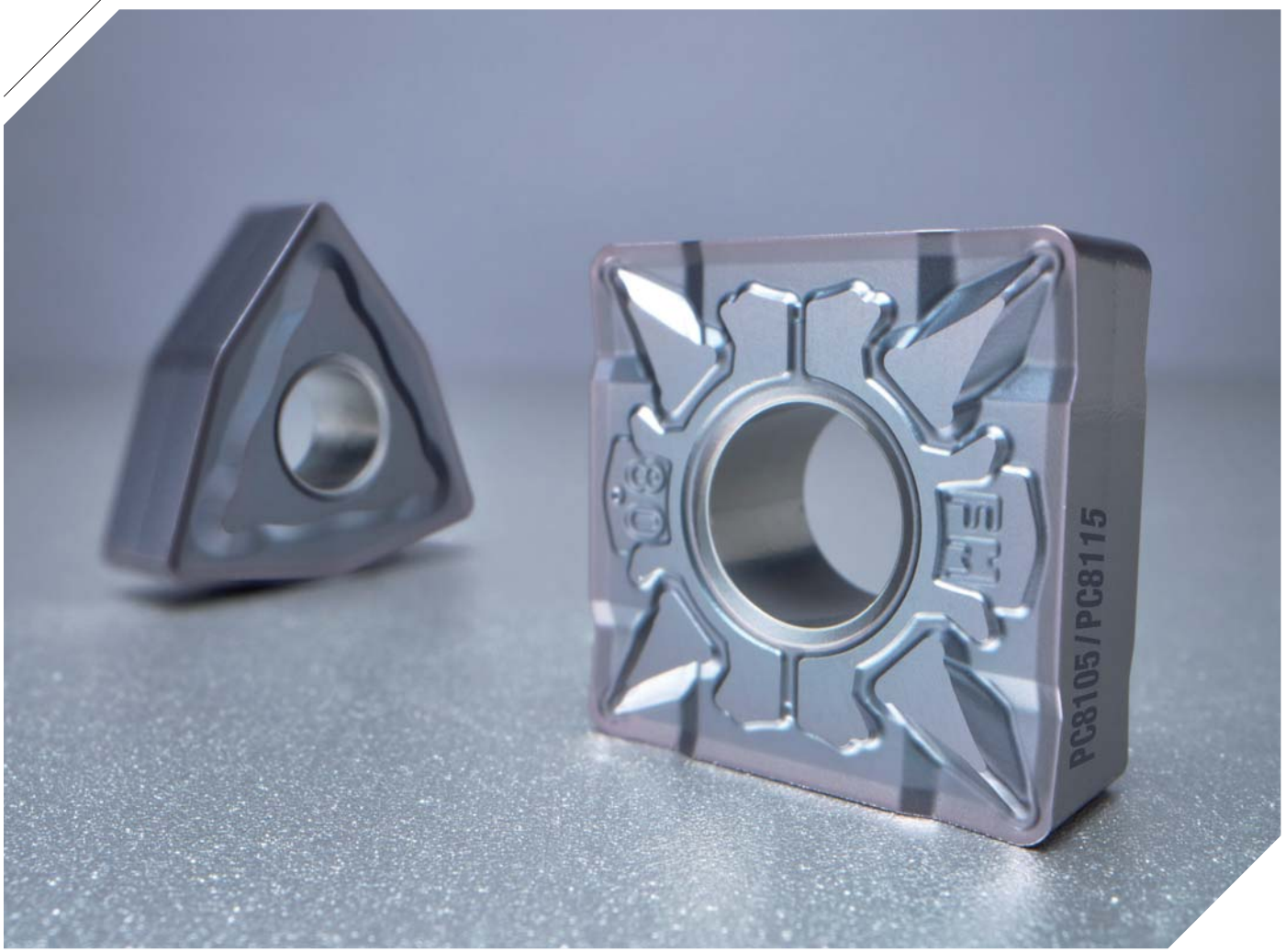
KORLOY
TECH-NEWS

PC8105/PC8115

Turning inserts for HRSA and Titanium alloys

- The TEX-Tech™ enhances tool life when machining heat-resistant and titanium alloys.
- The EnduraCore-Process™ enhances high-temperature wear and chipping resistance, ensuring stable machining.



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Turning inserts for HRSA and Titanium alloys

PC8105/PC8115

Heat Resistant Super Alloys (HRSA) such as Inconel, Waspaloy, and Rene exhibit excellent material properties even at temperatures of 700~1,000°C and are increasingly used in aerospace, power generation, and oil & gas industries. Titanium alloys (Ti alloys), with high strength, low density, and corrosion resistance, are also widely applied in aerospace, medical, and energy industries.

HRSA and titanium alloys are difficult-to-cut materials due to their high work-hardening tendency and low thermal conductivity, which cause heat to concentrate on the tool during machining, leading to chipping, adhesion, sudden fracture, and reduced tool life.

To improve productivity in machining these materials, KORLOY recommends PC8105/PC8115.

PC8105/PC8115 are dedicated grades for difficult-to-cut materials, featuring TEX-Tech™ PVD coating and the EnduraCore-Process™, which enhance wear resistance and chipping resistance.

As a result, tool life is improved by 20–50% compared to conventional grades, enabling stable and productive machining.

» Optimal grade for machining difficult-to-cut materials

- Substrate with excellent wear and fracture resistance
- PVD coating with excellent heat and wear resistance

» Optimized for various machining conditions

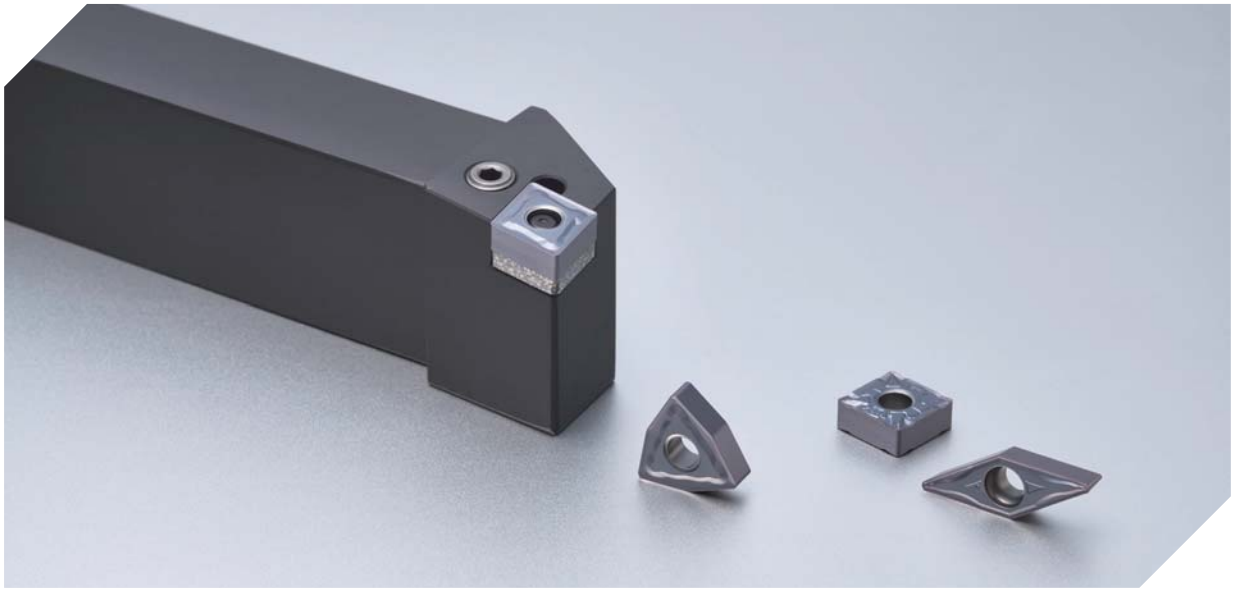
- Application of substrates dedicated to each grade

» Stable machining

- Excellent high-temperature wear and chipping resistance

» Optimized lineup for high-precision machining conditions:

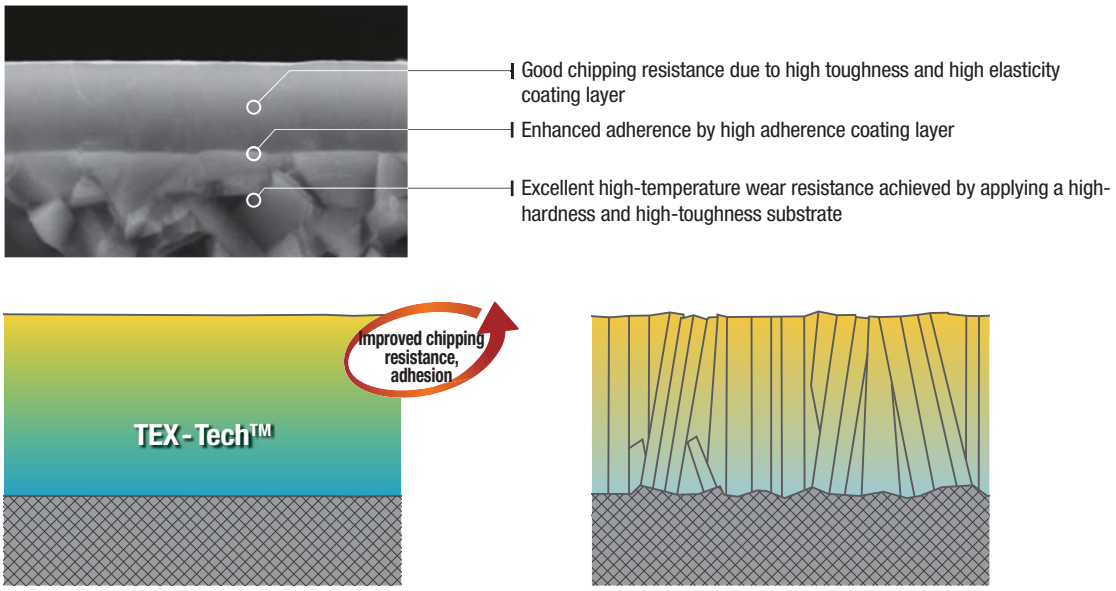
- PC8105 : optimized for medium/high-speed machining of difficult-to-cut materials
- PC8115 : optimized for medium/low-speed machining of difficult-to-cut materials



Features

- High-hardness PVD grade optimally designed for machining HRSA
- Application of a substrate optimized for the machining area (S05, S15)
- Application of the EnduraCore-Process™ enhances the plastic deformation resistance and fracture resistance of the high-hardness substrate
- Applied high-toughness PVD coating technology, TEX-Tech™, which prevents chipping and sudden fracture

TEX-Tech™ - high toughness PVD coating layer technology



[PC8105/PC8115]

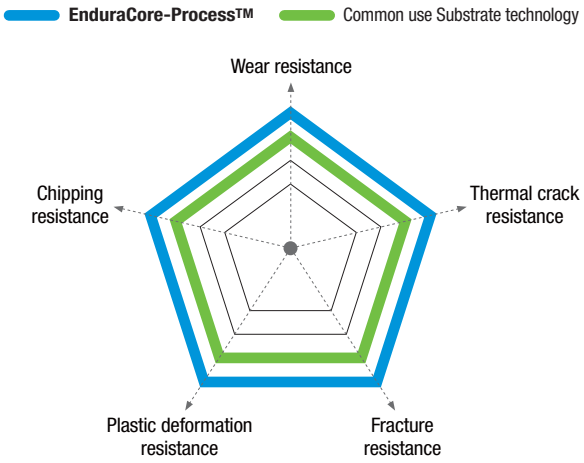
[Existing grade]

EnduraCore-Process™ – Application of substrate toughening process technology

EnduraCore-Process™

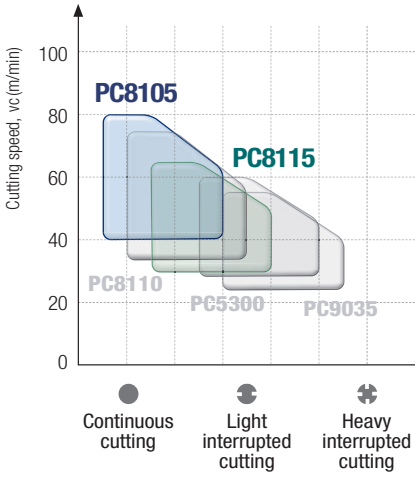
- Enhanced plastic deformation resistance of the substrate through optimized alloying elements and content.
- Improved strength of the substrate by realizing an alloy structure with uniform grain size.

Comparison of Substrate technologies

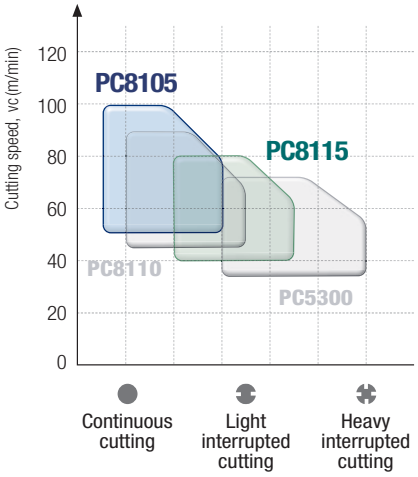


Application range

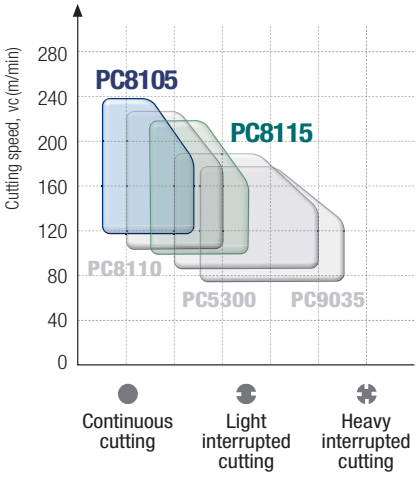
S HRSA



S Titanium alloy



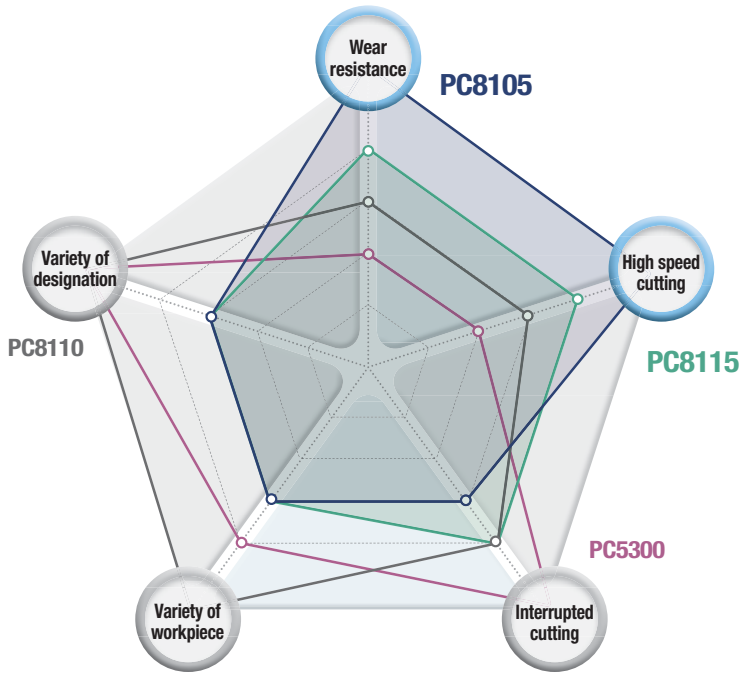
M Stainless steel



Recommended cutting conditions

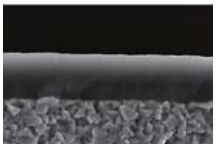
Workpiece				Specific cutting force (N/mm^2)	Brinell hardness (HB)	Recommended cutting condition		
ISO	Workpiece material	ISO (DIN)	AISI			vc (m/min)		fn (mm/rev)
						PC8105	PC8115	
S	Ti alloy	(TiAl5Sn2.5) (TiAl6V4)	R54520 R56401	1400	301~381	50	40	0.30
						75	**60**	**0.20**
						100	80	0.10
	Ni-base	- - -	N07041 N04400 N07718	3000	286~409	40	30	0.30
						60	**50**	**0.20**
						80	70	0.10
	Fe-base	(1.4980) (1.4898)	A286 N09901	2600	250~350	45	35	0.30
						70	**55**	**0.20**
						90	75	0.10
M	Ferritic/ martensitic series	X6CrAl13 X6Cr17	405 430	1650	≤ 183	140	120	0.30
						215	**195**	**0.20**
						290	265	0.10
		- X12Cr13	403 410	1800	≤ 200	140	120	0.30
						215	**195**	**0.20**
						290	265	0.10
	Austenite series	X5CrNi18-9 X5CrNiMo17-12-2	304 316	2000	≤ 187	115	100	0.30
						175	**160**	**0.20**
						235	215	0.10
	Precipitation series	X5CrNiCuNb16-4	630 (17-4PH)	2800	≤ 350	60	50	0.30
						90	**80**	**0.20**
						120	110	0.10

HRSA Turning Grade Selection Guide



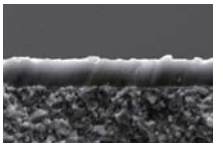
PC8105 (S05) New

- Excellent wear resistance
- Excellent high-speed machinability



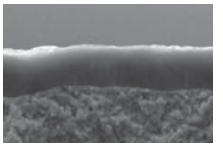
PC8110 (S10)

- Excellent wear resistance
- Excellent general machinability



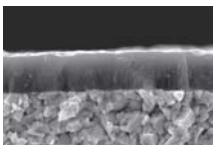
PC8115 (S15) New

- Excellent wear resistance
- Excellent chipping resistance



PC5300 (S20)

- Excellent interrupted machinability
- Excellent chipping and fracture resistance



Grade	Wear resistance	High speed cutting	Interrupted cutting	Variety of workpiece	Variety of designation
PC8105 (S05) New	★★★★★	★★★★★	★★★	★★★	★★★
PC8110 (S10)	★★★	★★★	★★★★	★★★★★	★★★★★
PC8115 (S15) New	★★★★	★★★★	★★★★	★★★	★★★
PC5300 (S20)	★★	★★	★★★★★	★★★★	★★★★★

[Selection system of PVD coated grade]

1st Recommended

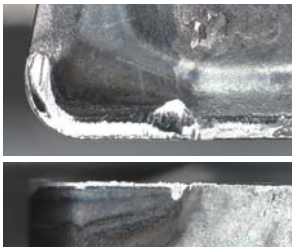
Workpiece	ISO / vc (m/min)	Grade (Recommended cutting speed)					
		Wear resistance ← • → Toughness					
		S05	S10	S15	S20	S25	S30
S	60	PC8105 (40-80)					
	55		PC8110 (35-75)				
	50			PC8115 (30-70)			
	45				PC5300 (30-60)		
	40					PC9035 (25-55)	
	35						PC5400 (25-50)

Workpiece	ISO / vc (m/min)	Grade (Recommended cutting speed)					
		Wear resistance ← • → Toughness					
		M10	M15	M20	M25	M30	M35
M	175	PC8105 (115-235)					
	160		PC8110 (105-225)				
	145			PC8115 (100-215)			
	130				PC5300 (90-190)		
	115					PC9035 (75-175)	
	100						PC5400 (60-160)

Performance evaluation

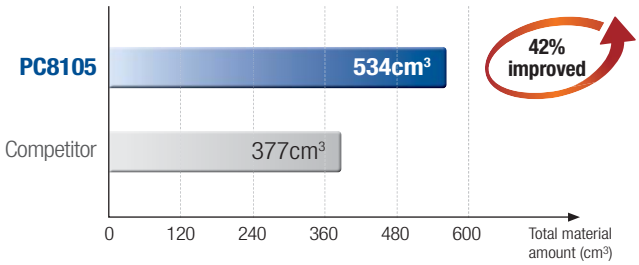
Adhesion resistance, Fracture resistance

Workpiece	Ni-base (Inconel718), Round bar (∅100)
Cutting condition	vc (m/min) = 30, fn (mm/rev) = 0.2, ap (mm) = 2, Wet
Tool	**Insert** CNMG120408-VP4 (PC8105) **Holder** DCLNL3232-P12



[PC8105]

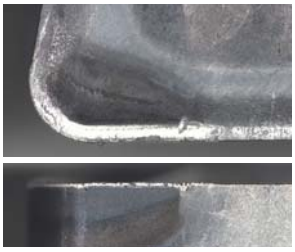
[Competitor]



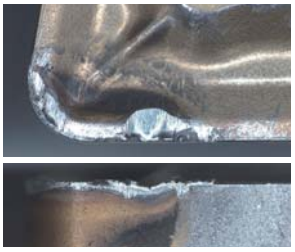
- Material removal rate Q (cm³/min) : 12
- Cutting time (min) : 44.5

Wear resistance

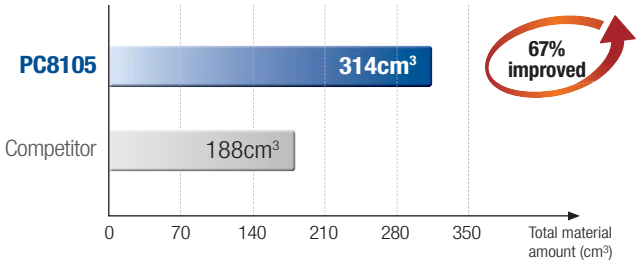
Workpiece	Ni-base (Inconel718), Round bar (∅100)
Cutting condition	vc (m/min) = 50, fn (mm/rev) = 0.15, ap (mm) = 2, Wet
Tool	**Insert** CNMG120408-VP4 (PC8105) **Holder** DCLNL3232-P12



[PC8105]



[Competitor]

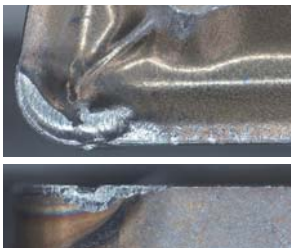


- Material removal rate Q (cm³/min) : 15
- Cutting time (min) : 20.9

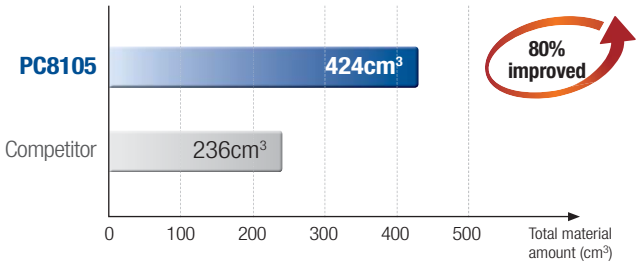
Wear resistance

Workpiece	Ti alloy (Ti-6Al-4V), Round bar (∅100)
Cutting condition	vc (m/min) = 63, fn (mm/rev) = 0.25, ap (mm) = 1.5, Wet
Tool	**Insert** CNMG120408-VP4 (PC8105) **Holder** DCLNL3232-P12

[PC8105]



[Competitor]



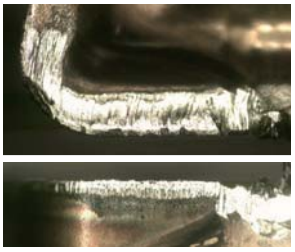
- Material removal rate Q (cm³/min) : 23.6
- Cutting time (min) : 18

Performance evaluation

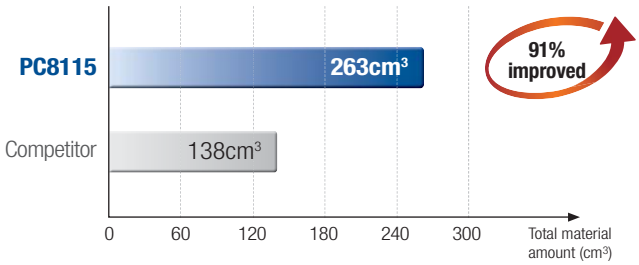
Adhesion resistance, Fracture resistance

Workpiece	Ni-base HRSA (Inconel718), Round bar (Ø100)
Cutting condition	vc (m/min) = 30, fn (mm/rev) = 0.2, ap (mm) = 2, Wet
Tool	Insert CNMG120408-VP3 (PC8115) Holder DCLNL3232-P12

[PC8115]



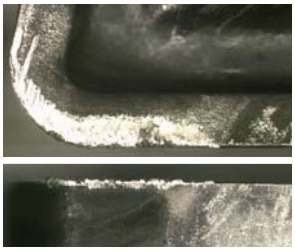
[Competitor]



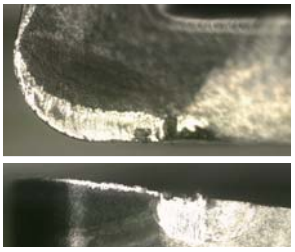
- Material removal rate Q (cm³/min) : 12
- Cutting time (min) : 21.9

Wear resistance

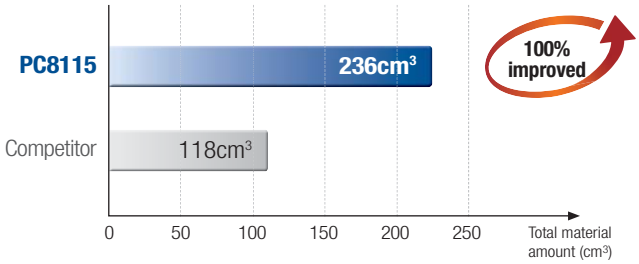
Workpiece	Ni-base HRSA (Inconel718), Round bar (Ø100)
Cutting condition	vc (m/min) = 50, fn (mm/rev) = 0.12, ap (mm) = 1.5, Wet
Tool	Insert CNMG120408-VP3 (PC8115) Holder DCLNL3232-P12



[PC8115]



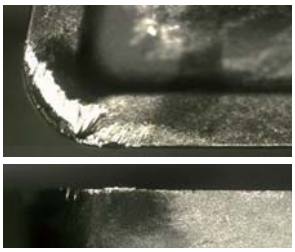
[Competitor]



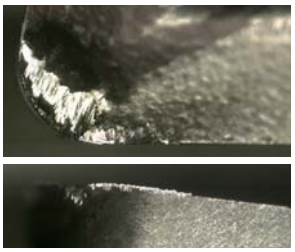
- Material removal rate Q (cm³/min) : 9
- Cutting time (min) : 26.2

Wear resistance

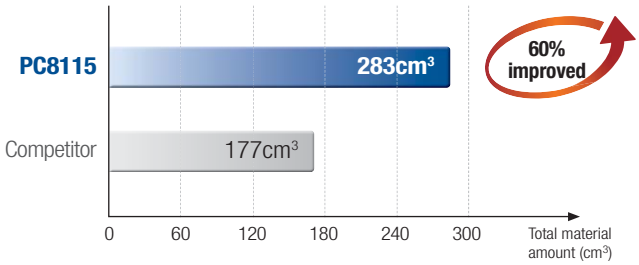
Workpiece	Ni-base HRSA (Inconel718), Round bar (Ø300)
Cutting condition	vc (m/min) = 50, fn (mm/rev) = 0.15, ap (mm) = 0.6, Wet
Tool	Insert CNMG120408-VP3 (PC8115) Holder DCLNL3232-P12



[PC8115]



[Competitor]

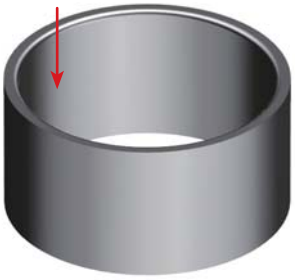


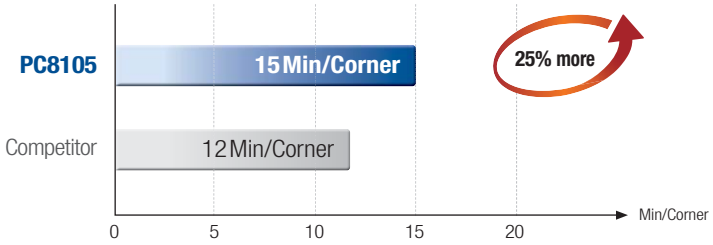
- Material removal rate Q (cm³/min) : 3.8
- Cutting time (min) : 74.5

Application examples

Ti alloy (Ti-6Al-4V)

Workpiece use	Aerospace parts
Cutting condition	vc(m/min) = 60, fn(mm/rev) = 0.25, ap(mm) = 2.6, Wet
Tool	Insert SNMG120408-FM(PC8105)

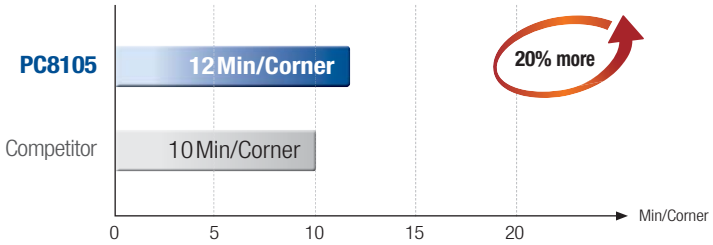




» 25% longer tool life than competitor

Fe-base HRSA (M152)

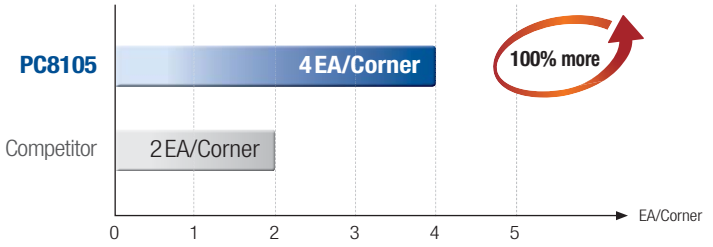
Workpiece use	Aero-engine turbine parts
Cutting condition	vc(m/min) = 130, fn(mm/rev) = 0.2, ap(mm) = 2, Wet
Tool	Insert WNMG080408-FM(PC8105)



» 20% longer tool life than competitor

Ni-base HRSA (Inconel718)

Workpiece use	Aero-engine pipe ring
Cutting condition	vc(m/min) = 30, fn(mm/rev) = 0.2, ap(mm) = 2, Wet
Tool	Insert CNMG120408-VP4(PC8105)

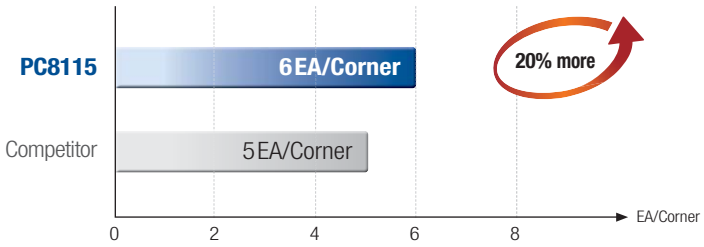


» 100% longer tool life than competitor

Application examples

Ni-base HRSA (Inconel718)

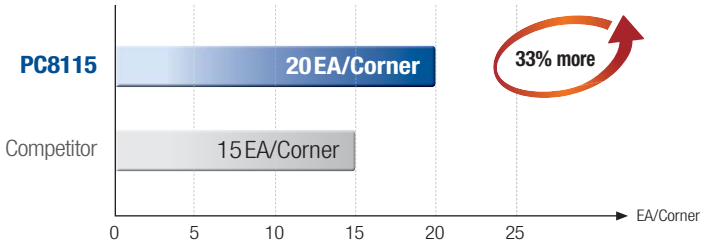
Workpiece use	Aerospace parts
Cutting condition	vc(m/min) = 43, fn(mm/rev) = 0.27, ap(mm) = 1.5, Wet
Tool	Insert WNMG080408-MP(PC8115)



» 20% longer tool life than competitor

Ni-base HRSA (Hastelloy)

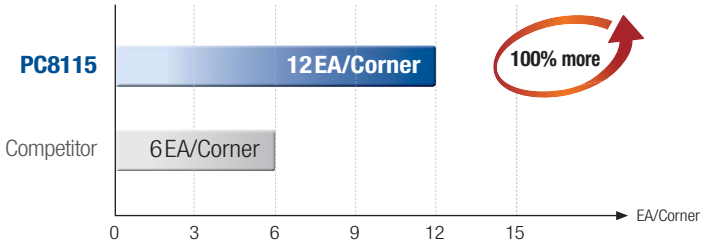
Workpiece use	Semiconductor parts
Cutting condition	vc(m/min) = 50, fn(mm/rev) = 0.2, ap(mm) = 0.2, Wet
Tool	Insert DNMG150604-VP1(PC8115)



» 33% longer tool life than competitor

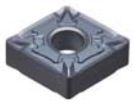
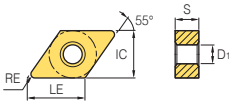
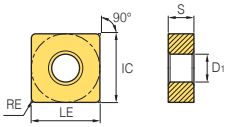
Ti alloy (Ti-829)

Workpiece use	Aero-engine parts
Cutting condition	vc(m/min) = 35~40, fn(mm/rev) = 0.25, ap(mm) = 1~2, Wet
Tool	Insert SNMG120412-VP4(PC8115)



» 100% longer tool life than competitor

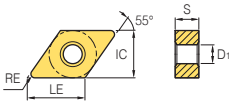
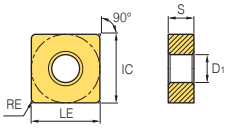
Stock items

Picture	Designation		Coated PC8105	Coated PC8115	Dimension (mm) IC	RE	S	L	D1	Cutting condition fn (mm/rev)	ap (mm)	Geometry
 CNMG-FM*	CNMG	120404-FM	●		12.7	0.397	4.76	12.896	5.16	0.10 (0.10~0.30)	0.80 (0.30~2.00)	
		120408-FM	●		12.7	0.794	4.76	12.896	5.16	0.15 (0.10~0.30)	1.00 (0.50~2.00)	
		120412-FM	●		12.7	1.191	4.76	12.896	5.16	0.15 (0.10~0.30)	1.00 (0.50~2.00)	
		120404-MP		●	12.7	0.397	4.76	12.896	5.16	0.20 (0.10~0.40)	1.50 (0.40~4.00)	
		120408-MP	●	●	12.7	0.794	4.76	12.896	5.16	0.25 (0.15~0.45)	2.00 (0.50~4.50)	
		120412-MP	●		12.7	1.191	4.76	12.896	5.16	0.30 (0.15~0.50)	2.00 (0.80~5.00)	
		120404-MM		●	12.7	0.397	4.76	12.896	5.16	0.25 (0.10~0.40)	2.50 (0.50~5.50)	
		120408-MM		●	12.7	0.794	4.76	12.896	5.16	0.25 (0.12~0.45)	3.00 (0.50~5.50)	
		120412-MM		●	12.7	1.191	4.76	12.896	5.16	0.30 (0.15~0.60)	3.00 (0.50~5.50)	
		120416-MM		●	12.7	1.588	4.76	12.896	5.16	0.35 (0.20~0.65)	3.00 (0.50~5.50)	
		160608-MM		●	15.875	0.794	6.35	16.12	6.35	0.25 (0.12~0.45)	4.00 (0.50~7.00)	
		160612-MM		●	15.875	1.191	6.35	16.12	6.35	0.30 (0.15~0.60)	4.00 (0.50~7.00)	
		160616-MM		●	15.875	1.588	6.35	16.12	6.35	0.35 (0.18~0.65)	4.00 (0.50~7.00)	
		190608-MM		●	19.05	0.794	6.35	19.344	7.93	0.30 (0.12~0.45)	4.00 (0.50~8.50)	
		190612-MM		●	19.05	1.191	6.35	19.344	7.93	0.30 (0.15~0.60)	4.00 (0.50~8.50)	
		190616-MM		●	19.05	1.588	6.35	19.344	7.93	0.35 (0.12~0.65)	4.00 (0.50~8.50)	
		120404-RM		●	12.7	0.397	4.76	12.896	5.16	0.25 (0.10~0.50)	3.00 (2.00~6.00)	
		120408-RM		●	12.7	0.794	4.76	12.896	5.16	0.30 (0.15~0.55)	3.00 (2.00~6.00)	
		120412-RM		●	12.7	1.191	4.76	12.896	5.16	0.35 (0.20~0.60)	3.00 (2.00~6.00)	
		160608-RM		●	15.875	0.794	6.35	16.12	6.35	0.30 (0.15~0.55)	4.00 (2.00~6.00)	
		160612-RM		●	15.875	1.191	6.35	16.12	6.35	0.35 (0.20~0.60)	4.00 (2.00~8.00)	
		160616-RM		●	15.875	1.588	6.35	16.12	6.35	0.40 (0.25~0.70)	4.00 (2.00~8.00)	
		190608-RM		●	19.05	0.794	6.35	19.344	7.93	0.30 (0.15~0.55)	4.50 (2.00~10.00)	
		190612-RM		●	19.05	1.191	6.35	19.344	7.93	0.35 (0.20~0.60)	4.50 (2.00~10.00)	
		190616-RM		●	19.05	1.588	6.35	19.344	7.93	0.40 (0.25~0.70)	4.50 (2.00~10.00)	
		120404-VP1	●		12.7	0.397	4.76	12.896	5.16	0.10 (0.05~0.15)	0.80 (0.10~1.50)	
		120408-VP1	●		12.7	0.794	4.76	12.896	5.16	0.14 (0.07~0.20)	0.80 (0.10~1.50)	
		120404-VP2	●	●	12.7	0.397	4.76	12.896	5.16	0.20 (0.05~0.30)	1.50 (0.10~3.00)	
		120408-VP2	●	●	12.7	0.794	4.76	12.896	5.16	0.25 (0.10~0.40)	2.50 (0.50~4.50)	
		120404-VP3	●	●	12.7	0.397	4.76	12.896	5.16	0.18 (0.05~0.30)	1.55 (0.10~3.00)	
		120408-VP3	●	●	12.7	0.794	4.76	12.896	5.16	0.20 (0.10~0.40)	2.50 (0.50~4.50)	
		120412-VP3		●	12.7	1.191	4.76	12.896	5.16	0.23 (0.15~0.45)	2.75 (0.50~5.00)	
		120408-VP4	●	●	12.7	0.794	4.76	12.896	5.16	0.25 (0.15~0.35)	2.00 (1.00~4.00)	
		120412-VP4	●	●	12.7	1.191	4.76	12.896	5.16	0.30 (0.20~0.40)	2.00 (1.00~4.00)	
		190608-VP4		●	19.05	0.794	6.35	19.344	7.93	0.25 (0.15~0.45)	4.00 (1.00~8.00)	
		190612-VP4		●	19.05	1.191	6.35	19.344	7.93	0.35 (0.25~0.50)	4.00 (2.00~8.00)	
 CNGG-VP3*	CNGG	120404-VP3	●	●	12.7	0.397	4.76	12.896	5.16	0.18 (0.05~0.30)	1.55 (0.10~3.00)	
		120408-VP3	●	●	12.7	0.794	4.76	12.896	5.16	0.25 (0.10~0.40)	2.50 (0.50~4.50)	
		120412-VP3	●	●	12.7	1.191	4.76	12.896	5.16	0.30 (0.12~0.50)	2.50 (0.50~5.00)	
 DNMG-FM*	DNMG	150404-FM	●		12.7	0.397	4.76	15.508	5.16	0.10 (0.10~0.30)	0.80 (0.30~2.00)	
		150408-FM	●		12.7	0.794	4.76	15.508	5.16	0.15 (0.10~0.30)	1.00 (0.50~2.00)	
		150604-FM	●		12.7	0.397	6.35	15.508	5.16	0.10 (0.10~0.30)	0.80 (0.30~2.00)	
		150608-FM	●		12.7	0.794	6.35	15.508	5.16	0.15 (0.10~0.30)	1.00 (0.50~2.00)	

* : Standard insert shape

●: Stock item

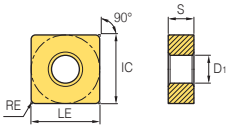
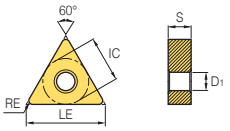
Stock items

Picture	Designation		Coated		Dimension (mm)					Cutting condition		Geometry
			PC8105	PC8115	IC	RE	S	L	D_1	fn (mm/rev)	ap (mm)	
 DNMG-FM*	**DNMG**	**150408-MP**	●		12.7	0.794	4.76	15.508	5.16	0.25 (0.15-0.45)	2.00 (0.50-4.50)	
		150412-MP	●		12.7	1.191	4.76	15.508	5.16	0.30 (0.15-0.50)	2.00 (0.80-5.00)	
		150608-MP	●		12.7	0.794	6.35	15.508	5.16	0.25 (0.15-0.45)	2.00 (0.50-4.50)	
		150612-MP	●		12.7	1.191	6.35	15.508	5.16	0.30 (0.15-0.50)	2.00 (0.80-5.00)	
		150404-MM		●	12.7	0.397	4.76	15.508	5.16	0.20 (0.10-0.40)	3.00 (0.50-6.40)	
		150408-MM		●	12.7	0.794	4.76	15.508	5.16	0.25 (0.12-0.45)	3.00 (0.50-6.40)	
		150412-MM		●	12.7	1.191	4.76	15.508	5.16	0.30 (0.15-0.60)	3.00 (0.50-6.40)	
		150604-MM		●	12.7	0.397	6.35	15.508	5.16	0.20 (0.10-0.40)	3.00 (0.50-6.40)	
		150608-MM		●	12.7	0.794	6.35	15.508	5.16	0.25 (0.12-0.45)	3.00 (0.50-6.40)	
		150612-MM		●	12.7	1.191	6.35	15.508	5.16	0.30 (0.15-0.60)	3.00 (0.50-6.40)	
		150404-RM		●	12.7	0.397	4.76	15.508	5.16	0.25 (0.10-0.50)	3.00 (2.00-6.00)	
		150408-RM		●	12.7	0.794	4.76	15.508	5.16	0.30 (0.15-0.55)	3.00 (2.00-6.00)	
		150412-RM		●	12.7	1.191	4.76	15.508	5.16	0.35 (0.20-0.60)	3.00 (2.00-6.00)	
		150604-RM		●	12.7	0.397	6.35	15.508	5.16	0.25 (0.10-0.50)	3.00 (2.00-6.00)	
		150404-VP1	●	●	12.7	0.397	4.76	15.508	5.16	0.10 (0.05-0.15)	0.80 (0.10-1.50)	
		150408-VP1	●	●	12.7	0.794	4.76	15.508	5.16	0.10 (0.07-0.15)	0.80 (0.10-1.50)	
		150604-VP1		●	12.7	0.397	6.35	15.508	5.16	0.10 (0.05-0.15)	0.80 (0.10-1.50)	
		150608-VP1		●	12.7	0.794	6.35	15.508	5.16	0.10 (0.07-0.15)	0.80 (0.10-1.50)	
		150404-VP2	●	●	12.7	0.397	4.76	15.508	5.16	0.20 (0.05-0.30)	1.50 (0.10-3.00)	
		150408-VP2	●	●	12.7	0.794	4.76	15.508	5.16	0.25 (0.10-0.40)	2.50 (0.50-4.50)	
		150604-VP2	●	●	12.7	0.397	6.35	15.508	5.16	0.20 (0.05-0.30)	1.50 (0.10-3.00)	
		150608-VP2	●	●	12.7	0.794	6.35	15.508	5.16	0.25 (0.10-0.40)	2.50 (0.50-4.50)	
		150408-VP3	●	●	12.7	0.794	4.76	15.508	5.16	0.25 (0.10-0.45)	2.50 (0.50-5.00)	
		150412-VP3	●	●	12.7	1.191	4.76	15.508	5.16	0.30 (0.12-0.50)	2.50 (0.50-5.00)	
		150604-VP3	●	●	12.7	0.397	6.35	15.508	5.16	0.18 (0.05-0.30)	1.55 (0.10-3.00)	
		150608-VP3	●	●	12.7	0.794	6.35	15.508	5.16	0.25 (0.10-0.45)	2.50 (0.50-5.00)	
		150612-VP3	●	●	12.7	1.191	6.35	15.508	5.16	0.30 (0.12-0.50)	2.50 (0.50-5.00)	
		150608-VP4	●	●	12.7	0.794	6.35	15.508	5.16	0.20 (0.10-0.30)	1.00 (0.20-2.00)	
 DNGG-VP3*	**DNGG**	**150404-VP3**	●	●	12.7	0.397	4.76	15.508	5.16	0.18 (0.05-0.30)	1.55 (0.10-3.00)	
		150408-VP3	●	●	12.7	0.794	4.76	15.508	5.16	0.25 (0.10-0.45)	2.50 (0.50-5.00)	
		150412-VP3	●	●	12.7	1.191	4.76	15.508	5.16	0.30 (0.12-0.50)	2.50 (0.50-5.00)	
		150604-VP3	●	●	12.7	0.397	6.35	15.508	5.16	0.18 (0.05-0.30)	1.55 (0.10-3.00)	
		150608-VP3	●	●	12.7	0.794	6.35	15.508	5.16	0.25 (0.10-0.45)	2.50 (0.50-5.00)	
		150612-VP3	●	●	12.7	1.191	6.35	15.508	5.16	0.30 (0.12-0.50)	2.50 (0.50-5.00)	
 SNMG-FM*	**SNMG**	**120404-FM**	●		12.7	0.397	4.76	12.7	5.16	0.10 (0.10-0.30)	0.80 (0.30-2.00)	
		120408-FM	●		12.7	0.794	4.76	12.7	5.16	0.15 (0.10-0.30)	1.00 (0.50-2.00)	
		120412-FM	●		12.7	1.191	4.76	12.7	5.16	0.15 (0.10-0.30)	1.00 (0.50-2.00)	
		120404-MP	●		12.7	0.397	4.76	12.7	5.16	0.20 (0.10-0.40)	1.50 (0.40-4.00)	
		120408-MP	●		12.7	0.794	4.76	12.7	5.16	0.25 (0.15-0.45)	2.00 (0.50-4.50)	
		120404-MM		●	12.7	0.397	4.76	12.7	5.16	0.20 (0.10-0.40)	3.00 (0.50-6.40)	
		120408-MM		●	12.7	0.794	4.76	12.7	5.16	0.25 (0.12-0.45)	3.00 (0.50-6.40)	
		120412-MM		●	12.7	1.191	4.76	12.7	5.16	0.30 (0.15-0.60)	3.00 (0.50-6.40)	
		150612-MM		●	15.875	1.191	6.35	15.875	6.35	0.30 (0.15-0.60)	3.75 (0.50-8.00)	

* : Standard insert shape

●: Stock item

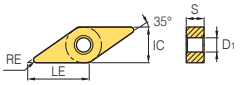
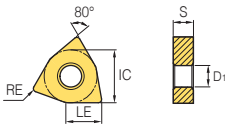
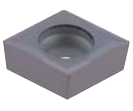
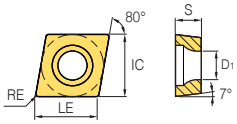
Stock items

Picture	Designation		Coated		Dimension (mm)					Cutting condition		Geometry
			PC8105	PC8115	IC	RE	S	L	D_1	fn (mm/rev)	ap (mm)	
 SNMG-FM*	**SNMG**	**190608-MM**		●	19.05	0.794	6.35	19.05	7.93	0.25 (0.12~0.45)	4.00 (0.50-9.50)	
		190612-MM		●	19.05	1.191	6.35	19.05	7.93	0.30 (0.15~0.60)	4.00 (0.50-9.50)	
		120404-RM		●	12.7	0.397	4.76	12.7	5.16	0.25 (0.10~0.50)	3.00 (2.00-6.00)	
		120408-RM		●	12.7	0.794	4.76	12.7	5.16	0.30 (0.15~0.55)	3.00 (2.00-6.00)	
		120412-RM		●	12.7	1.191	4.76	12.7	5.16	0.35 (0.20~0.60)	3.00 (2.00-6.00)	
		150612-RM		●	15.875	1.191	6.35	15.875	6.35	0.35 (0.20~0.60)	4.00 (2.00-8.00)	
		190608-RM		●	19.05	0.794	6.35	19.05	7.93	0.35 (0.20~0.60)	4.00 (2.00-10.00)	
		190612-RM		●	19.05	1.191	6.35	19.05	7.93	0.35 (0.20~0.60)	4.00 (2.00-10.00)	
		120404-VP2	●	●	12.7	0.397	4.76	12.7	5.16	0.20 (0.05~0.35)	1.50 (0.10~3.00)	
		120408-VP2	●	●	12.7	0.794	4.76	12.7	5.16	0.23 (0.10~0.45)	2.50 (0.50~4.50)	
		120412-VP2	●	●	12.7	1.191	4.76	12.7	5.16	0.25 (0.10~0.50)	2.75 (0.50~5.00)	
		120404-VP3	●	●	12.7	0.397	4.76	12.7	5.16	0.15 (0.05~0.30)	1.50 (0.10~3.00)	
		120408-VP3	●	●	12.7	0.794	4.76	12.7	5.16	0.23 (0.10~0.45)	2.50 (0.50~5.00)	
		120412-VP3	●	●	12.7	1.191	4.76	12.7	5.16	0.23 (0.10~0.45)	2.50 (0.50~5.00)	
		120408-VP4	●	●	12.7	0.794	4.76	12.7	5.16	0.20 (0.10~0.30)	1.00 (0.20~2.00)	
		120412-VP4	●	●	12.7	1.191	4.76	12.7	5.16	0.20 (0.10~0.30)	1.00 (0.20~2.00)	
		150612-VP4	●	●	15.875	1.191	6.35	15.875	6.35	0.25 (0.20~0.35)	2.50 (1.00~4.50)	
		190612-VP4		●	19.05	1.191	6.35	19.05	7.93	0.25 (0.20~0.35)	4.00 (2.00~8.00)	
 SNGG-VP3*	**SNGG**	**120404-VP3**	●	●	12.7	0.397	4.76	12.7	5.16	0.18 (0.05~0.30)	1.55 (0.10~3.00)	
		120408-VP3	●	●	12.7	0.794	4.76	12.7	5.16	0.23 (0.10~0.45)	2.50 (0.50~5.00)	
		120412-VP3	●	●	12.7	1.191	4.76	12.7	5.16	0.23 (0.10~0.45)	2.50 (0.50~5.00)	
 TNMG-FM*	**TNMG**	**160404-FM**	●		9.525	0.397	4.76	16.498	3.81	0.10 (0.10~0.30)	0.80 (0.30~2.00)	
		160408-FM	●		9.525	0.794	4.76	16.498	3.81	0.15 (0.10~0.30)	1.00 (0.50~2.00)	
		160412-FM	●		9.525	1.191	4.76	16.498	3.81	0.15 (0.10~0.30)	1.00 (0.50~2.00)	
		160404-MP	●		9.525	0.397	4.76	16.498	3.81	0.20 (0.10~0.40)	1.00 (0.40~3.50)	
		160408-MP	●		9.525	0.794	4.76	16.498	3.81	0.25 (0.15~0.45)	1.50 (0.50~4.00)	
		160412-MP	●		9.525	1.191	4.76	16.498	3.81	0.30 (0.15~0.50)	2.00 (0.80~4.50)	
		160404-MM		●	9.525	0.397	4.76	16.498	3.81	0.20 (0.10~0.40)	3.00 (0.50~4.80)	
		160408-MM		●	9.525	0.794	4.76	16.498	3.81	0.25 (0.12~0.45)	3.00 (0.50~4.80)	
		220408-MM		●	12.7	0.794	4.76	21.997	5.16	0.25 (0.12~0.45)	4.00 (0.50~6.50)	
		220412-MM		●	12.7	1.191	4.76	21.997	5.16	0.30 (0.15~0.60)	4.00 (0.50~6.50)	
		160404-RM		●	9.525	0.397	4.76	16.498	3.81	0.25 (0.10~0.50)	3.00 (2.00~6.00)	
		160408-RM		●	9.525	0.794	4.76	16.498	3.81	0.30 (0.15~0.55)	3.00 (2.00~6.00)	
		220408-RM		●	12.7	0.794	4.76	21.997	5.16	0.30 (0.15~0.55)	4.00 (2.00~7.50)	
		220412-RM		●	12.7	1.191	4.76	21.997	5.16	0.35 (0.20~0.60)	4.00 (2.00~7.50)	
		160404-VP2	●	●	9.525	0.397	4.76	16.498	3.81	0.20 (0.05~0.30)	1.50 (0.10~3.00)	
		160408-VP2	●	●	9.525	0.794	4.76	16.498	3.81	0.25 (0.10~0.45)	1.80 (0.50~3.10)	
		160404-VP3	●	●	9.525	0.397	4.76	16.498	3.81	0.20 (0.10~0.40)	1.75 (0.80~3.50)	
		160408-VP3	●	●	9.525	0.794	4.76	16.498	3.81	0.25 (0.12~0.50)	2.50 (0.50~5.00)	
		160408-VP4	●	●	9.525	0.794	4.76	16.498	3.81	0.23 (0.15~0.35)	2.00 (1.00~4.00)	
		160412-VP4	●	●	9.525	1.191	4.76	16.498	3.81	0.26 (0.20~0.40)	2.00 (1.00~4.00)	
 TNGG-VP3*	**TNGG**	**160404-VP3**	●	●	9.525	0.397	4.76	16.498	3.81	0.20 (0.10~0.40)	1.75 (0.80~3.50)	
		160408-VP3	●	●	9.525	0.794	4.76	16.498	3.81	0.25 (0.12~0.50)	2.50 (0.50~5.00)	

* : Standard insert shape

●: Stock item

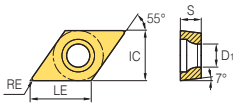
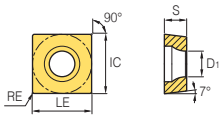
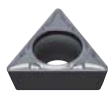
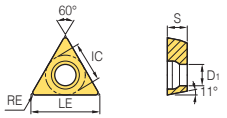
Stock items

Picture	Designation		Coated		Dimension (mm)					Cutting condition		Geometry
			PC8105	PC8115	IC	RE	S	L	D_1	fn (mm/rev)	ap (mm)	
 VNMG-FM*	**VNMG**	160404-FM	●		9.525	0.397	4.76	16.606	3.81	0.10 (0.10~0.30)	0.80 (0.30~2.00)	
		160408-FM	●		9.525	0.794	4.76	16.606	3.81	0.15 (0.10~0.30)	1.00 (0.50~2.00)	
		160404-MP	●		9.525	0.397	4.76	16.606	3.81	0.20 (0.10~0.40)	1.00 (0.40~3.50)	
		160408-MP	●		9.525	0.794	4.76	16.606	3.81	0.23 (0.15~0.45)	1.50 (0.50~4.00)	
		160404-MM		●	9.525	0.397	4.76	16.606	3.81	0.20 (0.10~0.40)	2.00 (0.50~4.00)	
		160408-MM		●	9.525	0.794	4.76	16.606	3.81	0.25 (0.12~0.45)	2.00 (0.50~4.00)	
		160404-VP3	●	●	9.525	0.397	4.76	16.606	3.81	0.19 (0.08~0.30)	2.50 (0.50~5.00)	
		160408-VP3	●	●	9.525	0.794	4.76	16.606	3.81	0.25 (0.12~0.50)	2.50 (0.50~5.00)	
 VNGG-VP3*	**VNGG**	160404-VP3		●	9.525	0.397	4.76	16.606	3.81	0.19 (0.08~0.30)	1.50 (0.10~3.00)	
 WNMG-FM*	**WNMG**	080404-FM	●		12.7	0.397	4.76	8.687	5.16	0.10 (0.10~0.30)	0.80 (0.30~2.00)	
		080408-FM	●		12.7	0.794	4.76	8.687	5.16	0.15 (0.10~0.30)	1.00 (0.50~2.00)	
		080412-FM	●		12.7	1.191	4.76	8.687	5.16	0.15 (0.10~0.30)	1.00 (0.50~2.00)	
		080404-MP	●	●	12.7	0.397	4.76	8.687	5.16	0.20 (0.10~0.40)	1.50 (0.40~4.00)	
		080408-MP	●	●	12.7	0.794	4.76	8.687	5.16	0.25 (0.15~0.45)	2.00 (0.50~4.50)	
		080404-MM		●	12.7	0.397	4.76	8.687	5.16	0.20 (0.10~0.40)	2.50 (0.50~4.00)	
		080408-MM		●	12.7	0.794	4.76	8.687	5.16	0.25 (0.12~0.45)	2.50 (0.50~4.00)	
		080412-MM		●	12.7	1.191	4.76	8.687	5.16	0.30 (0.15~0.60)	2.50 (0.50~4.00)	
		080404-RM		●	12.7	0.397	4.76	8.687	5.16	0.25 (0.10~0.50)	2.50 (0.50~4.00)	
		080408-RM		●	12.7	0.794	4.76	8.687	5.16	0.30 (0.15~0.55)	2.50 (2.00~4.00)	
		080412-RM		●	12.7	1.191	4.76	8.687	5.16	0.35 (0.20~0.60)	2.50 (2.00~4.00)	
		080408-VP2	●	●	12.7	0.794	4.76	8.687	5.16	0.25 (0.12~0.50)	1.75 (0.50~3.00)	
		080412-VP2	●	●	12.7	1.191	4.76	8.687	5.16	0.30 (0.15~0.55)	2.00 (0.80~3.30)	
		080404-VP3	●	●	12.7	0.397	4.76	8.687	5.16	0.25 (0.10~0.45)	2.50 (0.50~5.00)	
		080408-VP3	●	●	12.7	0.794	4.76	8.687	5.16	0.30 (0.12~0.50)	2.50 (0.50~5.00)	
		080412-VP3	●		12.7	1.191	4.76	8.687	5.16	0.30 (0.12~0.50)	2.50 (0.50~5.00)	
		080408-VP4	●	●	12.7	0.794	4.76	8.687	5.16	0.23 (0.15~0.35)	2.00 (1.00~4.00)	
		080412-VP4	●	●	12.7	1.191	4.76	8.687	5.16	0.25 (0.15~0.35)	2.00 (1.00~4.00)	
 CCMT-VL*	**CCMT**	060202-MP		●	6.35	0.198	2.38	6.448	2.8	0.06 (0.04~0.12)	0.80 (0.20~1.50)	
		060204-MP	●	●	6.35	0.397	2.38	6.448	2.8	0.08 (0.05~0.15)	1.00 (0.30~1.50)	
		09T302-MP	●	●	9.525	0.198	3.97	9.672	4.4	0.10 (0.07~0.15)	1.00 (0.30~2.00)	
		09T304-MP	●	●	9.525	0.397	3.97	9.672	4.4	0.15 (0.08~0.25)	1.50 (0.50~2.50)	
		09T308-MP	●	●	9.525	0.794	3.97	9.672	4.4	0.20 (0.10~0.30)	2.00 (0.50~2.50)	
		060204-VL	●	●	6.35	0.397	2.38	6.448	2.8	0.06 (0.04~0.10)	0.30 (0.08~-0.90)	
		09T304-VL		●	9.525	0.397	3.97	9.672	4.4	0.06 (0.05~0.10)	0.50 (0.10~1.00)	
		09T308-VL	●	●	9.525	0.794	3.97	9.672	4.4	0.08 (0.08~0.15)	0.50 (0.10~1.00)	
 CCGT-VP1*	**CCGT**	060201-VP1	●	●	6.35	0.1	2.38	6.448	2.8	0.05 (0.05~0.06)	0.50 (0.06~1.00)	
		060202-VP1	●	●	6.35	0.198	2.38	6.448	2.8	0.07 (0.03~0.10)	0.70 (0.08~1.50)	
		060204-VP1	●	●	6.35	0.397	2.38	6.448	2.8	0.09 (0.05~0.12)	0.80 (0.10~1.50)	
		09T301-VP1	●	●	9.525	0.1	3.97	9.672	4.4	0.07 (0.03~0.13)	0.50 (0.06~1.00)	
		09T302-VP1	●	●	9.525	0.198	3.97	9.672	4.4	0.09 (0.04~0.15)	0.70 (0.08~1.50)	
		09T304-VP1	●	●	9.525	0.397	3.97	9.672	4.4	0.13 (0.06~0.20)	0.80 (0.10~1.50)	

* : Standard insert shape

●: Stock item

Stock items

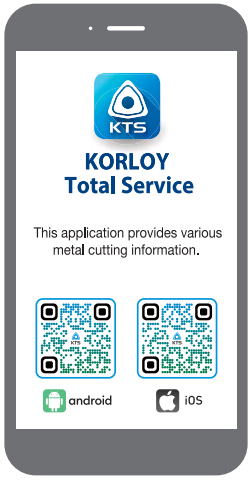
Picture	Designation		Coated PC8105	Coated PC8115	IC	RE	S	L	D1	Cutting condition fn (mm/rev)	Cutting condition ap (mm)	Geometry
 DCMT-MP*	**DCMT**	070202-MP	●	●	6.35	0.198	2.38	7.752	2.8	0.06 (0.03~0.12)	0.80 (0.10~1.50)	
		070204-MP	●	●	6.35	0.397	2.38	7.752	2.8	0.10 (0.05~0.15)	0.90 (0.30~1.80)	
		070208-MP	●	●	6.35	0.794	2.38	7.752	2.8	0.11 (0.08~0.22)	0.90 (0.30~1.80)	
		11T302-MP	●	●	9.525	0.198	3.97	11.628	4.4	0.10 (0.04~0.15)	1.00 (0.30~2.00)	
		11T304-MP	●	●	9.525	0.397	3.97	11.628	4.4	0.15 (0.08~0.20)	1.30 (0.50~2.30)	
		11T308-MP		●	9.525	0.794	3.97	11.628	4.4	0.25 (0.10~0.30)	1.30 (0.50~2.30)	
		070204-VL	●	●	6.35	0.397	2.38	7.752	2.8	0.06 (0.04~0.10)	0.30 (0.08~0.90)	
		11T308-VL	●	●	9.525	0.794	3.97	11.628	4.4	0.08 (0.08~0.15)	0.50 (0.10~1.00)	
 DCGT-VP1*	**DCGT**	070201-VP1	●	●	6.35	0.1	2.38	7.752	2.8	0.03 (0.03~0.06)	0.50 (0.06~1.00)	
		070202-VP1	●	●	6.35	0.198	2.38	7.752	2.8	0.09 (0.03~0.18)	0.80 (0.08~1.50)	
		070204-VP1	●	●	6.35	0.397	2.38	7.752	2.8	0.10 (0.05~0.12)	0.85 (0.10~1.50)	
		11T302-VP1	●	●	9.525	0.198	3.97	11.628	4.4	0.10 (0.04~0.15)	0.80 (0.08~1.50)	
		11T304-VP1	●	●	9.525	0.397	3.97	11.628	4.4	0.13 (0.06~0.20)	0.85 (0.10~1.50)	
 SCMT-VL*	**SCMT**	09T304-MP	●	●	9.525	0.397	3.97	9.672	4.4	0.15 (0.05~0.25)	1.40 (0.30~3.00)	
		09T308-MP	●	●	9.525	0.794	3.97	9.672	4.4	0.20 (0.10~0.30)	1.50 (0.50~3.00)	
		120408-MP	●	●	12.7	0.794	4.76	12.896	5.5	0.20 (0.10~0.30)	1.80 (0.80~3.50)	
		09T304-VL	●	●	9.525	0.397	3.97	9.672	4.4	0.05 (0.05~0.10)	0.50 (0.10~1.00)	
		09T308-VL	●	●	9.525	0.794	3.97	9.672	4.4	0.08 (0.08~0.15)	0.50 (0.10~1.00)	
 TCMT-VL*	**TCMT**	110202-MP	●		6.35	0.198	2.38	10.999	2.8	0.06 (0.03~0.12)	0.80 (0.20~1.50)	
		110204-MP	●		6.35	0.397	2.38	10.999	2.8	0.08 (0.05~0.15)	0.80 (0.20~1.50)	
		110208-MP	●		6.35	0.794	2.38	10.999	2.8	0.14 (0.10~0.28)	1.00 (0.25~2.00)	
		16T304-MP	●	●	9.525	0.397	3.97	16.498	4.4	0.12 (0.08~0.20)	1.50 (0.30~2.50)	
		16T308-MP	●		9.525	0.794	3.97	16.498	4.4	0.20 (0.10~0.30)	1.50 (0.50~2.50)	
		16T312-MP	●		9.525	1.191	3.97	16.498	4.4	0.25 (0.20~0.35)	1.50 (0.50~2.50)	
		16T304-VL	●	●	9.525	0.397	3.97	16.498	4.4	0.10 (0.05~0.20)	0.75 (0.30~1.50)	
		16T308-VL	●	●	9.525	0.794	3.97	16.498	4.4	0.10 (0.05~0.20)	0.75 (0.30~1.50)	
 TPMT-VL*	**TPMT**	110304-VL	●	●	6.35	0.397	3.18	10.999	2.8	0.10 (0.05~0.20)	0.65 (0.20~1.50)	
 VBMT-MU*	**VBMT**	160404-MP	●	●	9.525	0.397	4.76	16.606	4.4	0.10 (0.08~0.20)	1.20 (0.30~2.00)	
		160408-MP		●	9.525	0.794	4.76	16.606	4.4	0.18 (0.10~0.25)	1.30 (0.50~2.00)	
		160412-MP	●	●	9.525	0.794	4.76	16.606	4.4	0.25 (0.10~0.35)	1.40 (0.50~2.30)	
		160404-VL	●	●	9.525	0.397	4.76	16.606	4.4	0.10 (0.05~0.20)	0.50 (0.30~1.50)	
		160408-VL	●	●	9.525	0.794	4.76	16.606	4.4	0.13 (0.10~0.20)	0.50 (0.30~1.50)	
		160412-VL	●	●	9.525	0.794	4.76	16.606	4.4	0.15 (0.10~0.25)	0.80 (0.30~1.50)	
 VCMT-VL*	**VCMT**	160404-MP	●		9.525	0.397	4.76	16.606	4.4	0.10 (0.08~0.20)	1.00 (0.30~2.00)	
		160412-MP	●		9.525	1.191	4.76	16.606	4.4	0.18 (0.10~0.35)	1.20 (0.50~2.30)	
		160404-VL	●		9.525	0.397	4.76	16.606	4.4	0.10 (0.05~0.20)	0.50 (0.30~1.50)	
		160408-VL	●		9.525	0.794	4.76	16.606	4.4	0.13 (0.10~0.20)	0.50 (0.30~1.50)	
 VCGT-VP1*	**VCGT**	110301-VP1	●	●	6.35	0.1	3.18	11.071	2.8	0.08 (0.02~0.15)	0.20 (0.05~0.50)	
		110302-VP1	●	●	6.35	0.198	3.18	11.071	2.8	0.10 (0.02~0.18)	0.55 (0.10~1.00)	
		110304-VP1	●	●	6.35	0.397	3.18	11.071	2.8	0.11 (0.03~0.18)	0.65 (0.15~1.20)	
 VPGT-VP1*	**VPGT**	110301-VP1	●	●	6.35	0.1	3.18	11.071	2.8	0.08 (0.02~0.15)	0.20 (0.05~0.50)	
		110302-VP1	●	●	6.35	0.198	3.18	11.071	2.8	0.10 (0.02~0.18)	0.55 (0.10~1.00)	
		110304-VP1	●	●	6.35	0.397	3.18	11.071	2.8	0.11 (0.03~0.18)	0.65 (0.15~1.20)	

* : Standard insert shape

●: Stock item

⚠ For the safe metalcutting

- Use safety supplies such as protective gloves to prevent possible injury while touching the edge of tools.
- Use safety glasses or safety cover to hedge possible dangers. Inappropriate usage or excessive cutting condition may lead tool's breakage or even the fragment's scattering.
- Clamp the workpiece tightly enough to prevent its movement while its machining.
- Properly manage the tool change phase because the inordinately used tool can be easily broken under the excessive cutting load or severe wear, and it may threat the operator's safety.
- Use safety cover because chips evacuated during cutting are hot and sharp and may cause burns and cuts. To remove chips safely, stop machining, put on protective gloves, and use a hook or other tools.
- Prepare for fire prevention measures as the use of the non-water soluble cutting oil may cause fire.
- Use safety cover and other safety supplies because the spare parts or the tools can be pulled out due to centrifugal force while high speed machining.



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