

* For m_c and $k_{c1.1}$; see the "General" section of the Technical Compendium, page F 7.



Sustainable products and services – certified and transparent

Walter is a company that takes responsibility for people and the environment. Sustainability is a central component of our corporate strategy. It pervades our products and business divisions and is reviewed and certified by independent third parties on a regular basis.

Proven to be produced to high standards

All processes, procedures, methods and instruments that we use are checked and certified by an independent body according to strict criteria. Occupational health and safety, quality assurance and environmentally friendly actions (for example through resource-saving, energy-efficient and CO_2-offset production) are examples of this. Our social commitment shows that Walter has a broader definition of responsibility.

Transparency throughout the entire process chain – for your peace of mind

The integrated management system at Walter includes the sustainable use of resources and production equipment as well as of people – our customers, partners and employees. So that you can count on all of our products meeting these requirements throughout the entire process chain, we apply our own benchmarks to our suppliers too.

Certification

The integrated management system at Walter includes certification in accordance with:

- ISO 9001 (Quality management)
- VDA 6.4 (Production equipment for the automotive industry)
- ISO 14001 (Environmental management)
- ISO 45001 (Occupational health and safety management)
- ISO 50001 (Energy management)

You can find more information on Walter certification here:

Occupational health and safety
Walter protects its employees against health hazards. To prevent accidents, we continuously review our processes and take proactive measures as a precaution.

Environmental and energy management
Environmental protection is an important company objective for Walter. We use energy efficiently and deploy practical methods to sustainably reduce the consumption of energy, water and resources.

Quality management
Walter is continuously improving its products and processes. We ensure our product quality using effective measures and procedures – and check it on a regular basis with our comprehensive quality management system.

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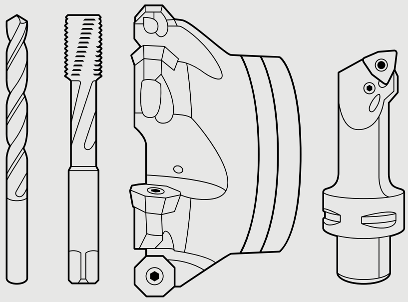

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