THE NEW VALUE FRONTIER

KYOCERA

Positive wiper insert | WP chipbreaker

WP chipbreaker

High productivity with newly designed wiper edge geometry

Excellent surface roughness and smooth chip control during high feed machining

High quality surface finish

High machining accuracy with low cutting forces

Insert grade and corner radius lineup expansion

Fewer programming corrections with new handed insert designs

Handed design

Positive wiper insert

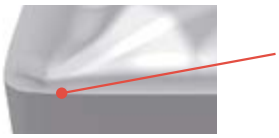
WP chipbreaker

High productivity with newly designed wiper edge geometry
Handed / Non-handed insert designs available depending on application

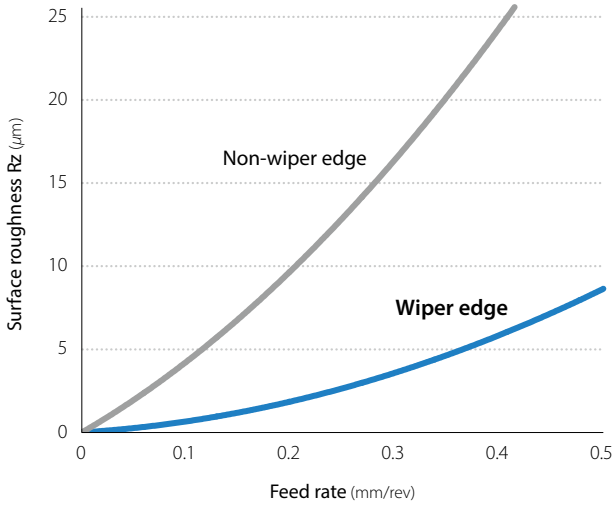
1 Excellent surface roughness during high feed machining

Dual-dot structure
One dot offers stabilized chip control at low feed rates, while a second dot controls chips at higher feeds

Sharp wiper edge design
Excellent surface finish and low cutting forces with sharp wiper edge design



Wiper edge comparison (Internal evaluation)



Cutting conditions: Vc = 200 m/min, ap = 0.3 mm, toolholder: A20R-SCLCR09-22AE
Insert: CCMT09T304 type

2 Stable chip control in a wide range of feed rates

Smooth chip control from low feed to high feed rate

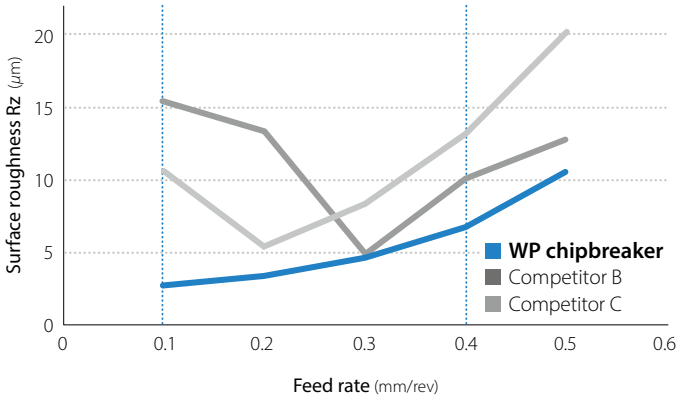
Chip control comparison (Internal evaluation)

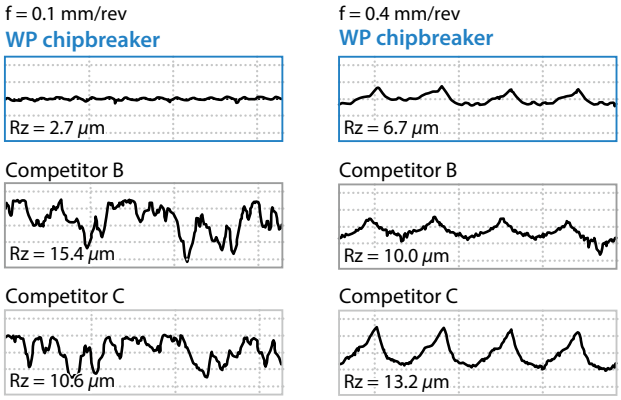
Cutting conditions: Vc = 200 m/min, ap = 0.3 mm, wet Toolholder: A20R-SCLCR09-22AE Insert: CCMT09T304 type Workpiece: 15CrMo4

3 Excellent surface finish

WP chipbreaker offers excellent surface roughness across a wide range of cutting conditions

Surface finish comparison (Internal evaluation)

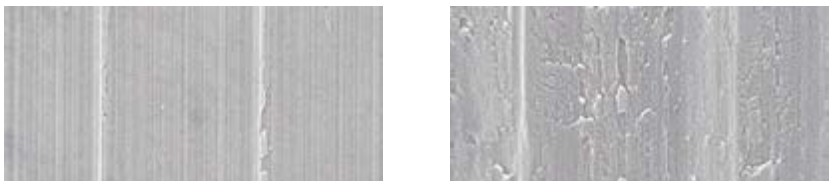


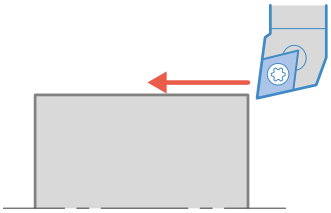


Cutting conditions: Vc = 150 m/min, ap = 0.5 mm, wet Toolholder: A20R-SCLCR09-22AE Insert: CCMT09T304 type Workpiece: 15CrMo4

4 Reduces galling for better surface finish

WP chipbreaker reduces tearing of the finished surface by controlling adhesion with the newly designed wiper edge



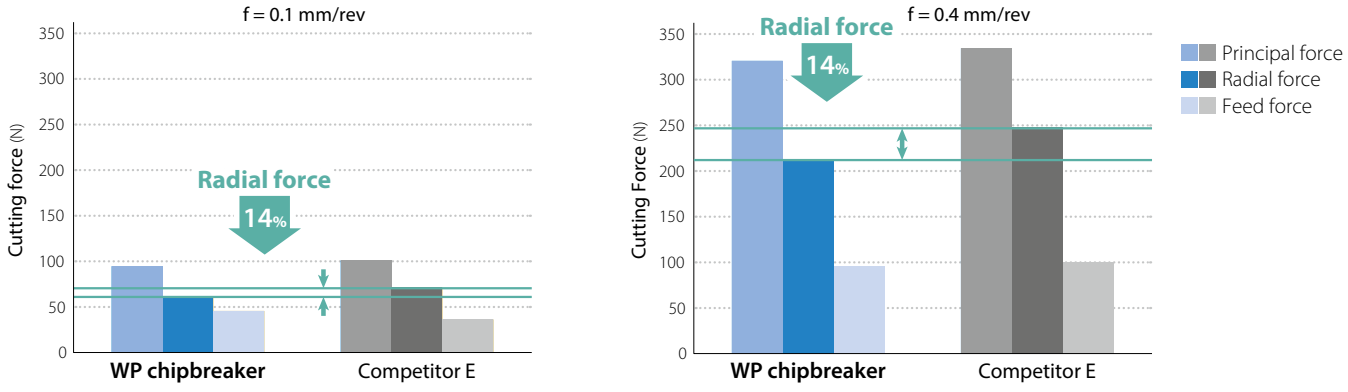


Cutting conditions: Vc = 80 m/min, ap = 0.73 mm, f = 0.05 mm/rev, wet
Insert: CCMT09T304 type Workpiece: ST45 (steel pipe)

5 High machining accuracy with low radial forces

Prevents tool deflection by reducing radial forces

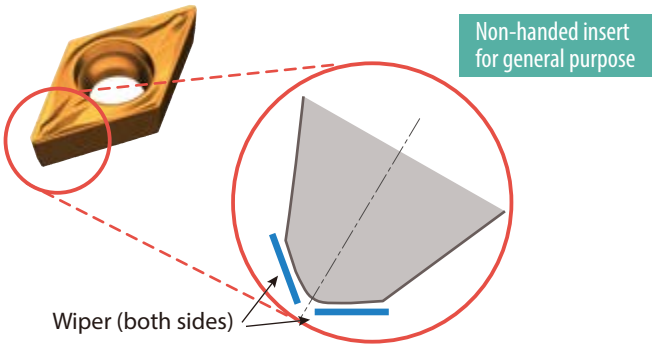
Cutting force comparison (Internal evaluation)



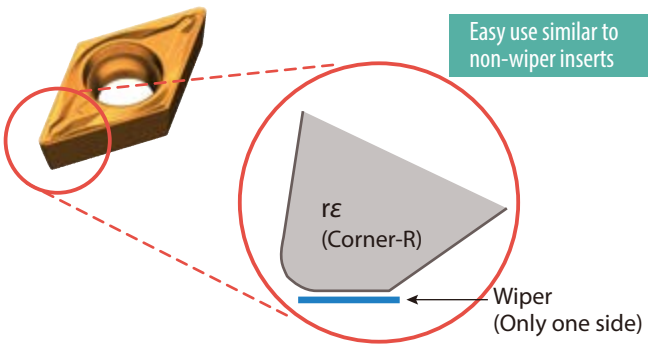
Cutting conditions: Vc = 200 m/min, ap = 0.3 mm, wet Toolholder: A20R-SCLCR09-22AE Insert: CCMT09T304 type Workpiece: 15CrMo4

6 Handed / Non-handed insert designs available depending on application (DCMX···/TPMX···)

Non-handed insert design

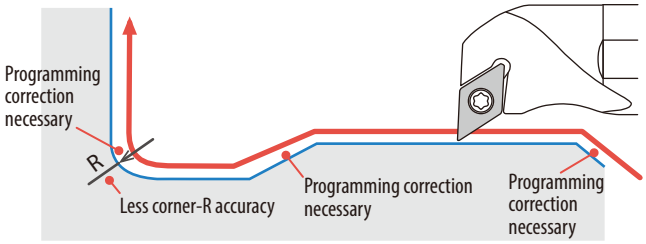


Handed insert (Drawing shows left-hand)

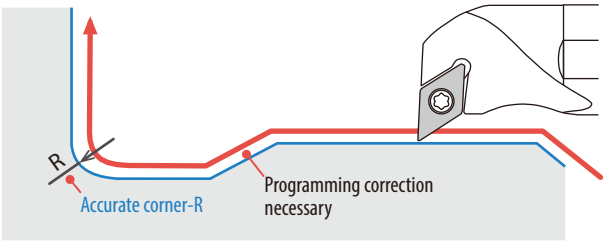


Proper use of non-handed and handed inserts

Non-handed insert design



Handed insert design



Using non-handed wiper insert

· Programming correction necessary at 3 points
· For machining with less Corner-R accuracy required

Using handed wiper insert

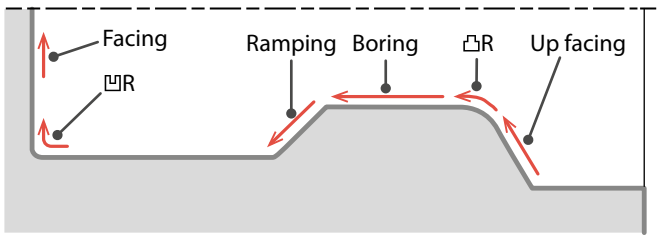
· Programming correction only necessary for plunging
· Accurate corner-R available

Similar use as a non-wiper insert with fewer programming corrections

* Cutting-edge position is different with non-wiper insert
Please adjust cutting-edge position

Caution (Finished edge line)

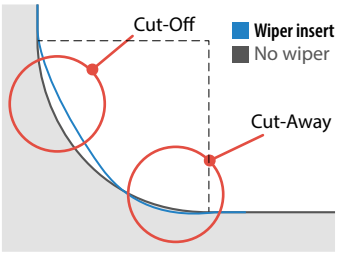
Non-handed insert design



Application	Caution
Boring/Facing	For D type and T type inserts, expected performance may vary depending on toolholders Please check the applicable toolholder
Up facing/Ramping	For D type and T type inserts, Z-direction program corrections are required
凹R/凸R	Wiper Insert should not be used when an accurate Corner-R is required

Radius cutting (Differences from non-wiper insert)

Cut-off and cut-away will occur between radius machining and straight machining
There is a limit to the use of a wiper insert when there is an R parameter symbol
Please refer to the list on the right for finished dimensions



D type, T type

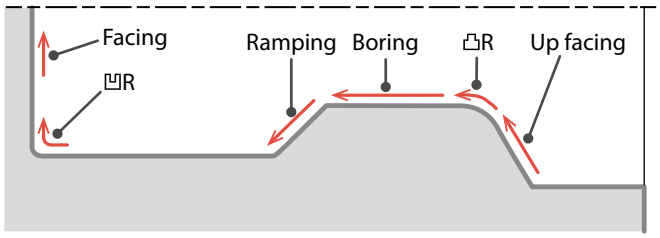
Unit: mm

Nominal corner R	Finished dimension
0.2	R0.2 $^{+0.3}_{-0.1}$
0.4	R0.4 ±0.2
0.8	R0.8 ±0.5

There is no limit for using CCMT type inserts

CCMT type inserts meet ISO standard

Handed insert design



Application	Caution
Boring	For D type and TP type inserts, expected performance may vary depending on toolholders Please check the applicable toolholder
Ramping	For D type and TP type inserts, Z-direction program corrections are required
凹R/凸R	Same as non-wiper insert
Up facing	Same as non-wiper insert
Facing	Same as non-wiper insert

Available inserts

Usage classification ✖: Interruption / 1st choice ✱: Interruption / 2nd choice ●: Continuous - Light interruption / 1st Choice ◔: Continuous - Light interruption / 2nd choice ●: Continuous / 1st choice ○: Continuous / 2nd choice

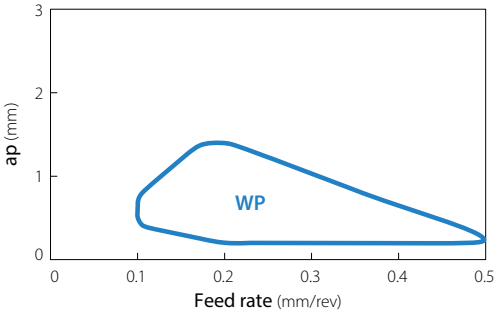
P	Carbon steel / Alloy steel	●	●	●	●	○	●	●	✖	●	◔
M	Stainless steel									◔	●

Shape	Description	Dimensions (mm)					Cermet		MEGACOAT NANO Cermet		CVD coated carbide				MEGACOAT NANO	MEGACOAT
		I.C.	Thickness	Hole	Corner-R (rε)	Relief angle	TN610	TN620	PV710	PV720	CA510	CA515	CA525	CA530	PR1425	PR1225
	CCMT 060202WP 060204WP 060208WP	6.35	2.38	2.8	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●
	CCMT 09T302WP 09T304WP 09T308WP	9.525	3.97	4.4	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●
	DCMX 070202WP 070204WP 070208WP	6.35	2.38	2.8	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●
	DCMX 11T302WP 11T304WP 11T308WP	9.525	3.97	4.4	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●
NEW  Left-hand shown	DCMX 070204 R/L-WP	6.35	2.38	2.8	0.4	7°		●		●					●	
	DCMX 11T304 R/L-WP	9.525	3.97	4.4	0.4	7°		●		●					●	
	TCMX 090204WP	5.56	2.38	2.5	0.4	7°	●	●	●	●	●	●	●	●	●	●
	TCMX 110204WP	6.35	2.38	2.8	0.4	7°	●	●	●	●	●	●	●	●	●	●
	TPMX 090202WP 090204WP 090208WP	5.56	2.38	2.8	0.2 0.4 0.8	11°	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●
	TPMX 110302WP 110304WP 110308WP	6.35	3.18	3.3	0.2 0.4 0.8	11°	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●
NEW  Left-hand shown	TPMX 110304 R/L-WP	6.35	3.18	3.3	0.4	11°		●		●					●	

●: Available

Recommended cutting conditions

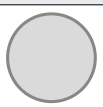
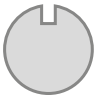
Workpiece	Insert grade	Min. - Recommendation - Max.		
		Vc (m/min)	ap (mm)	f (mm/rev)
Carbon steel / Alloy steel	TN610	80 – 170 – 260	0.15 – 0.30 – 1.50	0.10 – 0.25 – 0.50
	TN620	80 – 150 – 210		
	PV710	90 – 190 – 280		
	PV720	80 – 150 – 210		
	CA510	120 – 170 – 220		
	CA515	100 – 160 – 210		
	CA525	90 – 140 – 190		
	CA530	80 – 120 – 160		
	PR1425	60 – 120 – 200		
	PR1225	50 – 80 – 150		



CCMT09T type: Steel

Recommended insert grade

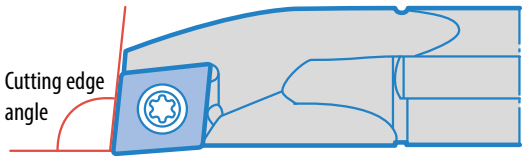
Carbon steel / Alloy steel

Applications		Target	Base material	Coating	Recommended grade
	Continuous	Surface quality	Cermet	Non-coated	TN610 / TN620
		Wear resistance		MEGACOAT NANO	PV710 / PV720
	Light interrupted	Wear resistance (High speed)	Carbide	CVD	CA510 / CA515 / CA525 / CA530
		Fracture resistance (Small parts)		MEGACOAT NANO and MEGACOAT	PR1425 / PR1225

Corresponding toolholders / Lead angles

Applicable cutting edge angle

Insert	Cutting edge angle
CCMT06/09	95°
DCMX07/11	93°
TCMX09/11	95°
TPMX09/11	95°



Applicable toolholder

Insert	Application	Description	Applicable
CCMT06/09	Boring	A-SCLC-AE	Yes
		S-SCLC-A	
		E-SCLC-A	
		HA-SCLC09	
	External turning	ACLC-FF	Yes
		SCLC-FF	
		SCLC	
		S-SCLC	
DCMX07/11	Boring	A-SDUC-AE	Yes *1
		S-SDUC-A	
		E-SDUC-A	
		HA-SDUC11	
		A-SDZC-AE	Yes *2
		S-SDZC-A	
		E-SDZC-A	
		A-SDQC-AE	No
		S-SDQC-A	
		E-SDQC-A	

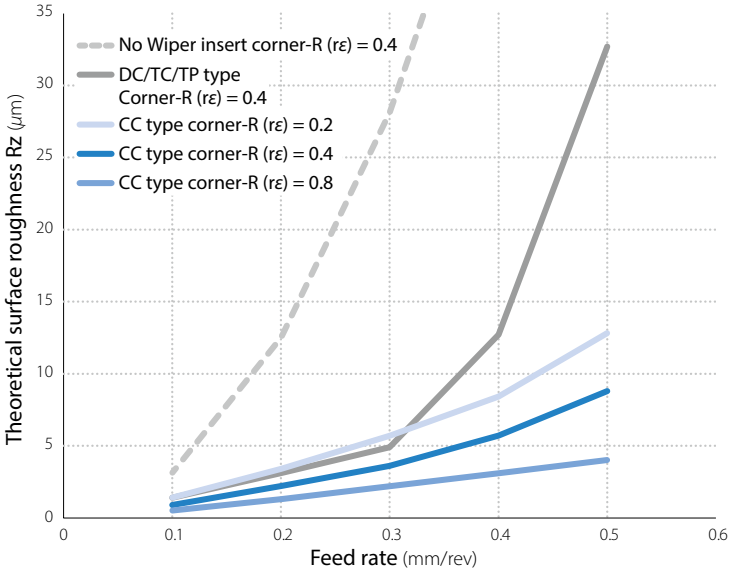
Insert	Application	Description	Applicable
DCMX07/11	External turning	ADJC-FF	Yes *2
		SDJC-FF	
		SDJC	
		S-SDUC	Yes *1
		SDLC-FF	See caution *2
		S-SDLC	See caution *1
		SDXC	No
		SDNC-F	
		SDNC	
TCMX09/11	Boring	A-STLC-AE	Yes
		S-STLC-A	
	External turning	STGC	No
TPMX09/11	Boring	A-STLP-AE	Yes *1
		S-STLP-A	
		E-STLP-A	
		S-STWP-E	No
		S-STWP	
		C-STXP	
	External turning	STGP	No

*1 Left-hand Insert for right-hand toolholder, right-hand insert for left-hand toolholder
*2 Right-hand insert for right-hand toolholder, left-hand insert for left-hand toolholder

Caution: The SDLC-FF and S-SDLC toolholders have a 5° lead angle
While the DCMX...WP can offer surface finish improvements over non-wiper inserts in those toolholders, optimum performance will be obtained by using a 3° lead angle, such as ADJC-FF, SDJC-FF, SDJC, S-SDUC, etc.

Setting conditions for wiper inserts

Theoretical surface roughness



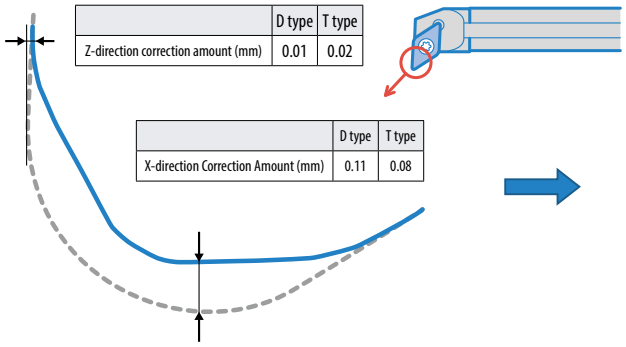
The theoretical surface roughness of a wiper insert is lower than inserts without a wiper

When selecting a feed rate, see left chart for theoretical surface roughness

WP chipbreaker edge position offset adjustment

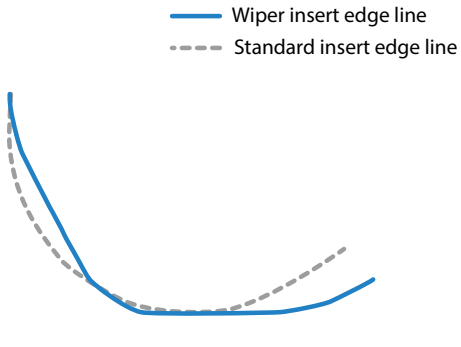
Non-handed insert design

For D type and T type, cutting edge offsets are required

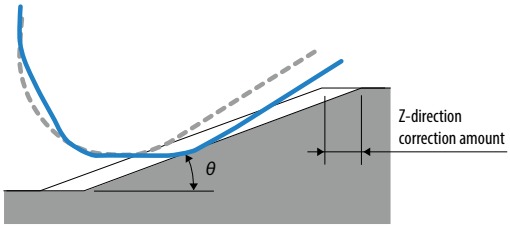


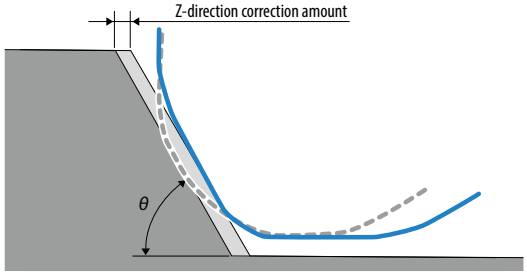
	D type	T type
Z-direction correction amount (mm)	0.01	0.02

	D type	T type
X-direction Correction Amount (mm)	0.11	0.08



For D type and T type, program corrections are required for ramping and profiling





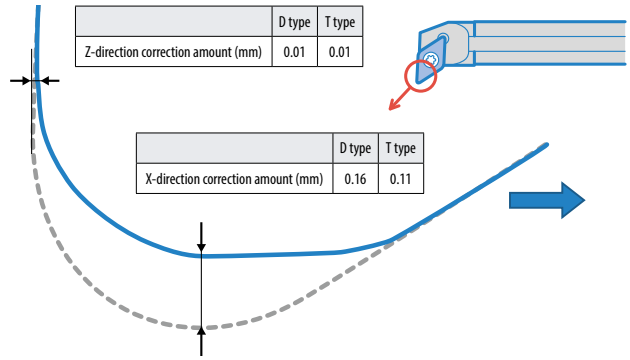
Ramping angle θ	0°	5°	10°	15°	20°	25°
Z-direction correction amount (mm) D type	0	−0.14	−0.15	−0.16	−0.16	−0.17
Z-direction correction amount (mm) T type	0	−0.16	−0.17	−0.17	−0.17	—

Profiling angle θ	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°
Z-direction correction amount (mm) D Type	0.00	0.07	0.06	0.04	0.03	0.02	0.01	0.00	–	–	–
Z-direction correction amount (mm) T type	0.00	0.07	0.06	0.05	0.05	0.04	0.03	0.02	0.01	0.01	0.00

Profiling angle θ	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°
Z-direction correction amount (mm) D type	−0.01	−0.02	−0.03	−0.04	−0.05	−0.05	−0.04	−0.03	−0.02	−0.01	0.00
Z-direction correction amount (mm) T type	–	–	–	−0.01	−0.02	−0.03	−0.04	−0.03	−0.02	−0.01	0.00

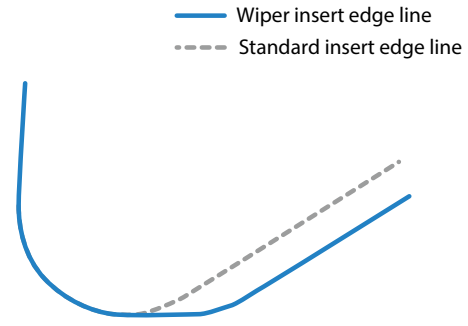
Handed insert design

For D type and T type, cutting edge offsets are required

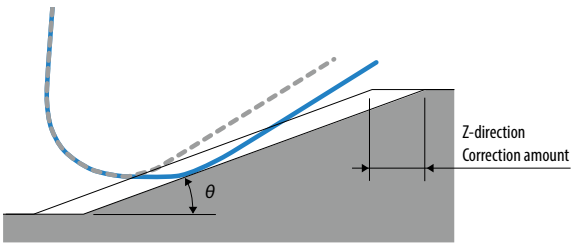


	D type	T type
Z-direction correction amount (mm)	0.01	0.01

	D type	T type
X-direction correction amount (mm)	0.16	0.11



Programming correction is necessary for plunging with D and T type inserts (Not necessary for up-facing)

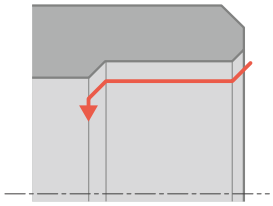


Ramping angle θ	0°	5°	10°	15°	20°	25°
Z-direction correction amount (mm) D type	0	−0.22	−0.24	−0.24	−0.25	−0.25
Z-direction correction amount (mm) T type	0	−0.24	−0.24	−0.25	−0.24	—

Case studies

Hub C45

Vc = 160 m/min
ap = 0.15 mm (1 pass)
f = 0.08 mm/rev
Wet
A16Q-SCLCR09-18AE
CCMT09T304WP TN620



WP Chipbreaker TN620 2.3 sec.

50 % and more

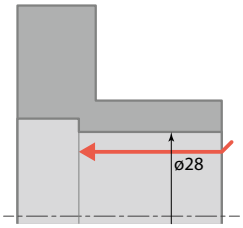
Competitor F (No Wiper) 5.6 sec.

WP chipbreaker reduced the cutting time by more than 50% by increasing feed rate and reducing number of cuts (2 passes to 1 pass). Wiper edge also improved surface roughness.

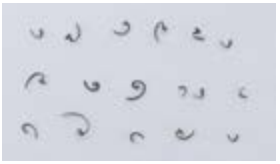
(User evaluation)

Sleeve C45

Vc = 180 m/min
ap = 0.2 mm
f = 0.27 mm/rev
Wet
S16-SCLCR09 type
CCMT09T304WP PV720



WP chipbreaker



Competitor G (Wiper edge)

WP chipbreaker improved chip control compared to competitor G. Machining efficiency was improved by increasing feed rate. Tool life extended to 1.5 times that of Competitor G.

(User evaluation)

Negative wiper insert

WE/WF chipbreaker

High productivity with newly designed wiper edge geometry

Finishing-Medium

WE chipbreaker (For high machining efficiency)

- High productivity by reducing cutting time during higher feed machining
- Stable chip control in a wide range of applications

Finishing

WF chipbreaker (For excellent surface roughness)

- High productivity with smooth chip control in finishing operations
- Excellent surface roughness by controlling adhesion

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