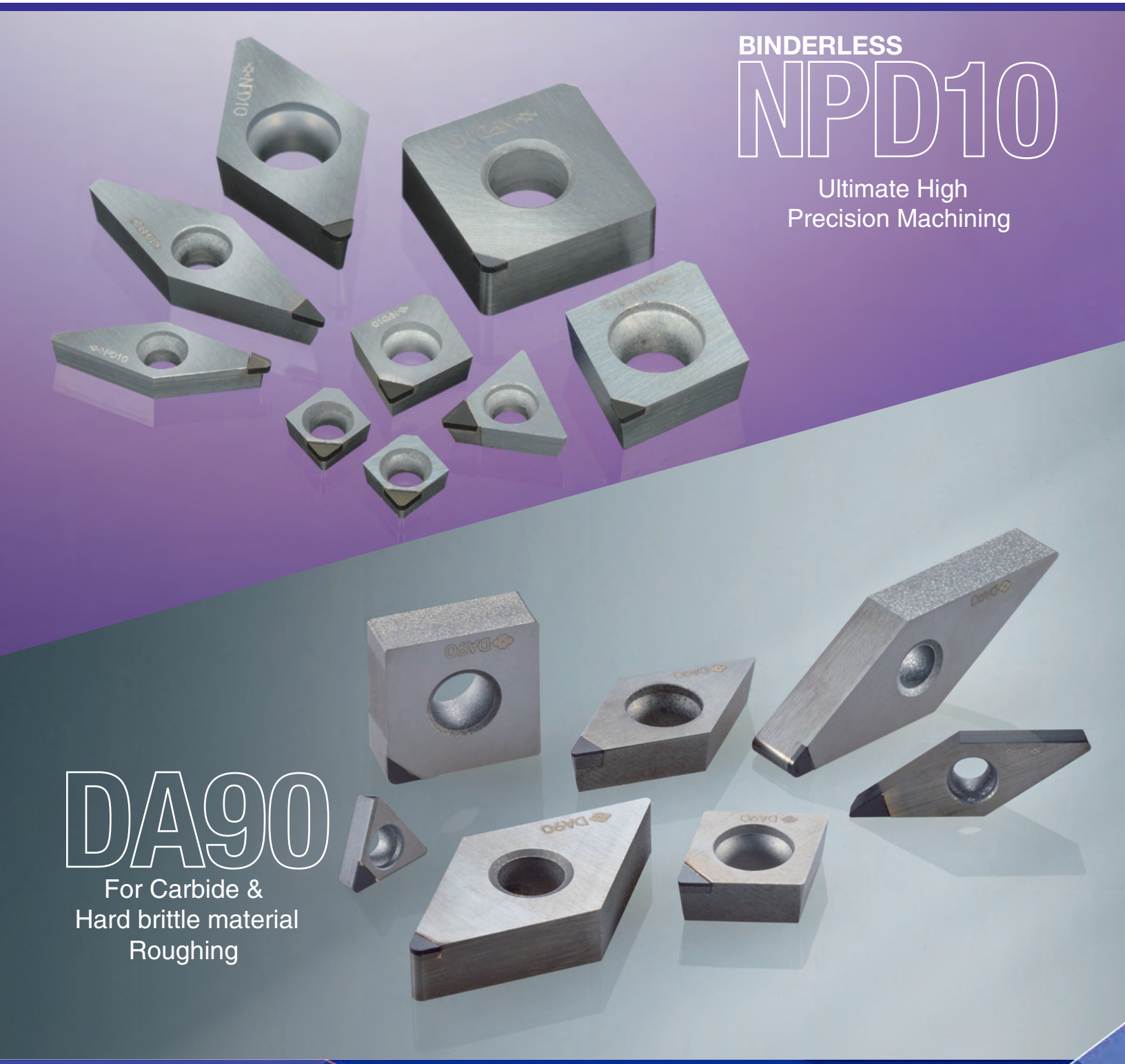
CAT.NPD10DA90.03/19

SUMITOMO
CARBIDE - CBN - DIAMOND

PCD tool for
Carbide & hard brittle material turning

BINDERLESS NPD10 / DA90



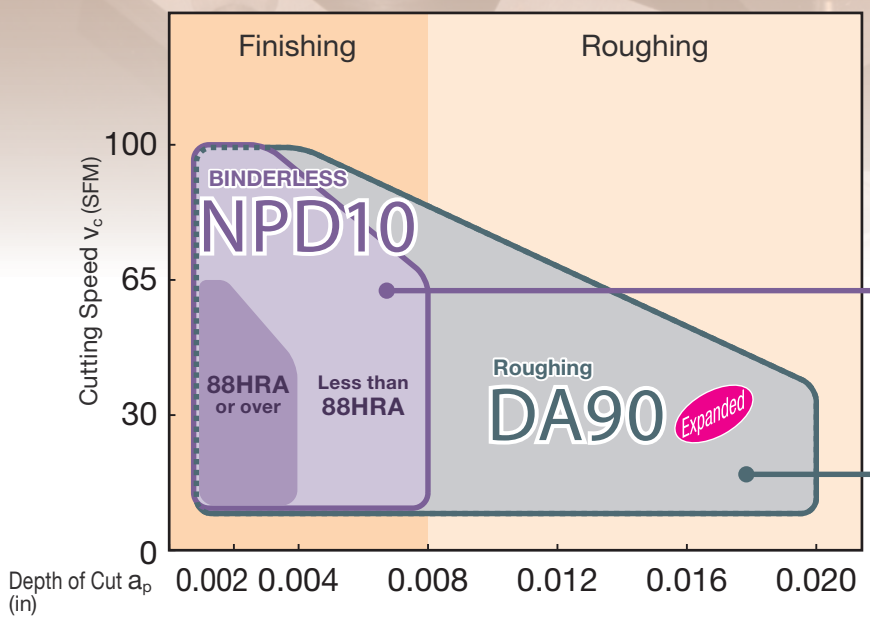
P M K N S H Cemented Carbide Brittle Materials

SUMITOMO
ELECTRIC
GROUP

BINDERLESS

NPD10/DA90

●Application Range (Carbide)



● NPD10

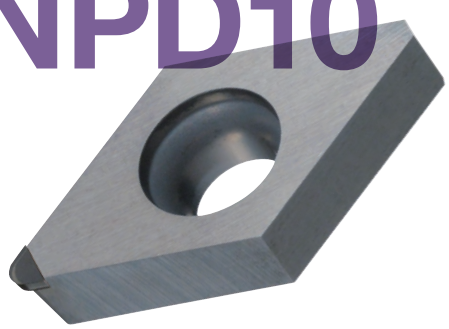
Shows excellent wear resistance and presents dimentional changes under finishing conditions of the carbide machining.

● DA90 Expanded

Achieves stable tool life for rough machining of carbide.

BINDERLESS

NPD10



Adopts Nano-polycrystalline Diamond for the cutting edge, which is binder-less, isotropic and harder than single crystal diamond.
Achieves long tool life and improved machining accuracy for carbide and hard brittle material machining compared to conventional diamond tools.

Best suited for finish machining of carbide and hard brittle material

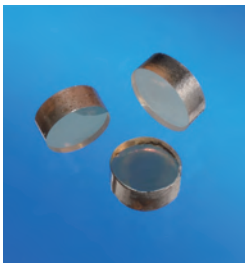
Achieves high precision machining of carbide with nano-polycrystalline diamond, which has excellent wear resistance.

Maintains excellent dimensional accuracy over long periods

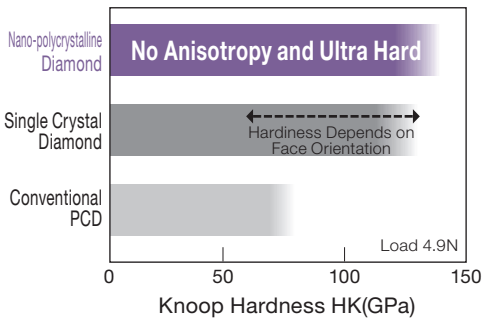
Greatly reduces the number of times that the tool must be indexed compared to previous diamond tools, improving work efficiency and reducing total cost.

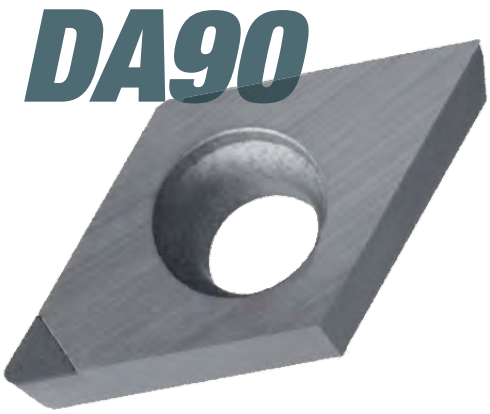
●Nano-polycrystalline Diamond

Nano-polycrystalline Diamond is a polycrystalline diamond that directly binds nanometer-level diamond particles at high strength without using binders. It is harder than single-crystal diamond and has no cleavability. Therefore, it enables machining of hard brittle materials such as carbides and enables new machining methods.



●Hardness





A grade made by sintering rough-grained diamond which contains the highest amount of diamond, has excellent wear resistance for rough machining of carbide and hard brittle material.
Achieves high cost performance as same performance as before through optimal design and development of mass production technology.

Best suited for rough machining of carbide and hard brittle material

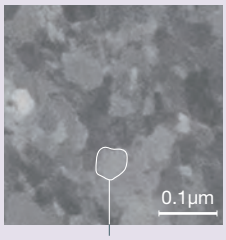
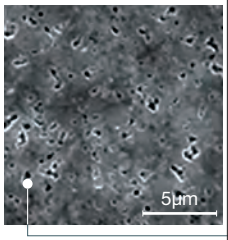
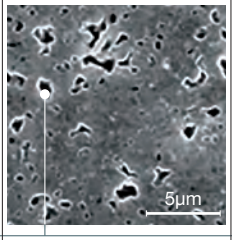
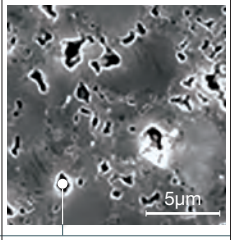
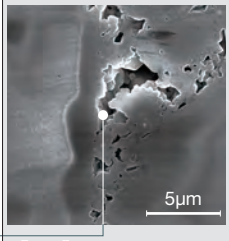
Achieves stable tool life for rough machining of carbide and hard brittle material by the excellent wear resistance of rough-grained polycrystalline diamond.

Adopting NF Inserts

Achieves high cost performance as same performance as before through optimal design and development of mass production technology.

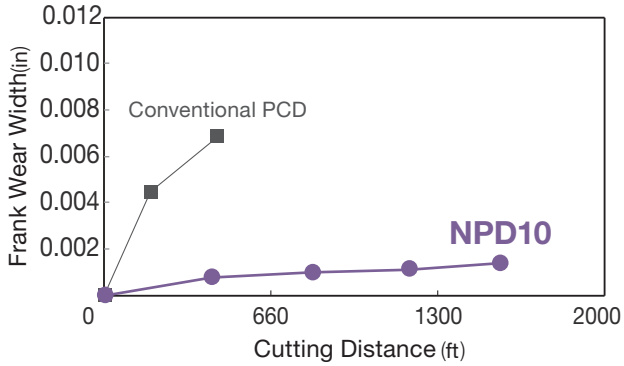
Expand stock items for carbide and hard brittle materials machining

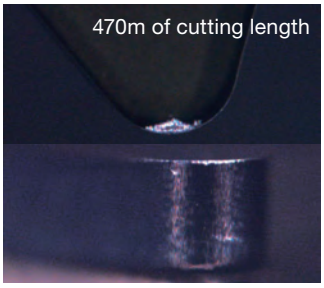
Grade line up

Grade	NPD10	DA1000	DA2200	DA150	DA90
Microstructure	 Diamond grain				
		Cavity which was made by some melted ombination materials with acid treatment.			
Bonding Material	–	Co	Co	Co	Co
Grain Size (μm)	less than 0.05	less than 0.5	0.5	5	50
CBN Content (%)	100	90 to 95	85 to 90	85 to 90	90 to 95

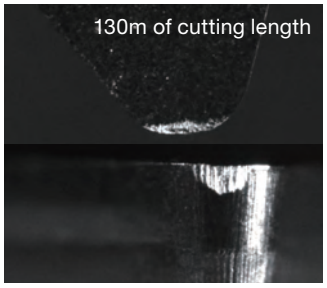
●Wear Resistance of NPD10

NPD10 shows excellent wear resistance.





NPD10 (V_B=0.001in)

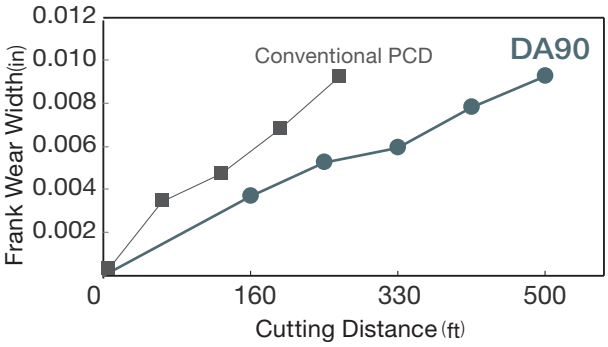


Conventional PCD (V_B=0.007 in)

Part Material : Carbide (87HRA), Insert : DCMA32.51RH
Cutting Conditions: v_c= 66 SFM, f= 0.004 IPR, a_p=0.004 in Dry

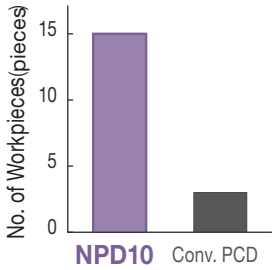
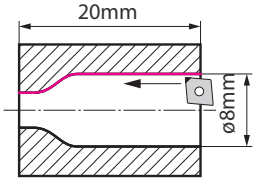
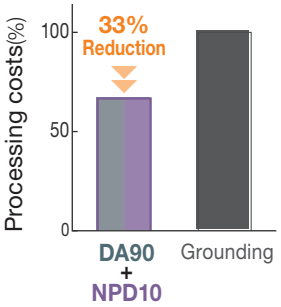
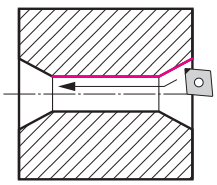
●Wear Resistance of DA90

DA90 shows excellent wear resistance under rough machining conditions.



Part Material : Carbide (87HRA)
Insert : NF-DCMA21.51
Cutting Conditions: v_c= 66 SFM, f= 0.004 IPR, a_p=0.008 in Wet

●Application Examples

Carbide Machining VC40 (89HRA) Die Metal Mold	Carbide Machining VM30 (91HRA) Die Metal Mold
NPD10 achieved more 5 times longer tool life than comventional PCD.  	Reduced processing costs 33% by applying DA90 for roughing and NPD10 for finishing.  
Insert : CCMW04X104RH (NPD10) Internal turning Cutting Conditions: v_c= 50 SFM f=0.0006 IPR a_p=0.003 in Dry	Insert : Rough NF-CCMA21.50.5 (DA90) Internal turning Finishing CCMA21.50.5RH (NPD10) Internal turning Cutting Conditions: Rough v_c= 66 SFM f= 0.004 IPR a_p=0.004 in Dry Finishing v_c= 66 SFM f= 0.004 IPR a_p=0.008 in Dry

●Stock Items of NPD10

Negative Insert

Shape	Cat. No.	Stock NPD10	Cutting Edge Length	Dimensions (mm) Inscribed Circle	Thickness	Hole	Nose Radius
	DNMA 432RH	★	1.8	12.7	4.76	5.16	0.8
	433RH	★	1.8				1.2
	SNMA 432RH	★	1.7	12.7	4.76	5.16	0.8
	433RH	★	1.7				1.2
	VNMA 432RH	★	1.8	9.525	4.76	3.81	0.8
	433RH	★	1.5				1.2

Positive Insert

Shape	Relief angle	Cat. No.	Stock NPD10	Cutting Edge Length	Dimensions (mm) Inscribed Circle	Thickness	Hole	Nose Radius
	7°	CCMA 03X102RH	★	1.3	3.5	1.4	1.9	0.2
		03X104RH	★	1.3				0.4
		CCMA 04X102RH	★	1.7	4.3	1.8	2.3	0.2
		04X104RH	★	1.7				0.4
		CCMA 21.50.5RH	★	1.7	6.35	2.38	2.8	0.2
		21.51RH	★	1.7				0.4
		CCMA 32.50.5RH	★	1.7	9.525	3.97	4.4	0.2
		32.51RH	★	1.7				0.4
		32.52RH	★	1.6				0.8
	7°	DCMA 21.50.5RH	★	2.1	6.35	2.38	2.8	0.2
		21.51RH	★	2.0				0.4
		DCMA 32.50.5RH	★	2.1	9.525	3.97	4.4	0.2
		32.51RH	★	1.9				0.4
		32.52RH	★	1.6				0.8
	11°	TPMA 630.5RH	★	1.2	4.76	2.38	2.3	0.2
		631RH	★	1.0				0.4
		TPMA 220.5RH	★	1.5	6.35	3.18	3.4	0.2
		221RH	★	1.3				0.4
		222RH	★	1.0				0.8
		TPMA 330.5RH	★	2.2	9.525	4.76	4.4	0.2
		331RH	★	2.0				0.4
		332RH	★	1.6				0.8
	7°	VCMA 080201RH	★	2.2	4.76	2.38	2.3	0.1
		080202RH	★	1.9				0.2
		080204RH	★	1.5				0.4
		VCMA 220.5RH	★	2.1	6.35	3.18	2.8	0.2
		221RH	★	1.7				0.4
		VCMA 330.5RH	★	2.1	9.525	4.76	4.4	0.2
		331RH	★	1.7				0.4
		332RH	★	1.8				0.8
		333RH	★	1.5				1.2

Shape of a rounded corner is cylindrical.

●Stock Items of DA90

Negative Insert

Shape	Cat. No.	Stock DA90	Cutting Edge Length	Dimensions (mm) Inscribed Circle	Thickness	Hole	Nose Radius
	NF-DNMA 432	★	2.0	12.7	4.76	5.16	0.8
	433	★	2.0				1.2
	NF-SNMA 432	★	2.4	12.7	4.76	5.16	0.8
	433	★	2.4				1.2
	NF-VNMA 432	★	1.9	9.525	4.76	3.81	0.8
	433	★	1.7				1.2

★ : Standard Stocked Item

Positive Insert

Shape	Relief angle	Cat. No.	Stock DA90	Cutting Edge Length	Dimensions (mm) Inscribed Circle	Thickness	Hole	Nose Radius
	7°	NF-CCMA 03X102	★	1.1	3.5	1.4	1.9	0.2
		03X104	★	1.1				0.4
		NF-CCMA 04X102	★	1.5	4.3	1.8	2.3	0.2
		04X104	★	1.5				0.4
		NF-CCMA 21.50.5	★	2.4	6.35	2.38	2.8	0.2
		21.51	★	2.4				0.4
		NF-CCMA 32.50.5	★	2.4	9.525	3.97	4.4	0.2
		32.51	★	2.4				0.4
		32.52	★	2.3				0.8
	7°	NF-DCMA 21.50.5	★	2.6	6.35	2.38	2.8	0.2
		21.51	★	2.4				0.4
		NF-DCMA 32.50.5	★	2.6	9.525	3.97	4.4	0.2
		32.51	★	2.4				0.4
		32.52	★	2.0				0.8
	11°	NF-TPMA 630.5	★	2.5	4.76	2.38	2.3	0.2
		631	★	2.4				0.4
		NF-TPMA 220.5	★	2.5	6.35	3.18	3.4	0.2
		221	★	2.4				0.4
		222	★	2.1				0.8
		NF-TPMA 330.5	★	2.5	9.525	4.76	4.4	0.2
		331	★	2.4				0.4
		332	★	2.1				0.8
	7°	NF-VCMA 080202	★	3.2	4.76	2.38	2.3	0.2
		080204	★	2.8				0.4
		NF-VCMA 220.5	★	3.2	6.35	3.18	2.8	0.2
		221	★	2.8				0.4
		NF-VCMA 330.5	★	3.7	9.525	4.76	4.4	0.2
		331	★	3.3				0.4
		332	★	2.4				0.8
		333	★	2.1				1.2

Shape of a rounded corner is cylindrical.

SUMITOMO

CARBIDE - CBN - DIAMOND

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