THE NEW VALUE FRONTIER

KYOCERA

Hybrid cermet for steel machining

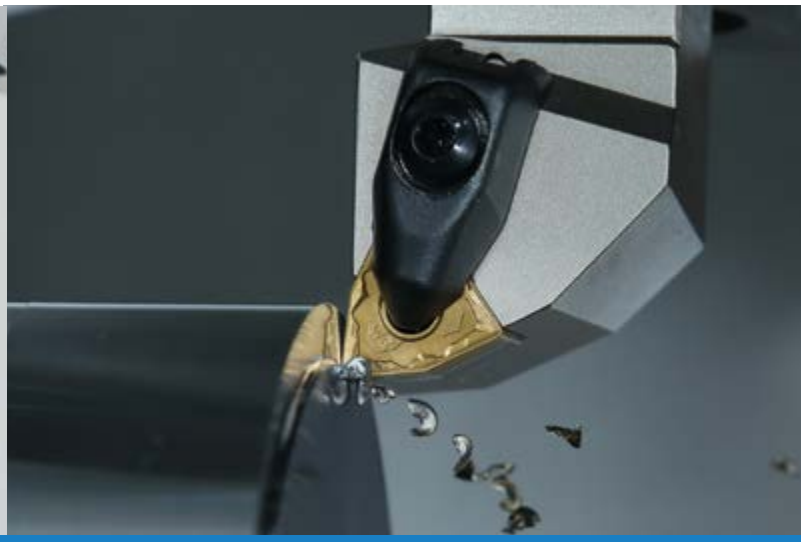
TN620/PV720
TN610/PV710

General use

TN620/PV720

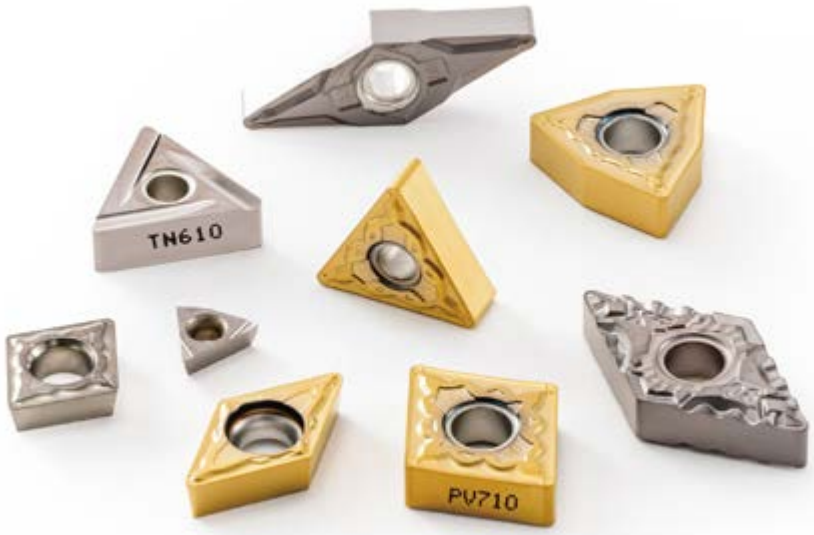
High speed / continuous

TN610/PV710



New cermet for high quality surface finish machining

3 advantages to the hybrid coating technology



Uncoated CERMET

TN610/TN620

MEGACOAT NANO CERMET

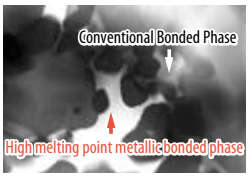
PV710/PV720

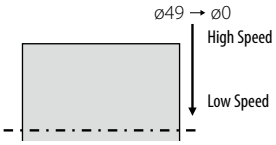
Three attributes of the hybrid technology contributes to superior surface finish and machining stability.

1 Excellent surface finish

- **Combining the conventional cermet bonded phase (nickel, cobalt) and the special high melting point metallic bonded phase**
- **Provides high adhesion resistance to eliminate galling of the workpiece**

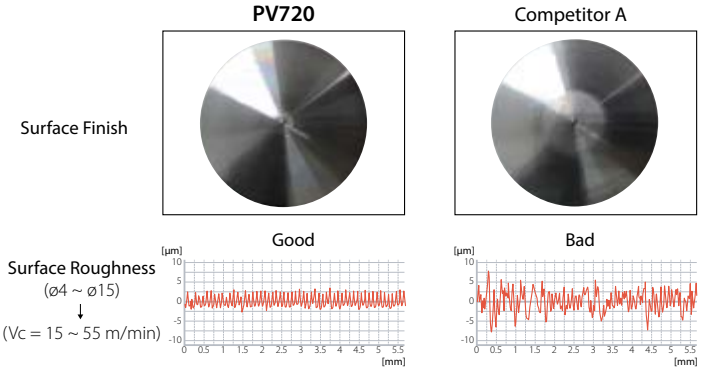
Specialized strengthening technology
High melting point
"Hybrid bonded phase"





Surface finish comparison (In-house evaluation)

Cutting conditions: Vc = 180 ~ 0 m/min (Constant rotational speed), ap = 0.5 mm, f = 0.1 mm/rev, wet, CNMG120404 type, workpiece: C10



2 Excellent fracture resistance

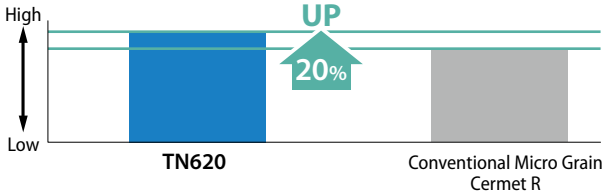
Improved strength with uniform micro grain hard phase and superior compressive stress with high melting point bonded phase. This combination yields greater fracture resistance.

Specialized strengthening technology Grain "hybrid hard phase"

TN620 Structure

Inner Structure

Compressive residual stress in hard phase (In-house evaluation)

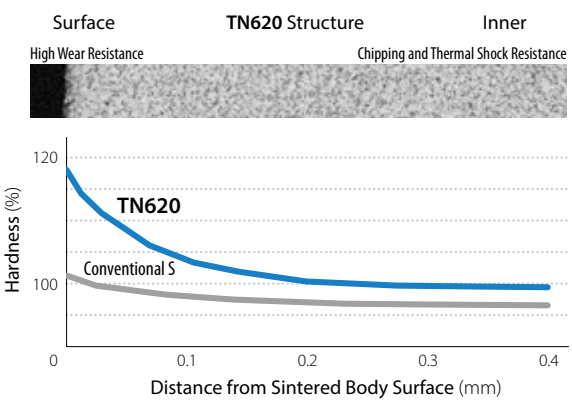


3 Excellent wear resistance

- **Excellent fracture resistance with surface-hardened layer using gradient composition technology**
- **Continuously-varied hardness provides wear and fracture resistance**

TN620's inner structure has high toughness and chipping resistance along with thermal and greater wear resistance than that of the conventional micro grain cermet. (See right chart) (In-house evaluation)

Specialized strengthening technology
Special surface-hardened "hybrid structure"



Uncoated CERMET

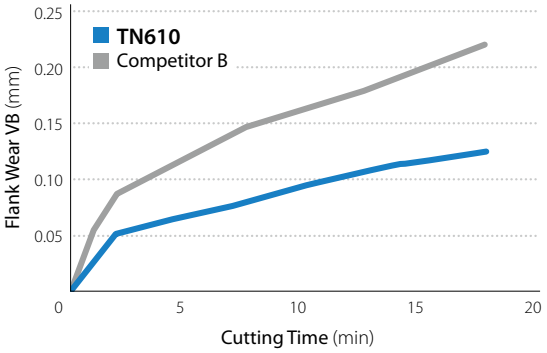
TN610/TN620

High speed/continuous

TN610

- Higher wear resistance during continuous and finish machining
- High quality/high precision machining

Wear resistance comparison (In-house evaluation)



After machining 17.9 min.

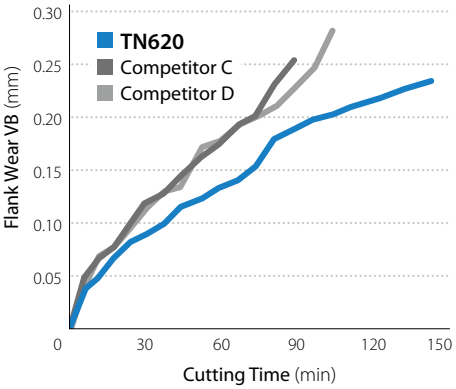
Cutting conditions: Vc = 300 m/min, ap = 1.0 mm, f = 0.2 mm/rev
Wet, CNMG120408 type; workpiece: 34CrMo4

General use

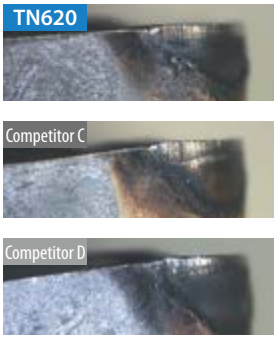
TN620

General use for quality surface finishes with balanced wear and fracture resistance

Wear resistance comparison (In-house evaluation)

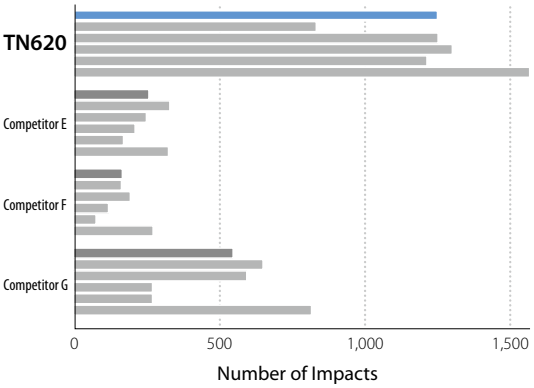


After machining 89 min.



Cutting conditions: Vc = 200 m/min, f = 0.2 mm/rev, ap = 1.0 mm
wet, CNMG120408 type; workpiece: 34CrMo4

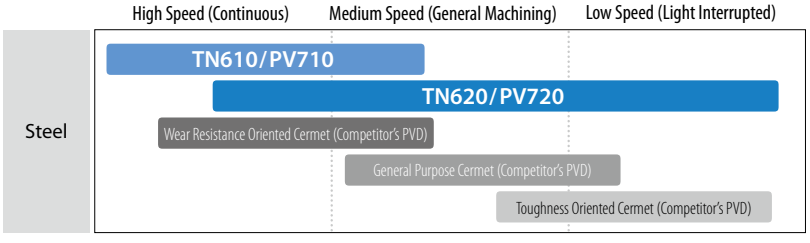
Fracture resistance comparison (In-house evaluation)

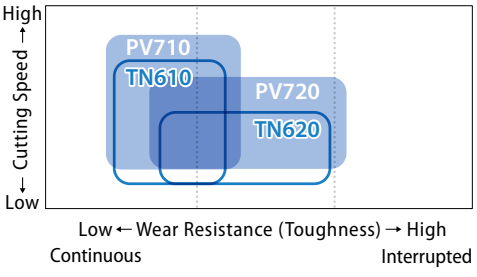


Average Values Shown Above

Cutting conditions: Vc = 250 m/min, ap = 1.0 mm, f = 0.2 mm/rev
wet, CNMG120408 type; workpiece: C45 (4 grooves in workpiece)

Steel application range





MEGACOAT NANO CERMET

PV710/PV720

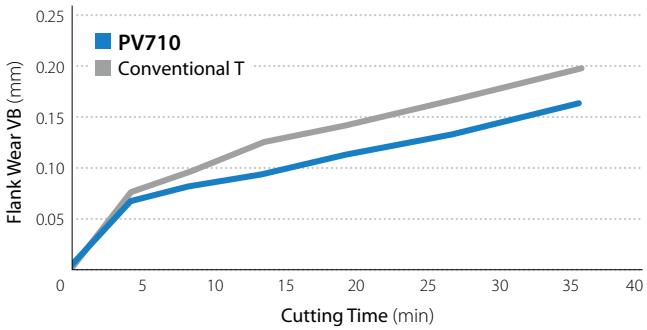
Grades PV710/PV720 improve performance by composite lamination of MEGACOAT NANO and special TiN coating to combine high adhesion resistance and great visibility of the used cutting edge even in dim light.

High speed/continuous

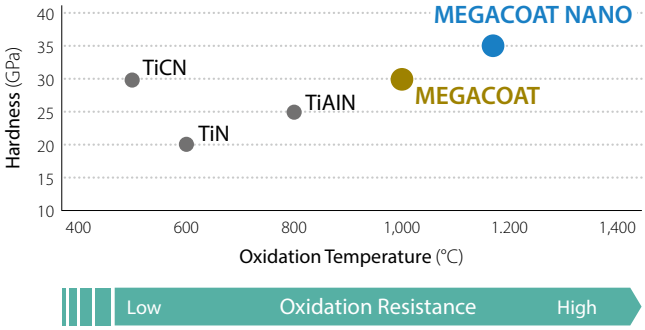
PV710

Long tool life during high speed and continuous machining

Wear resistance comparison (In-house evaluation)



Coating Properties



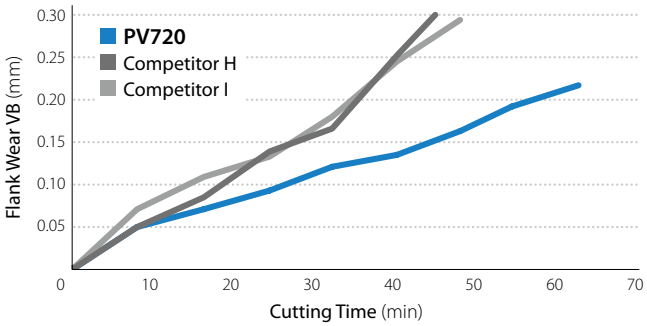
Cutting conditions: Vc = 350 m/min, ap = 1.0 mm, f = 0.2 mm/rev, wet, CNMG120408 type
Workpiece: 34CrMo4

General use

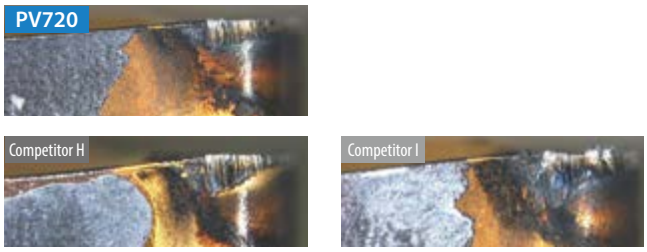
PV720

High efficiency machining and superior surface finish

Wear resistance comparison (In-house evaluation)

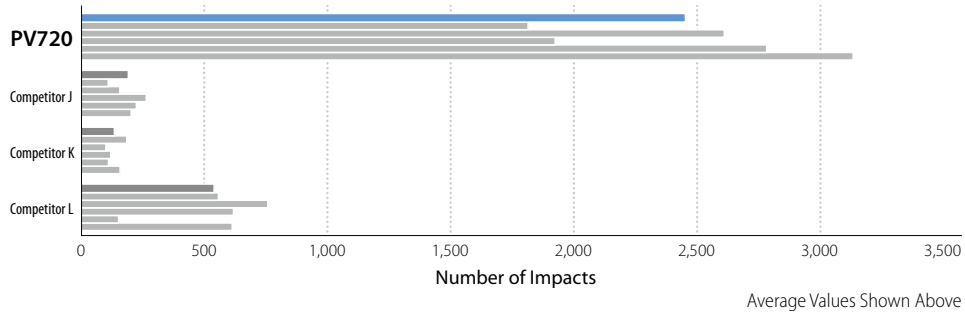


Flank wear condition after machining 48 min.



Cutting conditions: V = 250 m/min, ap = 1.0 mm, f = 0.2 mm/rev, wet, CNMG120408 type; workpiece: 34CrMo4

Fracture resistance comparison (In-house evaluation)



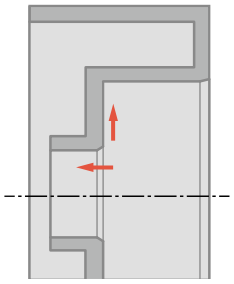
Average Values Shown Above

Cutting conditions: V = 250 m/min, ap = 1.0 mm, f = 0.2 mm/rev, wet, CNMG120408 type; workpiece: C45 (4 grooves in workpiece)

Case studies

Drum - C30

Vc = 300 m/min
ap = 0.5 mm
f = 0.2 ~ 0.3 mm/rev
Wet
CNMG090408HQ



Tool Life

TN620 **800** pcs/edge

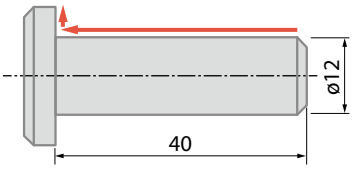
Competitor M (Cermet) **550 - 750** pcs/edge

x 1.1 - 1.4 Tool Life

TN620 shows 1.1 to 1.4 times longer tool life compared to competitor M (Cermet). (User evaluation)

Yoke pin - C35

Vc = 75 m/min
ap = 0.15 mm
f = 0.12 mm/rev
Wet
TNGG160404R-S



Tool Life

TN620 **450** pcs/edge

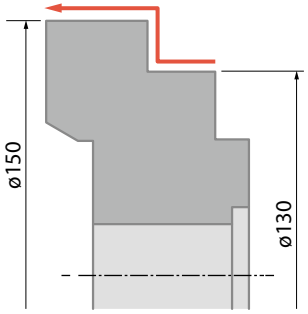
Competitor N (Cermet) **300** pcs/edge

x 1.5 Tool Life

TN620 shows 1.5 times longer tool life compared to competitor N (Cermet). Stable surface roughness and shiny surface finish. No chipping and stable machining. (User evaluation)

Piston - C45 normalized

Vc = 450 m/min
ap = 0.15 ~ 0.2 mm
f = 0.04 mm/rev
Wet (Water soluble)
CNMG120404PP



Tool Life

PV710 **200** pcs/edge

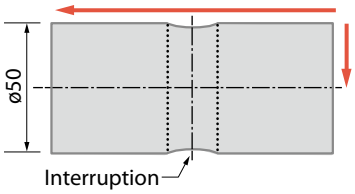
Conventional U (PVD Coated Cermet) **90** pcs/edge

x 2.2 Tool Life

PV710 shows 2.2 times longer tool life compared to conventional U (PVD coated cermet). (User evaluation)

Piston - 15CrMo5

Vc = 250 m/min
ap = 0.1 ~ 0.2 mm
f = 0.08 mm/rev
Wet (Water soluble)
CNMG120404PP



Tool Life

PV710 **250** pcs/edge

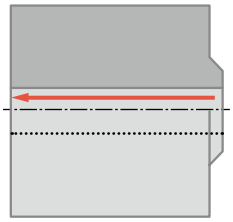
Competitor O (PVD Coated Cermet) **180** pcs/edge

x 1.3 Tool Life

PV710 shows 1.3 times longer tool life compared to competitor O (PVD coated cermet). (User evaluation)

Oil pump - sintered steel

Vc = 160 m/min
ap = 0.2 mm
f = 0.1 mm/rev
Wet
TPGH090204L



Tool Life

PV720 **Avg. 800** pcs/edge

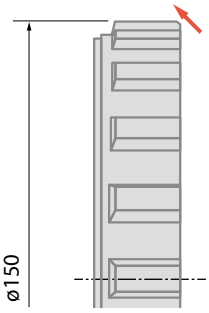
Competitor P (PVD Coated Cermet) **300** pcs/edge

x 2.7 Tool Life

PV720 shows 2.7 times longer tool life compared to competitor P (PVD coated cermet). (User evaluation)

Ring gear - special alloy steel

Vc = 300 m/min
ap = 0.2 mm
f = 0.2 ~ 0.4 mm/rev
Wet
WNMG080404PP



Tool Life

PV720 **Avg. 10,000** pcs/edge

Competitor Q (PVD Coated Cermet) **3,000** pcs/edge

x 3.3 Tool Life

PV720 shows 3.3 times longer tool life compared to competitor Q (PVD coated cermet). (User evaluation)

Finishing PP chipbreaker

Negative type

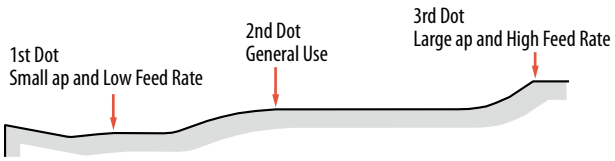
Features

3-Step dmart dot structure for a wide range of steel finishing feed rates

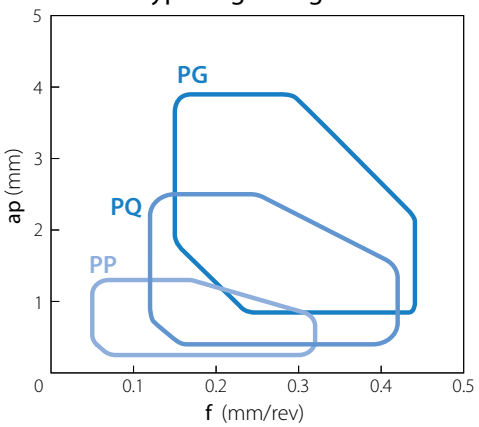
Smooth taper cutting edge reduces cutting forces

Corner-R(rε) 0.2 mm - 1.2 mm are available

Each Dot Functions According to the Cutting Conditions



Steel C-type Edge Length = 12



Finishing - Medium PQ chipbreaker

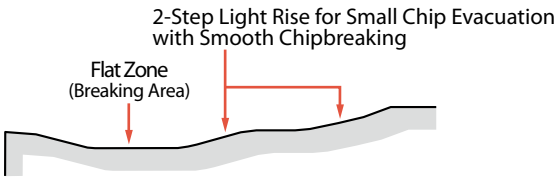
Negative type

Features

Stable chip control in a wide range of medium-finishing applications with the newly developed "flat zone" (breaking area) and rising 2-step smart wall effect

Twin dots on the edge tip provide smooth chip control at smaller ap during high feed turning and facing

Continuous Variable Land (CVL) with well-balanced edge sharpness and toughness



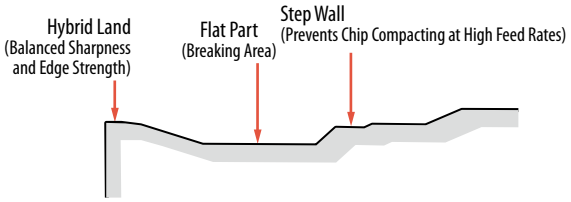
Medium - Roughing PG chipbreaker

Negative type

Features

Stable machining with good balance of edge sharpness and strength

Prevents chip compacting at high feed rates with good chip control at low feed rates



Finishing WF chipbreaker

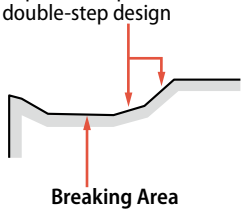
Negative type

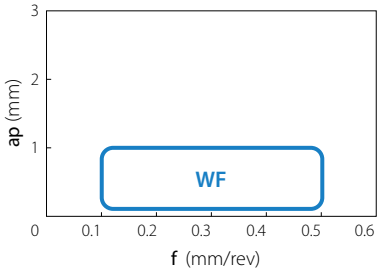
Features - Wiper insert

Unique wiper-edge design prevents peeling and provides superior surface finish

Provides excellent chip control with primary & secondary dots and improves cutting performance during finishing operations

Chipbreaker Cross Section
Improved chip control with double-step design





Finishing - Medium WE chipbreaker

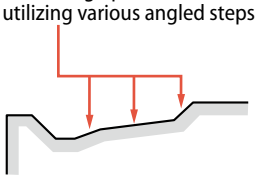
Negative type

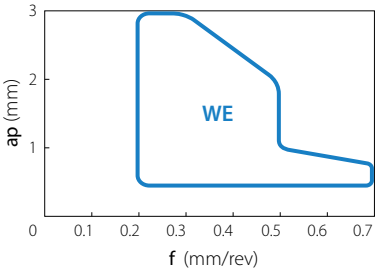
Features - Wiper insert

High-quality surface roughness even at high feed rates with unique wiper-edge design

Wide application range is available with improved chip control at low depths of cut
preventing chip crunching and running over chipbreaker dots at high feed rates

Chipbreaker Cross Section
Available for a wide range of machining operations utilizing various angled steps





Finishing WP chipbreaker

Positive type

Features - Wiper insert

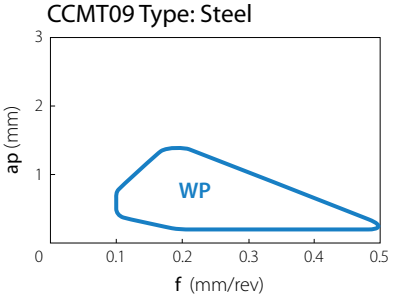
Excellent surface roughness and smooth chip control at high feed rates

High grade surface finish with no tear

High machining accuracy with low cutting forces

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

CCMT09 Type: Steel



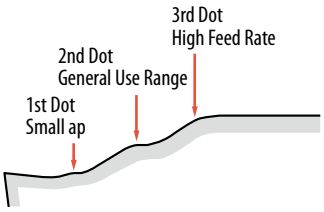
Finishing PP chipbreaker

Positive type

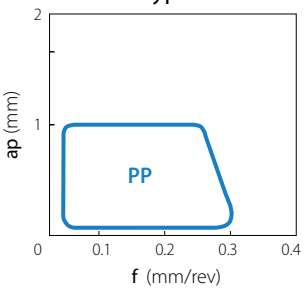
Features

Stable chip control when finishing steel

Special edge designed for sharpness and improved strength for stable tool life during high feed machining operations



CPMT09 Type: Steel



Recommended cutting conditions

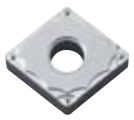
Vc (m/min)

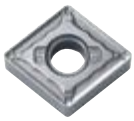
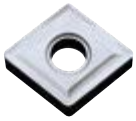
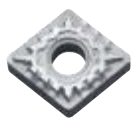
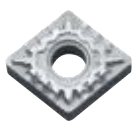
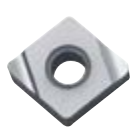
	Low Carbon Steel Low Carbon Alloy Steel 150 HB or Below	Medium Carbon Steel Medium Carbon Alloy Steel 250 HB or Below	High Carbon Alloy Steel 300 HB or Below
TN610	150 – **250** – 350		150 – **230** – 300
TN620	100 – **200** – 300		100 – **180** – 250

Vc (m/min)

	Low Carbon Steel Low Carbon Alloy Steel 150 HB or Below	Medium Carbon Steel Medium Carbon Alloy Steel 250 HB or Below	High Carbon Alloy Steel 300 HB or Below
PV710	150 – **300** – 400		150 – **250** – 330
PV720	100 – **250** – 350		100 – **200** – 280

Negative type inserts

Shape Handed Insert shows right-hand	Description	Dimensions (mm)				TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)				
 Finishing / with wiper edge	CNMG 120404 WF 120408 WF	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Finishing / with wiper edge	CNMG 120404 WP 120408 WP	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Finishing-Medium / with wiper edge	CNMG 120404 WE 120408 WE 120412 WE	12.70	4.76	5.16	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing-Medium / with wiper edge	CNMG 120404 WQ 120408 WQ 120412 WQ	12.70	4.76	5.16	0.4 0.8 1.2	● ●	● ● ●	● ●	● ● ●
 Finishing	CNMG 120402 PP 120404 PP 120408 PP 120412 PP	12.70	4.76	5.16	0.2 0.4 0.8 1.2	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●
 Finishing	CNMG 090404 GP 090408 GP	9.525	4.76	3.81	0.4 0.8		● ●		● ●
	CNMG 120402GP 120404 GP 120408 GP	12.70	4.76	5.16	0.2 0.4 0.8	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing-Medium	CNMG 120404PQ 120408PQ 120412PQ	12.70	4.76	5.16	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing-Medium	CNMG 090404HQ 090408HQ	9.525	4.76	3.81	0.4 0.8		● ●		● ●
	CNMG 120404HQ 120408HQ 120412HQ	12.70	4.76	5.16	0.4 0.8 1.2	● ●	● ● ●	● ●	● ● ●
 Finishing-Medium / Up facing	CNMG 120404CQ 120408CQ	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Medium-Roughing	CNMG 090404GS 090408GS	9.525	4.76	3.81	0.4 0.8		● ●		● ●
	CNMG 120404GS 120408GS	12.70	4.76	5.16	0.4 0.8		● ●		● ●

Shape Handed Insert shows Right-hand	Description	Dimensions (mm)				TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)				
 Medium-Roughing	CNMG 120404 PG 120408 PG 120412 PG	12.70	4.76	5.16	0.4 0.8 1.2	● ●	● ● ●	● ●	● ● ●
 Medium-Roughing	CNMG 120404 PS 120408 PS	12.70	4.76	5.16	0.4 0.8		● ●		● ●
 Roughing	CNMG 120404 120408	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Low carbon steel / Finishing / Small ap	CNMG 120404 XF 120408 XF	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Low carbon steel / Finishing	CNMG 120404 XP 120408 XP	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Low carbon steel / Medium	CNMG 120404 XQ 120408 XQ	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Low carbon steel / Roughing	CNMG 120408 XS	12.70	4.76	5.16	0.8	●	●	●	●
 Finishing /Sharp Edge/ surface roughness oriented	CNGG 090402$^{R/L}$-S 090404$^{R/L}$-S 090408$^{R/L}$-S	9.525	4.76	3.81	0.2 0.4 0.8	● ● ●	● ● ●	● ● ●	● ● ●
 Medium	CNGG 120404$^{R/L}$ 120408$^{R/L}$	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●

Negative type inserts

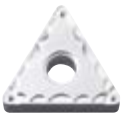
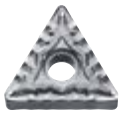
Shape Handed Insert shows right-hand	Description	Dimensions (mm)				TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)				
 Medium-Roughing / low cutting resistance	CNGG 120404R/L-25R 120408R/L-25R	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Finishing / with wiper edge	DNMX 150404 WF 150408 WF 150412 WF	12.70	4.76	5.16	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●
	DNMX 150604 WF 150608 WF 150612 WF	12.70	6.35	5.16	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing	DNMG 150402 PP 150404 PP 150408 PP 150412 PP	12.70	4.76	5.16	0.2 0.4 0.8 1.2	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●
	DNMG 150602 PP 150604 PP 150608 PP 150612 PP	12.70	6.35	5.16	0.2 0.4 0.8 1.2	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●
 Finishing	DNMG 110404 GP 110408 GP	9.525	4.76	3.81	0.4 0.8		● ●		● ●
	DNMG 150402 GP 150404 GP 150408 GP	12.70	4.76	5.16	0.2 0.4 0.8	● ● ●	● ● ●	● ● ●	● ● ●
	DNMG 150602 GP 150604 GP 150608 GP	12.70	6.35	5.16	0.2 0.4 0.8	● ● ●		● ● ●	
 Finishing-Medium	DNMG 150404 PQ 150408 PQ 150412 PQ	12.70	4.76	5.16	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●
	DNMG 150604 PQ 150608 PQ 150612 PQ	12.70	6.35	5.16	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing-Medium	DNMG 110402 HQ 110404 HQ	9.525	4.76	3.81	0.2 0.4		● ●		● ●
	DNMG 150404 HQ 150408 HQ 150412 HQ	12.70	4.76	5.16	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●
	DNMG 150604 HQ 150608 HQ 150612 HQ	12.70	6.35	5.16	0.4 0.8 1.2	● ● ●		● ● ●	
 Finishing-Medium / Up facing	DNMG 150404 CQ 150408 CQ 150412 CQ	12.70	4.76	5.16	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●
	DNMG 150604 CQ	12.70	6.35	5.16	0.4	●		●	
 Medium-Roughing	DNMG 110404 GS 110408 GS	9.525	4.76	3.81	0.4 0.8		● ●		● ●
	DNMG 150404 GS 150408 GS	12.70	4.76	5.16	0.4 0.8		● ●		● ●

Shape Handed Insert shows right-hand	Description	Dimensions (mm)				TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)				
 Medium-Roughing	DNMG 150404 PG 150408 PG 150412 PG	12.70	4.76	5.16	0.4 0.8 1.2	● ●	● ● ●	● ● ●	● ● ●
	DNMG 150604 PG 150608 PG 150612 PG	12.70	6.35	5.16	0.4 0.8 1.2	● ●	● ● ●	● ● ●	● ● ●
 Medium-Roughing	DNMG 150404 PS 150408 PS	12.70	4.76	5.16	0.4 0.8		● ●		● ●
 Roughing	DNMG 150404 150408	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Low carbon steel / Finishing / Small ap	DNMG 150404 XF 150408 XF	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Low carbon steel / Finishing	DNMG 150404 XP 150408 XP	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
	DNMG 150604 XP 150608 XP	12.70	6.35	5.16	0.4 0.8	● ●		● ●	
 Low carbon steel / Medium	DNMG 150404 XQ 150408 XQ	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Low carbon steel / Roughing	DNMG 150408 XS	12.70	4.76	5.16	0.8	●	●	●	●
 Medium	DNGG 150404R/L 150408R/L	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Medium-Roughing	RNMG 090300	9.525	3.18	3.81	–		●		●
	RNMG 120400	12.70	4.76	5.16	–		●		●
 Finishing-Medium	SNMG 120404 PQ 120408 PQ	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●

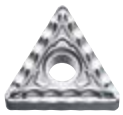
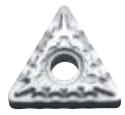
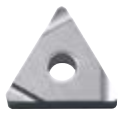
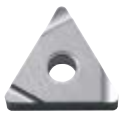
●: Available

Negative type inserts

Shape Handed Insert shows right-hand	Description	Dimensions (mm)				TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)				
 Finishing-Medium	SNMG 120404 HQ 120408 HQ 120412 HQ	12.70	4.76	5.16	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●
 Medium-Roughing	SNMG 120408 PG 120412 PG 120416 PG	12.70	4.76	5.16	0.8 1.2 1.6	● 	● ● ●	● 	● ● ●
 Roughing	SNMG 090304 090308	9.525	3.18	3.81	0.4 0.8	● ●	● ●	● ●	● ●
	SNMG 120404 120408 120412 120416 120420	12.70	4.76	5.16	0.4 0.8 1.2 1.6 2.0	● ● 	● ● ● ● ●	● ● 	● ● ● ● ●
 Low carbon steel / Finishing	SNMG 120408 XP	12.70	4.76	5.16	0.8	●	●	●	●
 Low carbon steel / Medium	SNMG 120408 XQ	12.70	4.76	5.16	0.8	●	●	●	●
 Low carbon steel / Roughing	SNMG 120408 XS	12.70	4.76	5.16	0.8	●	●	●	●
 B: Finishing-Medium C: Medium-Roughing	SNGG 090304R/L-B 090308R/L-B	9.525	3.18	3.81	0.4 0.8	● ●	● ●	● ●	● ●
	SNGG 120404R/L-C 120408R/L-C	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
	SNMG 120404R/L-C 120408R/L-C	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Medium-Roughing / Low cutting resistance	SNGG 120404R/L-25R 120408R/L-25R	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Finishing / with wiper edge	TNMX 160404 WF 160408 WF 160412 WF	9.525	4.76	3.81	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●

Shape Handed Insert shows right-hand	Description	Dimensions (mm)				TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)				
 Finishing	TNMG 160402 PP 160404 PP 160408 PP 160412 PP	9.525	4.76	3.81	0.2 0.4 0.8 1.2	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●
 Finishing	TNMG 110404 GP 110408 GP	6.35	4.76	2.26	0.4 0.8	 	● ●	 	● ●
	TNMG 160402 GP 160404 GP 160408 GP	9.525	4.76	3.81	0.2 0.4 0.8	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing-Medium	TNMG 160404 PQ 160408 PQ 160412 PQ	9.525	4.76	3.81	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing-Medium	TNMG 110404 HQ 110408 HQ	6.35	4.76	2.26	0.4 0.8	 	● ●	 	● ●
	TNMG 160404 HQ 160408 HQ 160412 HQ	9.525	4.76	3.81	0.4 0.8 1.2	● ●	● ● ●	● ●	● ● ●
 Finishing-Medium / Up facing	TNMG 160404 CQ 160408 CQ 160412 CQ	9.525	4.76	3.81	0.4 0.8 1.2	● ●	● ● ●	● ●	● ● ●
 Medium-Roughing	TNMG 110404 GS	6.35	4.76	2.26	0.4		●		●
	TNMG 160404 GS TNMG 160408 GS	9.525	4.76	3.81	0.4 0.8	 	● ●	 	● ●
 Medium-Roughing	TNMG 160404 PG 160408 PG 160412 PG	9.525	4.76	3.81	0.4 0.8 1.2	● ●	● ● ●	● ●	● ● ●
 Medium-Roughing	TNMG 160404 PS 160408 PS	9.525	4.76	3.81	0.4 0.8	 	● ●	 	● ●
 Roughing	TNMG 160404 160408 160412	9.525	4.76	3.81	0.4 0.8 1.2	● ●	● ● ●	● ●	● ● ●
	TNMG 220408	12.70	4.76	5.16	0.8		●		●
 Low carbon steel / Finishing / Small ap	TNMG 160404 XF 160408 XF	9.525	4.76	3.81	0.4 0.8	● ●	● ●	● ●	● ●

Negative type inserts

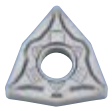
Shape Handed Insert shows right-hand	Description	Dimensions (mm)				TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)				
 Low carbon steel / Finishing	TNMG 160404 XP 160408 XP	9.525	4.76	3.81	0.4 0.8	● ●	● ●	● ●	● ●
 Low carbon steel / Medium	TNMG 160404 XQ 160408 XQ	9.525	4.76	3.81	0.4 0.8	● ●	● ●	● ●	● ●
 Low carbon steel / Roughing	TNMG 160408 XS	9.525	4.76	3.81	0.8		●		●
 Finishing-Medium	TNGG 160402 M-SK 160404 M-SK	9.525	4.76	3.81	<0.2 <0.4				● ●
 Medium-Roughing	TNMG 160404R/L-ST 160408R/L-ST	9.525	4.76	3.81	0.4 0.8	●	● ●	●	● ●
 Without chipbreaker	TNMA 160404 160408	9.525	4.76	3.81	0.4 0.8		● ●		● ●
Super Fine  Finishing / Sharp edge / Surface roughness oriented	TNEG 160402R/L-SSF 160404R/L-SSF	9.525	4.76	3.81	0.2 0.4	● ●	● ●	● ●	● ●
 Finishing / Sharp Edge / Surface roughness oriented	TNGG 160401R/L-S 160402R/L-S 160404R/L-S 160408R/L-S	9.525	4.76	3.81	0.1 0.2 0.4 0.8	 ● ● ●	● ● ● ●	 ● ● ●	● ● ● ●
 B: Finishing-Medium C: Medium-Roughing	TNGG 110302R/L-B 110304R/L-B	6.35	3.18	2.26	0.2 0.4	● ●	● ●	● ●	● ●
	TNGG 160402R/L-B 160404R/L-B 160408R/L-B	9.525	4.76	3.81	0.2 0.4 0.8	● ● ●	● ● ●	● ● ●	● ● ●
	TNGG 160402R/L-C 160404R/L-C 160408R/L-C 160412R/L-C	9.525	4.76	3.81	0.2 0.4 0.8 1.2	 ● ● ●	● ● ● ●	 ● ● ●	● ● ● ●
	TNGG 220404R/L-C 220408R/L-C	12.70	4.76	5.16	0.4 0.8		● ●		● ●
	TNMG 160404R/L-C 160408R/L-C	9.525	4.76	3.81	0.4 0.8	● ●	● ●	● ●	● ●

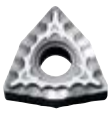
Shape Handed Insert shows Right-hand	Description	Dimensions (mm)				TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)				
 Medium-Roughing / Low cutting resistance	TNGG 160404R/L-25R 160408R/L-25R	9.525	4.76	3.81	0.4 0.8	● ●	● ●	● ●	● ●
 Finishing	VNMG 160402 PP 160404 PP 160408 PP 160412 PP	9.525	4.76	3.81	0.2 0.4 0.8 1.2	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●
 Finishing	VNMG 160402 GP 160404 GP 160408 GP	9.525	4.76	3.81	0.2 0.4 0.8	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing-Medium	VNMG 160404R/L-VC 160408R/L-VC 160412R/L-VC	9.525	4.76	3.81	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing-Medium	VNMG 160404 VF 160408 VF 160412 VF	9.525	4.76	3.81	0.4 0.8 1.2	● ●	● ● ●	● ●	● ● ●
 Finishing-Medium	VNMG 160404 PQ 160408 PQ 160412 PQ	9.525	4.76	3.81	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing-Medium	VNMG 160404 HQ 160408 HQ 160412 HQ	9.525	4.76	3.81	0.4 0.8 1.2	● ●	● ● ●	● ●	● ● ●
 Roughing	VNMG 160404 160408	9.525	4.76	3.81	0.4 0.8	● ●	● ●	● ●	● ●
 Finishing-Medium	VNGG 160402 M-SK 160404 M-SK	9.525	4.76	3.81	<0.2 <0.4	● ●	● ●	● ●	● ●
 Finishing / Sharp Edge / Surface roughness oriented	VNGG 160402R/L-S 160404R/L-S	9.525	4.76	3.81	0.2 0.4	 ●	● ●	 ●	● ●
 Medium	VNGG 160402R/L 160404R/L 160408R/L	9.525	4.76	3.81	0.2 0.4 0.8	● ● ●	● ● ●	● ● ●	● ● ●

An insert which corner R(RE) dimension is shown with inequality sign (ex. <0.1, <0.2) indicates minus tolerance of corner R(RE)

●: Available

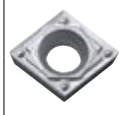
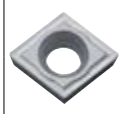
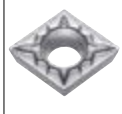
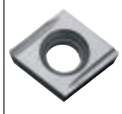
Negative type inserts

Shape Handed Insert shows right-hand	Description	Dimensions (mm)				TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)				
 Finishing / with wiper edge	WNMG 080404 WF 080408 WF	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Finishing / with wiper edge	WNMG 080404 WP 080408 WP	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Finishing-Medium / with wiper edge	WNMG 080404 WE 080408 WE 080412 WE	12.70	4.76	5.16	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing-Medium / with wiper edge	WNMG 080404 WQ 080408 WQ 080412 WQ	12.70	4.76	5.16	0.4 0.8 1.2	● ●	● ● ●	● ●	● ● ●
 Finishing	WNMG 080402 PP 080404 PP 080408 PP 080412 PP	12.70	4.76	5.16	0.2 0.4 0.8 1.2	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●
 Finishing	WNMG 060404 GP 060408 GP	9.525	4.76	3.81	0.4 0.8		● ●		● ●
	WNMG 080404 GP 080408 GP	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Finishing-Medium	WNMG 080404 PQ 080408 PQ	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Finishing-Medium	WNMG 06T304 HQ	9.525	3.97	3.81	0.4		●		●
	WNMG 060404 HQ 060408 HQ	9.525	4.76	3.81	0.4 0.8		● ●		● ●
	WNMG 080404 HQ 080408 HQ 080412 HQ	12.70	4.76	5.16	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing-Medium / Up facing	WNMG 080404 CQ 080408 CQ 080412 CQ	12.70	4.76	5.16	0.4 0.8 1.2	● ●	● ● ●	● ●	● ● ●
 Medium-Roughing	WNMG 060404 GS 060408 GS	9.525	4.76	3.81	0.4 0.8		● ●		● ●
	WNMG 080404 GS 080408 GS	12.70	4.76	5.16	0.4 0.8		● ●		● ●

Shape Handed Insert shows Right-hand	Description	Dimensions (mm)				TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)				
 Medium-Roughing	WNMG 080404 PG 080408 PG	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Medium-Roughing	WNMG 080404 PS 080408 PS	12.70	4.76	5.16	0.4 0.8		● ●		● ●
 Roughing	WNMG 080404 080408	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Low carbon steel / Finishing	WNMG 080404 XP 080408 XP	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Low carbon steel / Medium	WNMG 080404 XQ 080408 XQ	12.70	4.76	5.16	0.4 0.8	● ●	● ●	● ●	● ●
 Low carbon steel / Roughing	WNMG 080408 XS	12.70	4.76	5.16	0.8		●		●

Positive type inserts

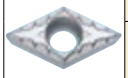
Shape Handed Insert shows left-hand	Description	Dimensions (mm)					TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)	Relief angle				
 Finishing / with wiper edge	CCMT 060202 WP 060204 WP 060208 WP	6.35	2.38	2.8	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●
	CCMT 09T302 WP 09T304 WP 09T308 WP	9.525	3.97	4.4	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing	CCMT 060202 PP 060204 PP	6.35	2.38	2.8	0.2 0.4	7°	● ●	● ●	● ●	● ●
	CCMT 09T302 PP 09T304 PP 09T308 PP	9.525	3.97	4.4	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing-Medium	CCMT 060202 GK 060204 GK	6.35	2.38	2.8	0.2 0.4	7°	● ●	● ●	● ●	● ●
	CCMT 09T302 GK 09T304 GK	9.525	3.97	4.4	0.2 0.4	7°	● ●	● ●	● ●	● ●
	CCMT 120404 GK 120408 GK	12.70	4.76	5.5	0.4 0.8	7°	● ●	● ●	● ●	● ●
 Finishing-Medium	CCMT 060202 HQ 060204 HQ	6.35	2.38	2.8	0.2 0.4	7°	● ●	● ●	● ●	● ●
	CCMT 09T302 HQ 09T304 HQ 09T308 HQ	9.525	3.97	4.4	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●
 Medium	CCGT 060201 060202 060204	6.35	2.38	2.8	0.1 0.2 0.4	7°	● ● ●	● ● ●	● ● ●	● ● ●
	CCGT 09T301 09T302 09T304	9.525	3.97	4.4	0.1 0.2 0.4	7°	● ● ●	● ● ●	● ● ●	● ● ●
	CCMT 09T308	9.525	3.97	4.4	0.8	7°	●	●	●	●
 Finishing / sharp edge	CCET 030101 M$^{R/L}$-F 030102 M$^{R/L}$-F 030104 M$^{R/L}$-F	3.5	1.4	1.9	<0.1 <0.2 <0.4	7°	● ● ●	L L L	● ● ●	L L L
	CCET 040101 M$^{R/L}$-F 040102 M$^{R/L}$-F 040104 M$^{R/L}$-F	4.3	1.8	2.3	<0.1 <0.2 <0.4	7°	● ● ●	L L L	● ● ●	L L L
 Low feed / sharp edge	CCET 060201 MF$^{R/L-U}$ 060202 MF$^{R/L-U}$	6.35	2.38	2.8	<0.1 <0.2	7°	● ●	● ●	● ●	● ●
	CCET 09T301 MF$^{R/L-U}$ 09T302 MF$^{R/L-U}$	9.525	3.97	4.4	<0.1 <0.2	7°	● ●	● ●	● ●	● ●
 Low feed / honed edge	CCGT 060201 E$^{R/L-U}$ 060202 E$^{R/L-U}$ 060204 E$^{R/L-U}$	6.35	2.38	2.8	0.1 0.2 0.4	7°	● ● ●	L ● ●	● ● ●	L ● ●
	CCGT 09T301 E$^{R/L-U}$ 09T302 E$^{R/L-U}$ 09T304 E$^{R/L-U}$	9.525	3.97	4.4	0.1 0.2 0.4	7°	● ● ●	● ● ●	● ● ●	● ● ●

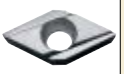
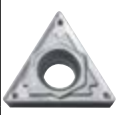
Shape Handed Insert shows left-hand	Description	Dimensions (mm)					TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)	Relief angle				
 Finishing	CPMT 080202 PP 080204 PP	7.94	2.38	3.3	0.2 0.4	11°	● ●	● ●	● ●	● ●
	CPMT 090302 PP 090304 PP 090308 PP	9.525	3.18	4.4	0.2 0.4 0.8	11°	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing	CPMT 080204 GP	7.94	2.38	3.3	0.4	11°	●	●	●	●
	CPMT 090304 GP 090308 GP	9.525	3.18	4.4	0.4 0.8	11°	● ●	● ●	● ●	● ●
 Finishing-Medium	CPMH 080204 HQ 080208 HQ	7.94	2.38	3.5	0.4 0.8	11°	● ●	● ●	● ●	● ●
	CPMH 090304 HQ 090308 HQ	9.525	3.18	4.5	0.4 0.8	11°	● ●	● ●	● ●	● ●
 Medium	CPMH 080204 080208	7.94	2.38	3.5	0.4 0.8	11°	● ●	● ●	● ●	● ●
	CPMH 090304 090308	9.525	3.18	4.5	0.4 0.8	11°	● ●	● ●	● ●	● ●
 Low carbon steel / Finishing	CPMT 080204 XP	7.94	2.38	3.3	0.4	11°	●	●	●	●
	CPMT 090304 XP 090308 XP	9.525	3.18	4.4	0.4 0.8	11°	● ●	● ●	● ●	● ●
 Low carbon steel / Finishing-Medium	CPMT 090304 XQ 090308 XQ	9.525	3.18	4.4	0.4 0.8	11°	● ●	● ●	● ●	● ●
 Finishing-Medium	CPMH 080204$^{R/L}$-Y	7.94	2.38	3.5	0.4	11°	●	●	●	●
	CPMH 090304$^{R/L}$-Y	9.525	3.18	4.5	0.4	11°	●	●	●	●
 Finishing / with wiper edge	DCMX 070202 WP 070204 WP 070208 WP	6.35	2.38	2.8	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●
	DCMX 11T302 WP 11T304 WP 11T308 WP	9.525	3.97	4.4	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing / with wiper edge	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°		●		●
 Finishing	DCMT 070202 PP 070204 PP	6.35	2.38	2.8	0.2 0.4	7°	● ●	● ●	● ●	● ●
	DCMT 11T302 PP 11T304 PP 11T308 PP	9.525	3.97	4.4	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●

An insert which corner R(RE) dimension is shown with inequality sign (ex. <0.1, <0.2) indicates minus tolerance of corner R(RE)

●: Available R : R-hand Only L : L-hand Only

Positive type inserts

Shape Handed Insert shows left-hand	Description	Dimensions (mm)					TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)	Relief angle				
 Finishing	DCMT 070202 GP 070204 GP	6.35	2.38	2.8	0.2 0.4	7°	● ●	● ●	● ●	● ●
	DCMT 11T304 GP 11T308 GP	9.525	3.97	0.4	0.4 0.8	7°	● ●	● ●	● ●	● ●
 Finishing-Medium	DCMT 070202 GK 070204 GK 070208 GK	6.35	2.38	2.8	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●
	DCMT 11T302 GK 11T304 GK 11T308 GK	9.525	3.97	4.4	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing-Medium	DCMT 070202 HQ 070204 HQ 070208 HQ	6.35	2.38	2.8	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●
	DCMT 11T302 HQ 11T304 HQ 11T308 HQ	9.525	3.97	4.4	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●
 Medium	DCGT 070201 070202 070204	6.35	2.38	2.8	0.1 0.2 0.4	7°	● ● ●	● ● ●	● ● ●	● ● ●
	DCGT 11T301 11T302 11T304	9.525	3.97	4.4	0.1 0.2 0.4	7°	● ● ●	● ● ●	● ● ●	● ● ●
	DCMT 11T308	9.525	3.97	4.4	0.8	7°	●	●	●	●
 Low carbon steel / Finishing	DCMT 070204 XP	6.35	2.38	2.8	0.4	7°	●	●	●	●
	DCMT 11T302 XP 11T304 XP 11T308 XP	9.525	3.97	4.4	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●
 Low carbon steel / Finishing-Medium	DCMT 11T304 XQ 11T308 XQ	9.525	3.97	4.4	0.4 0.8	7°	● ●	● ●	● ●	● ●
 Finishing / Sharp edge	DCET 070201 M$^{R/L}$-F 070202 M$^{R/L}$-F 070204 M$^{R/L}$-F	6.35	2.38	2.8	<0.1 <0.2 <0.4	7°	● ● ●	● ● ●	● ● ●	● ● ●
	DCET 11T301 M$^{R/L}$-F 11T302 M$^{R/L}$-F 11T304 M$^{R/L}$-F	9.525	3.97	4.4	<0.1 <0.2 <0.4	7°	● ● ●	● ● ●	● ● ●	● ● ●
 Low feed / Sharp edge	DCET 070201 MF$^{R/L-U}$ 070202 MF$^{R/L-U}$	6.35	2.38	2.8	<0.1 <0.2	7°	● ●	● ●	● ●	● ●
	DCET 11T301 MF$^{R/L-U}$ 11T302 MF$^{R/L-U}$	9.525	3.97	4.4	<0.1 <0.2	7°	● ●	● ●	● ●	● ●
 Low feed / Honed Edge	DCGT 070201 E$^{R/L-U}$ 070202 E$^{R/L-U}$ 070204 E$^{R/L-U}$	6.35	2.38	2.8	0.1 0.2 0.4	7°	● ● ●	● ● ●	● ● ●	● ● ●
	DCGT 11T301 E$^{R/L-U}$ 11T302 E$^{R/L-U}$ 11T304 E$^{R/L-U}$	9.525	3.97	4.4	0.1 0.2 0.4	7°	● ● ●	R ● ●	● ● ●	R ● ●

Shape Handed Insert shows left-hand	Description	Dimensions (mm)					TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)	Relief angle				
 Low feed / Sharp edge	DCET 11T301 MF$^{R/L-J}$ 11T302 MF$^{R/L-J}$	9.525	3.97	4.4	<0.1 <0.2	7°	● ●		● ●	
 Low feed / Honed edge	DCGT 11T301 E$^{R/L-J}$ 11T302 E$^{R/L-J}$ 11T304 E$^{R/L-J}$	9.525	3.97	4.4	0.1 0.2 0.4	7°	● ● ●	R R ●	● ● ●	R R ●
 Medium	RCMX 1003 M0	10.0	3.18	3.6	–	7°		●		●
	RCMX 1204 M0	12.0	4.76	4.2	–	7°		●		●
 Finishing-Medium	SCMT 09T304 HQ 09T308 HQ	9.525	3.97	4.4	0.4 0.8	7°	● ●	● ●	● ●	● ●
 Medium	SPMR 090304 G 090308 G	9.525	3.18	–	0.4 0.8	11°		● ●		● ●
	SPMR 120304 G 120308 G	12.7	3.18	–	0.4 0.8	11°		● ●		● ●
 Finishing	SPGR 090304$^{R/L}$ 090308$^{R/L}$	9.525	3.18	–	0.4 0.8	11°	● ●	● ●	● ●	● ●
	SPGR 120304$^{R/L}$ 120308$^{R/L}$	12.7	3.18	–	0.4 0.8	11°	● ●	● ●	● ●	● ●
 Without chipbreaker	SPMN 120308 120312	12.7	3.18	–	0.8 1.2	11°	● ●	● ●	● ●	● ●
 Finishing	TBMT 060102 DP 060104 DP	3.97	1.59	2.3	0.2 0.4	5°	● ●	● ●	● ●	● ●
 Finishing	TBGT 060102$^{R/L}$ 060104$^{R/L}$	3.97	1.59	2.3	0.2 0.4	5°	● ●	● ●	● ●	● ●
 Finishing / with wiper edge	TCMX 090204 WP	5.56	2.38	2.5	0.4	7°	●	●	●	●
	TCMX 110204 WP	6.35	2.38	2.8	0.4	7°	●	●	●	●
 Finishing-Medium	TCMT 090202 HQ 090204 HQ	5.56	2.38	2.5	0.2 0.4	7°	● ●	● ●	● ●	● ●
	TCMT 110202 HQ 110204 HQ 110208 HQ	6.35	2.38	2.8	0.2 0.4 0.8	7°	● ● ●	● ● ●	● ● ●	● ● ●
	TCMT 16T304 HQ 16T308 HQ	9.525	3.97	4.4	0.4 0.8	7°		● ●		● ●

An insert which corner R(RE) dimension is shown with inequality sign (ex. <0.1, <0.2) indicates minus tolerance of corner R(RE)

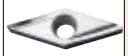
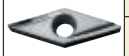
Positive type inserts

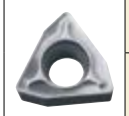
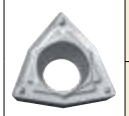
Shape Handed Insert shows left-hand	Description	Dimensions (mm)					TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)	Relief angle				
 Finishing / with Wiper Edge	TPMX 090202 WP 090204 WP 090208 WP	5.56	2.38	2.8	0.2 0.4 0.8	11°	● ● ●	● ● ●	● ● ●	● ● ●
	TPMX 110302 WP 110304 WP 110308 WP	6.35	3.18	3.3	0.2 0.4 0.8	11°	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing / with wiper edge	TPMX 110304R/L-WP	6.35	3.18	3.3	0.4	11°		●		●
 Finishing	TPMT 090202 PP 090204 PP	5.56	2.38	2.8	0.2 0.4	11°	● ●	● ●	● ●	● ●
	TPMT 110302 PP 110304 PP 110308 PP	6.35	3.18	3.3	0.2 0.4 0.8	11°	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing	TPMT 090202 GP 090204 GP	5.56	2.38	2.8	0.2 0.4	11°	● ●	● ●	● ●	● ●
	TPMT 110304 GP 110308 GP	6.35	3.18	3.3	0.4 0.8	11°	● ●	● ●	● ●	● ●
	TPMT 160304 GP	9.525	3.18	4.4	0.4	11°	●	●	●	●
 Finishing-Medium	TPMT 090202 HQ 090204 HQ	5.56	2.38	2.8	0.2 0.4	11°	● ●	● ●	● ●	● ●
	TPMT 110302 HQ 110304 HQ 110308 HQ	6.35	3.18	3.3	0.2 0.4 0.8	11°	● ● ●	● ● ●	● ● ●	● ● ●
	TPMT 160302 HQ 160304 HQ 160308 HQ	9.525	3.18	4.4	0.2 0.4 0.8	11°	● ● ●	● ● ●	● ● ●	● ● ●
 Low carbon steel / Finishing	TPMT 090204 XP	5.56	2.38	2.8	0.4	11°	●	●	●	●
	TPMT 110304 XP 110308 XP	6.35	3.18	3.3	0.4 0.8	11°	● ●	● ●	● ●	● ●
	TPMT 160304 XP 160308 XP	9.525	3.18	4.4	0.4 0.8	11°	● ●	● ●	● ●	● ●
 Low carbon steel / Finishing-Medium	TPMT 110304 XQ 110308 XQ	6.35	3.18	3.3	0.4 0.8	11°	● ●	● ●	● ●	● ●
	TPMT 160304 XQ 160308 XQ	9.525	3.18	4.4	0.4 0.8	11°	● ●	● ●	● ●	● ●
 Finishing	TPGH 080202R/L 080204R/L	4.76	2.38	2.3	0.2 0.4	11°	L L	● ●	L L	● ●
	TPGH 090202R/L 090204R/L	5.56	2.38	3.0	0.2 0.4	11°	L L	● ●	L L	● ●
	TPGH 110202R/L 110204R/L	6.35	2.38	3.5	0.2 0.4	11°	L L	L L	L L	L L
	TPGH 110302R/L 110304R/L 110308R/L	6.35	3.18	3.3	0.2 0.4 0.8	11°	L L ●	● ● ●	L L ●	● ● ●
	TPGH 160302R/L 160304R/L 160308R/L	9.525	3.18	4.5	0.2 0.4 0.8	11°	● ● L	● ● L	● ● L	● ● L

Shape Handed Insert shows left-hand	Description	Dimensions (mm)					TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)	Relief angle				
 Medium	TPGH 110302L-H 110304R/L-H 110308L-H	6.35	3.18	3.3	0.2 0.4 0.8	11°	L L L	L ● L	L L L	L ● L
	TPGH 160304L-H	9.525	3.18	4.5	0.4	11°	L	L	L	L
	TPGT 160402L-H 160404L-H	9.525	4.76	4.4	0.2 0.4	11°	L L	L L	L L	L L
 Without chipbreaker	TPGB 080204	4.76	2.38	2.3	0.4	11°		●		●
	TPGB 090204	5.56	2.38	3.0	0.4	11°		●		●
	TPGB 110204	6.35	2.38	3.5	0.4	11°	●	●	●	●
	TPGB 110302 110304 110308	6.35	3.18	3.3	0.2 0.4 0.8	11°	● ● ●	● ● ●	● ● ●	● ● ●
	TPGB 160304 160308	9.525	3.18	4.5	0.4 0.8	11°	● ●	● ●	● ●	● ●
 Finishing	TPMR 110304 GP	6.35	3.18	–	0.4	11°		●		●
	TPMR 160304 GP	9.525	3.18	–	0.4	11°		●		●
 Finishing-Medium	TPMR 110304 HQ 110308 HQ	6.35	3.18	–	0.4 0.8	11°		● ●		● ●
	TPMR 160304 HQ 160308 HQ	9.525	3.18	–	0.4 0.8	11°	● ●	● ●	● ●	● ●
 Medium	TPMR 110304G	6.35	3.18	–	0.4	11°		●		●
	TPMR 160304G 160308G	9.525	3.18	–	0.4 0.8	11°		● ●		● ●
 Medium	TPMR 110304 110308	6.35	3.18	–	0.4 0.8	11°	● ●	● ●	● ●	● ●
	TPMR 160304 160308	9.525	3.18	–	0.4 0.8	11°	● ●	● ●	● ●	● ●
 A: Finishing B: Finishing-Medium C: Medium	TPGR 110302L-A 110304L-A	6.35	3.18	–	0.2 0.4	11°	L L	L L	L L	L L
	TPGR 110304L-B 110308L-B	6.35	3.18	–	0.4 0.8	11°	L L	L L	L L	L L
	TPGR 160302R/L-B 160304R/L-B 160308R/L-B	9.525	3.18	–	0.2 0.4 0.8	11°	● ● ●	● ● ●	● ● ●	● ● ●
	TPGR 160304R/L-C 160308R/L-C	9.525	3.18	–	0.4 0.8	11°	● ●	● ●	● ●	● ●
 Without chipbreaker	TPGN 110304 110308	6.35	3.18	–	0.4 0.8	11°	● ●	● ●	● ●	● ●
	TPGN 160304 160308	9.525	3.18	–	0.4 0.8	11°	● ●	● ●	● ●	● ●

●: Available R : R-hand Only L : L-hand Only

Positive type inserts

Shape Handed Insert shows left-hand	Description	Dimensions (mm)					TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)	Relief angle				
 Finishing	VBMT 110302 PP 110304 PP 110308 PP	6.35	3.18	2.8	0.2 0.4 0.8	5°	● ● ●	● ● ●	● ● ●	● ● ●
	VBMT 160404 PP 160408 PP 160412 PP	9.525	4.76	4.4	0.4 0.8 1.2	5°	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing	VBMT 110304 GP	6.35	3.18	2.8	0.4	5°	●	●	●	●
	VBMT 160404 GP 160408 GP	9.525	4.76	4.4	0.4 0.8	5°	● ●	● ●	● ●	● ●
 Finishing	VBMT 110302 VF 110304 VF 110308 VF	6.35	3.18	2.8	0.2 0.4 0.8	5°	● ● ●	● ● ●	● ● ●	● ● ●
	VBMT 160402 VF 160404 VF 160408 VF 160412 VF	9.525	4.76	4.4	0.2 0.4 0.8 1.2	5°	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●
 Finishing-Medium	VBMT 110304 HQ 110308 HQ	6.35	3.18	2.8	0.4 0.8	5°	● ●	● ●	● ●	● ●
	VBMT 160404 HQ 160408 HQ 160412 HQ	9.525	4.76	4.4	0.4 0.8 1.2	5°	● ● ●	● ● ●	● ● ●	● ● ●
 Finishing / Sharp Edge	VBET 110301 M$^{R/L}$-F 110302 M$^{R/L}$-F	6.35	3.18	2.8	<0.1 <0.2	5°	● ●	● ●	● ●	● ●
 Finishing / Sharp Edge	VBGT 110301 R-F 110302 R-F	6.35	3.18	2.8	0.1 0.2	5°	 	R R	 	R R
 Finishing-Medium / Sharp Edge	VBET 110302 M$^{R/L}$-Y 110304 M$^{R/L}$-Y	6.35	3.18	2.8	<0.2 <0.4	5°	● ●	● ●	● ●	● ●
 Finishing-Medium	VBGT 110301R-Y 110302$^{R/L}$-Y 110304$^{R/L}$-Y	6.35	3.18	2.8	0.1 0.2 0.4	5°	 	R ● ●	 	R ● ●
	VBGT 160402$^{R/L}$-Y 160404$^{R/L}$-Y	9.525	4.76	4.4	0.2 0.4	5°	● ●	● ●	● ●	● ●

Shape Handed Insert shows left-hand	Description	Dimensions (mm)					TN610	TN620	PV710	PV720
		I.C.	Thick-ness	Hole	Corner-R (RE)	Relief angle				
 Finishing	VCMT 080202 PP 080204 PP	4.76	2.38	2.3	0.2 0.4	7°	● ●	● ●	● ●	● ●
	VCMT 160404 PP 160408 PP	9.525	4.76	4.4	0.4 0.8	7°	● ●	● ●	● ●	● ●
 Finishing	VCMT 080202 VF 080204 VF	4.76	2.38	2.3	0.2 0.4	7°	● ●	● ●	● ●	● ●
 Finishing-Medium	VCMT 080202 HQ 080204 HQ	4.76	2.38	2.3	0.2 0.4	7°	● ●	● ●	● ●	● ●
 Finishing	WBMT 060102$^{R/L}$-DP 060104$^{R/L}$-DP	3.97	1.59	2.3	0.2 0.4	5°	L L	● ●	L L	● ●
	WBMT 080202$^{R/L}$-DP 080204$^{R/L}$-DP	4.76	2.38	2.3	0.2 0.4	5°	L L	● ●	L L	● ●
 Finishing / Sharp Edge	WBET 060102 M$^{R/L}$-F 060104 M$^{R/L}$-F	3.97	1.59	2.3	<0.2 <0.4	5°	● ●	L L	● ●	L L
	WBET 080201 M$^{R/L}$-F 080202 M$^{R/L}$-F 080204 M$^{R/L}$-F	4.76	2.38	2.3	<0.1 <0.2 <0.4	5°	● ● ●	 L L	● ● ●	 L L
 Finishing	WPMT 110204 GP	6.35	2.38	2.8	0.4	11°		●		●
	WPMT 160304 GP	9.525	3.18	4.4	0.4	11°		●		●
 Finishing-Medium	WPMT 110202 HQ 110204 HQ	6.35	2.38	2.8	0.2 0.4	11°	● ●	● ●	● ●	● ●
	WPMT 160304 HQ 160308 HQ	9.525	3.18	4.4	0.4 0.8	11°	● ●	● ●	● ●	● ●

●: Available R: R-hand Only L: L-hand Only

An insert which corner R(RE) dimension is shown with inequality sign (ex. <0.1, <0.2) indicates minus tolerance of corner R(RE)