

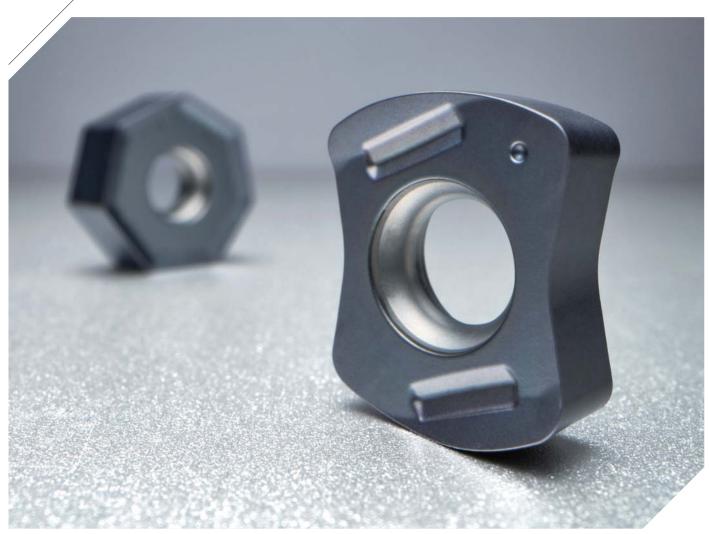


PC9540

Milling Insert for Stainless steel and Titanium machining

 \bullet Providing excellent wear resistance and adhesion resistance through the application of PVD fusion coating technology Omega-Tech TM

Achieving stable machining through the application of EnduraCore-Process™, a substrate toughening process technology







Milling Insert for Stainless steel and Titanium machining

PC9540

Stainless steel, with its excellent corrosion resistance, good strength, and gloss, is used in various industries such as automotive, power generation, and aerospace components. Recently, the use of high-strength and heat-resistant stainless steel has been increasing. At the same time, titanium is gaining attention as a key metal material in advanced industries such as IT, medical, and aerospace, due to its light weight and superior properties.

Despite their outstanding properties, these two metal materials generate high heat during cutting, leading to frequent issues such as wear, oxidation, and chip adhesion on the insert surface, which often cause chipping and breakage of the tool. Consequently, they are classified as hard-to-cut materials due to their poor machinability.

In particular, unstable heavy interrupted cutting of these hard-to-cut materials limits the improvement of tool life and cycle time for existing M25-M35 grade inserts.

KORLOY recommends PC9540 for improving productivity in stainless steel and titanium milling operations. PC9540 is a dedicated M40 grade for stainless steel and titanium, applying PVD fusion coating technology Omega-TechTM to maximize wear resistance, oxidation resistance, and adhesion resistance. Furthermore, by using a high-toughness substrate with EnduraCore-ProcessTM, a substrate toughening process technology, it enhances plastic deformation resistance and fracture resistance in medium cutting to roughing and severe interrupted milling and achieves stable machining.

As a result, an average tool life has increased by 20-50% compared to existing grades and improved productivity due to suitability for high feed machining.

As such, PC9540 is KORLOY's next-generation grade solution, leading the stainless steel and titanium machining market by providing enhanced productivity and stable machining quality.

Sood wear resistance, oxidation resistance and welding resistance

- Applied the exclusive PVD technology, Omega-Tech™

>> Higher productivity

 Available in high-feed machining with 20-50% improved performance compared to existing grades

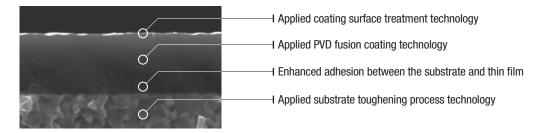
» Increased plastic deformation and fracture resistance

 Applied the substrate toughening process technology, EnduraCore-ProcessTM

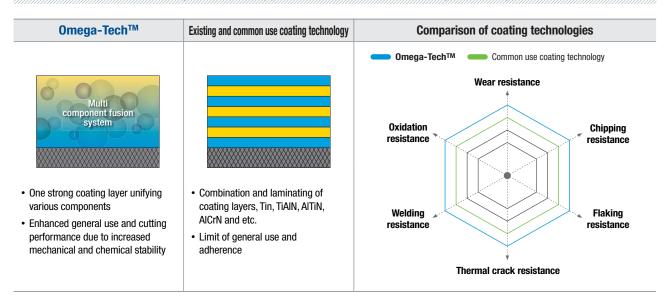


PC9540

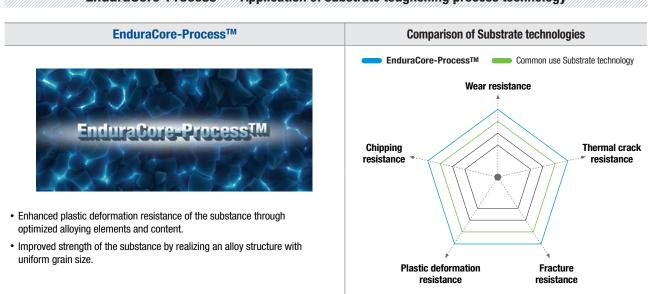
- · PVD grade optimally designed for heavy roughing and severe interrupted machining of stainless steel and titanium
- Excellent wear resistance, oxidation resistance, and adhesion resistance of the thin film by applying Omega-Tech™
- EnduraCore-Process[™] application enhances the substrate's plastic deformation resistance and fracture resistance
- Prevents chipping and sudden breakage due to coating surface treatment technology



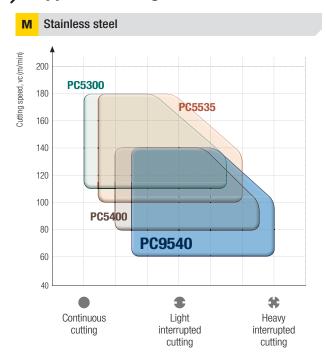
Omega-TechTM-application of PVD fusion coating technology

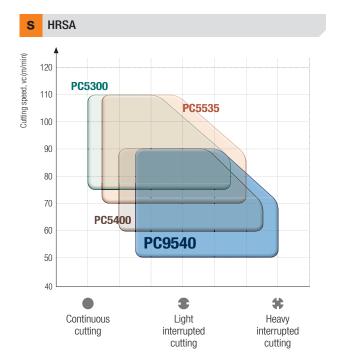


EnduraCore-ProcessTM-Application of substrate toughening process technology



™ Application range





		Workpiece		Specific	Brinell	Recommended cutting condition				
	Workpiece	ISO	AISI	cutting force	hardness	vc (m/min)	fz (mm/t)			
ISO	material	(DIN)	Aləi	(N/mm²)	(HB)		Facing / shouldering	High feed cutting		
		V00 AI40				100	0.25	1.3		
		X6CrAl13 X6Cr17	405 430	1650	≤ 183	140	0.15	0.8		
	Ferritic/	700117	400			180	0.05	0.3		
	martensitic series		400			80	0.25	1.3		
	301103	- X12Cr13	403 410	1800	≤ 200	120	0.15	0.8		
		ATZOITS	410			160	0.05	0.3		
		V=0.184.0.0			≤ 187	60	0.25	1.1		
	Austenite series	X5CrNi18-9 X5CrNiMo17-12-2	304 316	2000		100	0.15	0.7		
м		AJOHVIIVIO 17-12-2				140	0.05	0.3		
IVI	Austenite-ferritic series (duplex)	X2CrNiMoN22-5-3 X2CrNiMoCuN25-6-3	S31803 S32205 S32750	2200	≤ 310	40	0.25	1.1		
						70	0.15	0.7		
	Series (uupiex)	X2CrNiMoN25-7-4				100	0.05	0.3		
	Heat resistance stainless steel	(1.4837) (1.4848)	-		160~200	40	0.25	1.1		
				2300		70	0.15	0.7		
		(1.4040)				100	0.05	0.3		
	Precipitation series	A3UHMUHM010-4	630(17-4PH)	2800	≤ 350	40	0.25	1.1		
						70	0.15	0.7		
						100	0.05	0.3		
		Ti alloy (TiAl5Sn2.5) (TiAl6V4)	R54520 R56401	1400		50	0.2	0.9		
	Ti alloy				301~381	70	0.1	0.6		
		(10.001)	1130401			90	0.05	0.3		
						35	0.2	0.9		
	Fe-base	se -	N08800	2400	≤ 200	50	0.1	0.6		
S						65	0.05	0.3		
3			N07041			20	0.2	0.9		
	Ni-base	-	N04400	3000	286~409	35	0.1	0.6		
			N07718			50	0.05	0.3		
						20	0.2	0.9		
	Co-base	-	R30006	3100	336~421	30	0.1	0.6		
						40	0.05	0.3		

™ Application Guide Line

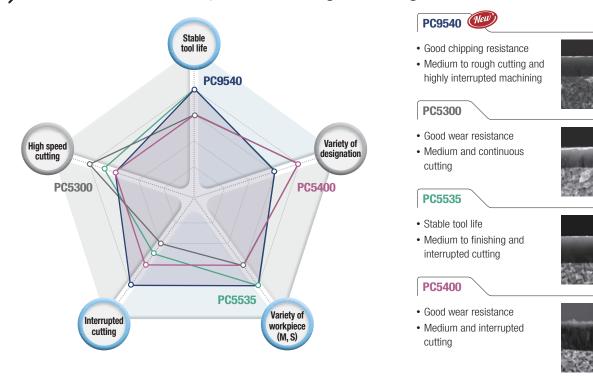
[Turbocharger Turbine Housing]

* : DIN

Section		Finishing	Medium cutting to roughing	Heavy interrupted cutting		
Recommended	1 st	PC5535	DC0540	D00540		
grade	2 nd PC5300		PC9540	PC9540		
Workpiece ma	terial	Heat resistance stainless steel (1.48 □□)*	Heat resistance stainless steel (1.48 □□)*	Heat resistance stainless steel		
Application	n	Machining with small depth of cut and small width of cut	Machining with large depth of cut and large width of cut	Frequent and unstable interrupted cutting		
Machining part						

[Power Generation and Aerospace Components]

Section		Power Generation	Aerospace					
Recommended	1 st	D00540	PC9540	UNC840, UPC845 PC9540				
grade	2 nd	PC9540	UNC840, UPC845					
Workpiece material		Precipitation hardening stainless steel (15-5PH, 17-4PH)	Titanium alloy (Ti-6Al-4V)	Ni base HRSA (Inconel718)				
Application		Shouldering, High-feed	Facing, Shouldering	Facing, High-feed				
Workpiece		Turbine blade	Flap track, landing gear	Blisk, turbine case				



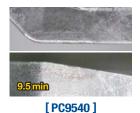
Grade	Stable tool life	Variety of designation	Variety of workpiece (M, S)	Interrupted cutting	High speed cutting
PC9540 (PC)	***	***	****	****	***
PC5300	***	****	***	**	****
PC5535	****	***	****	***	***
PC5400	***	****	***	***	***

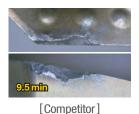
☑ Performance evaluation

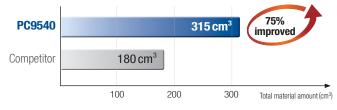
Austenitic stainless steel (STS316)

vc(m/min) = 100, fz(mm/t) = 0.25, ap(mm) = 1.5, wet **Cutting condition**

Tool Insert SNMX1206ANN-MF(PC9540) Holder RM8ACM4063HR-H







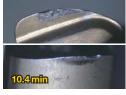
- Material removal rate Q (cm³/min): 19
- Cutting time (min): 16.6

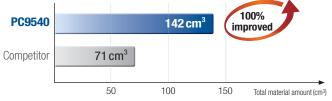
Duplex stainless steel (F51)

Cutting condition vc(m/min) = 90, fz(mm/t) = 0.6, ap(mm) = 0.6, wet

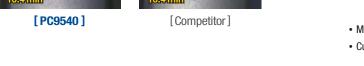
Insert LNMX060310R-ML(PC9540) Holder HFMDCM050R-22-8-LN06 Tool







- Material removal rate Q (cm³/min): 6.8
 - Cutting time (min): 20.9

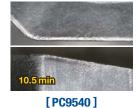


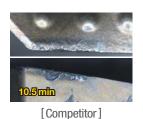


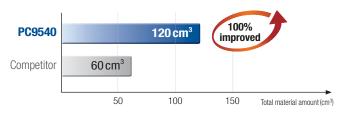
* : DIN

vc(m/min) = 100, fz(mm/t) = 0.15, ap(mm) = 1.5, wet **Cutting condition**

Insert SNMX1206ANN-MF(PC9540) Tool Holder RM8ACM4063HR-H







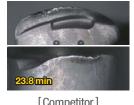
- Material removal rate Q (cm3/min): 5.7
- Cutting time (min): 21.1

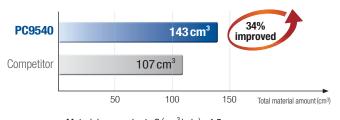
Titanium alloy (Ti-6AI-4V)

Cutting condition vc(m/min) = 60, fz(mm/t) = 0.6, ap(mm) = 0.6, wet

Tool Insert LNMX060310R-ML(PC9540) Holder HFMDCM050R-22-8-LN06







- Material removal rate Q (cm3/min): 4.5
- Cutting time (min): 31.6

[PC9540]

[Competitor]

☑ Application examples

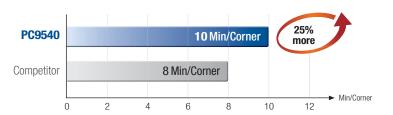
Martensitic stainless steel (Jethete M152)

Workpiece use Engine case of aerospace

Cutting condition vc(m/min) = 145, fz(mm/t) = 0.2, ap(mm) = 1.2, wet

Tool Insert ADKT10T316R-ML (PC9540) Holder AMXS020R-3W20-100-AD10





Heat resistance stainless steel (1.4848)*

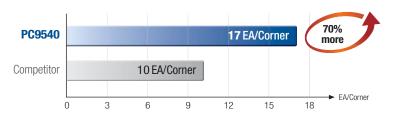
*:DIN

Workpiece use Automotive turbocharger turbine housing

Cutting condition vc (m/min) = 80, fz (mm/t) = 0.2, ap (mm) = 1.2, dry = 0.2

Tool Insert ONMX060608-MM(PC9540) Holder RM16AC6100HR-M





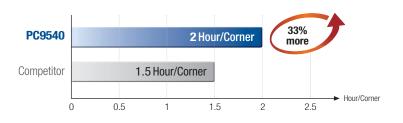
Precipitation hardening stainless steel (X5CrNiCuNb16-4)

Workpiece use Small modular reactor turbine blade

Cutting condition vc(m/min) = 85.5, fz(mm/t) = 0.61, ap(mm) = 0.5, wet

Tool Insert LNMX060310R-MF(PC9540) Holder HMFDCM040R-16-6-LN06





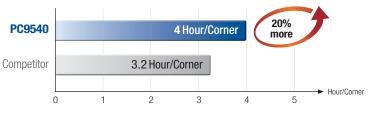
Titanium alloy (Ti-6AI-4V)

Workpiece use Flap track of aerospace

Cutting condition vc(m/min) = 58.9, fz(mm/t) = 0.48, ap(mm) = 0.4, wet

Tool Insert LNMX060310R-MF (PC9540) Holder HFMDS025R-4C25-140-LN06





✓ Stock items

		Designation		Coated		Din				
Туре	Picture			PC9540	APMX /INSL	IC/W ₁	S/S1	RE	BS	Geometry
Alpha Mill-X		ADKT	10T304PEER-ML 10T308PEER-ML 10T312PEER-ML 120408PESR-ML 170608PESR-ML 10T304PESR-MM	•	9.5 9.5 9.5 11.5 16.5 9.5	6.424 6.424 6.424 7.813 10.843 6.424	3.819 3.815 3.815 4.824 6.529 3.819	0.4 0.8 1.2 0.8 0.8	0.96 0.8 0.6 1.71 3.5 1.2	BS WI
Alp	ADKT-MM*	АРМТ	120408PESR-MM 170608PESR-MM	•	11.5	7.813 10.843	4.824 6.529	0.8	1.71 3.3	APMX
Alpha Mill	APMT-MM*		11T308PDER-ML 1604PDER-ML 11T3PDSR-MF 1604PDSR-MF 0602PDSR-MM 090308PDSR-MM 11T3PDSR-MM 11T3PDSR-MM 11T308PDSR-MM 1604PDSR-MM		11.2 16.4 11.2 16.4 6 9.4 11.2 16.4 17.4	6.467 9.41 6.467 9.41 4.24 6.21 6.467 9.41 10.98	3.6 5.76 3.6 5.76 2.6 3.6 3.6 3.6 5.76 6.35	0.8 0.8 0.5 0.8 0.4 0.8 0.5 0.8	0.797 0.985 1.2 1.1 0.9 0.5 1.2 0.9 1.1 2.2	BS APMX . S
HFMD	LNMX-ML*	LNMX	040205R-ML 060310R-ML 100412R-ML 060310R-MF 100412R-MF 040205R-MM 060310R-MM	•	6.2 10 12.2 10 12.2 6.2 10 12.2	4.2 6.8 10 6.8 10 4.2 6.8 10	2.35 3.6 4.2 3.6 4.2 2.35 3.6 4.2	0.5 1 1.2 1 1.2 0.5 1	- - - - - -	INSL PRE RE
RM16		ONMX	060608-MM 0606ANN-MM	•	4	16 16	6	0.8	1.03	BS BS RE
FMR		RDKT	10T3M0-MM 1204M0-MM	•	5	10 12	3.97 4.76	5	-	RE S

*: Standard insert shape

✓ Stock items

				Coated Dimension (mm)							
Туре	Picture		Designation	PC9540	APMX /INSL	IC/W ₁	S/S1	RE	BS	Geometry	
= 5		RPMT	1204M0E-ML2	•	6	12	4.76	6	-		
itive			1204M0E-ML3	•	6	12	4.76	6	-		
Future Mill P-positive	- RPMT-MM*		1204M0E-ML4	•	6	12	4.76	6	-	+ 18 10	
교관	RPMT-MM*		1204M0E-MF	•	6	12	4.76	6	-	RE	
		DULLY	1204M0S-MM	•	6	12	4.76	6	-		
RMR	0	RNMX	1204M0E-ML	•	6	12	4.75	6	-	RE BS S	
		SAGX	140808ANER-ML	•	5.5	14	6.56	0.8	1.21		
RM8-X	SAGX-MM*		140808ANER-MM	•	5.5	14	6.56	0.8	1.21	IC RE BS	
		SNMX	1206ANN-MF	•	6	12.7	6.35	8.0	1.56		
		1206	1206ENN-MF	•	9	12.7	6.35	1	1.32		
RM8			1206QNN-MF	•	11.5	12.7	6.35	8.0	1.394		
~			1206ANN-MM		RE						
	SNMX-MM*		1206ENN-MM	•	9	12.7	6.35	1	1.32	IC S1	
			1206QNN-MM	•	11.5	12.7	6.35	8.0	1.394		
		SQMT	120516R-ML	•	1.5	12	5	1.6	-	IC IC	
5				120516R-MF	•	1.5	12	5	1.6	-	Connect Connec
HQM			140520R-ML	•	2	14	5.6	2	-		
	SQMT-MF*		140520R-MF	•	2	14	5.6	2	-	RE APMX S	
		TNKT	110508PEER-ML	•	8	8	4.5	0.8	1.3		
ਛ			160608PEER-ML	•	11.5	11.7	5.5	0.8	1.5		
<u>e</u>			200708PEER-ML								
Triple Mill	TNKT-ML*		160608PESR-MM	•	11.5	11.7	5.53	0.8	1.5	IC BS S	
		WNGX	040304PNER-ML	•	4.3	7	3.46	0.4	1.6	In s	
			080604PNER-ML	•	8.2	13	6.4	0.4	4.1		
RM6			080608PNER-ML	•	8.2	13	6.4	0.8	3.7		
6	WNGX-MM*		080608PNSR-MM	•	8.2	13	6.4	0.8	3.7	APMX BS RE	
		WNMX	09T316ZNN-ML	•	1.5	9.525	3.97	1.6	1.7		
			130520ZNN-ML	•	2	12.7	5.56	2	2.5		
HRMD	WNMX-MM*		130520ZNN-MM	•	2	12.7	5.56	2	2.5	RE S1	

^{*:} Standard insert shape

✓ Stock items

				Coated	Coated Dimension (mm)					
Туре	Picture		Designation	PC9540	APMX /INSL	IC/W1	S/S1	RE	BS/D1	Geometry
•		XNKT	060405PNER-ML	•	5.5	6.5	4	0.5	1.3	
			080508PNER-ML	•	8	10	5.5	0.8	2.2	
			120608PNER-ML	•	12	12	6.5	0.8	2.76	
RM3			060405PNSR-MM	•	5.5	6.5	4	8.0	1.1	APMX
_	XNKT-MM*		080508PNSR-MM	•	8	10	5.5	8.0	2.2	
			120608PNSR-MM	•	12	12	6.5	8.0	2.76	BS RE S
		XNMX	060608-ML	•	14.67	14	6	0.8	-	FEE .
4			0606XNR-ML	•	14.67	14	6.5	8.0	0.98	
RM14										IC SI
		SPMT	040204-PD	•	-	4.7	2.4	0.4	2.3	
			050204-PD	•	-	5.1	2.4	0.4	2.3	
			060205-PD	•	-	6.2	2.5	0.5	2.5	RE_
			07T208-PD	•	-	7.5	2.8	0.7	2.8	
			090308-PD	•	-	9.2	3.3	8.0	3.4	
			11T308-PD	•	-	11	4	8.0	4	IC S
			130410-PD	•	-	13	4.5	1	4.5	
=			15M510-PD	•	-	15.2	5	1	5.5	
KING Drill			180510-PD	•	-	18.2	5.5	1	6	
K		XOMT	040204-PD	•	-	4.9	2.4	0.4	2.3	
			050204-PD	•	-	5.4	2.4	0.4	2.3	
			060204-PD	•	-	6.6	2.5	0.4	2.5	RE
			07T205-PD	•	-	7.8	2.8	0.5	2.8	
			090305-PD	•	-	9.6	3.3	0.5	3.4	
			11T306-PD	•	-	11.4	4	0.6	4	S
			130406-PD	•	-	13.6	4.5	0.6	4.5	
			15M508-PD	•	-	15.9	5	8.0	5.5	
			180508-PD	•	-	18.9	5.5	8.0	6	

*: Standard insert shape

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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