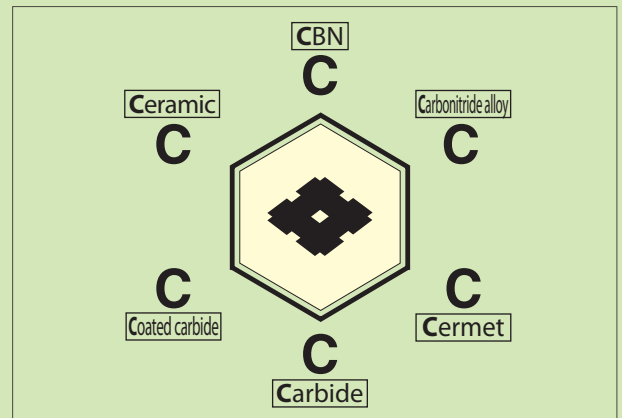
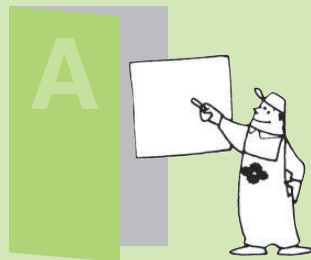


Grades

A1 to A35

A

A
Grades



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Selection of Sumitomo Grades (Turning)

Selection Guide by Work Material and Cutting Process



A
Grades

Cutting Process	P General Steel (Carbon Steel, Alloy Steel), Soft Steel						M Stainless Steel						K Cast Iron				
	Wear Resistance ← Fracture Resistance						Wear Resistance ← Fracture Resistance						Wear Resistance ← Fracture Resistance				
ISO Classification	—	P01	P10	P20	P30	P40	—	M01	M10	M20	M30	M40	—	K01	K10	K20	K30
Coated Carbide		AC810P ^C						AC6020M ^{New}						AC405K ^C			
			AC8025P ^{New}						AC6030M						AC415K ^C		
			AC820P ^C					AC610M	AC630M							AC420K ^C	
					AC830P ^C				AC830P	AC520U	AC530U					AC8025P ^{New}	
 A24																	
 A22			AC1030U ^{New}							AC1030U ^{New}					AC1030U ^{New}		
Coated Cermet		T1500Z ^P															
			T3000Z ^P														
 A27																	
Cermet		T1000A						T1000A						T1000A			
			T1500A						T1500A								
 A27																	
Carbide			ST10P	ST20E	A30												
	 A28																
Ceramic														NB90S			
	 A34																
Uncoated CBN																	
Coated CBN																	
 A30																	

Cutting Process	S Exotic Alloy					H Hardened Steel					N Non-Ferrous Metal					Sintered Components				
	Wear Resistance ← Fracture Resistance					Wear Resistance ← Fracture Resistance					Wear Resistance ← Fracture Resistance					Wear Resistance ← Fracture Resistance				
ISO Classification	—	S01	S10	S20	S30	—	H01	H10	H20	H30	—	N01	N10	N20	N30	—	01	10	20	30
Coated Carbide A24		AC510U																		
			AC520U																	
Cermet A27																				
Carbide A28																				
Ceramic A34																				
Coated CBN A30																				
Uncoated CBN A30																				
PCD A32																				

A2

1st Recommendation 2nd Recommendation CVD Coating PVD Coating Blank: Uncoated



Selection of Sumitomo Grades (Milling)







A
Grades

Cutting Process	P General Steel (Carbon Steel, Alloy Steel), Soft Steel						M Stainless Steel						K Cast Iron				
	Wear Resistance ← Fracture Resistance						Wear Resistance ← Fracture Resistance						Wear Resistance ← Fracture Resistance				
ISO Classification	—	P01	P10	P20	P30	P40	—	M01	M10	M20	M30	M40	—	K01	K10	K20	K30
Coated Carbide A24			ACP100					ACM100						ACK100			
				ACP200					ACM200						ACK200		
					ACP300			ACK300			ACM300						ACK300
								ACP300									
Cermet A27			T250A						T250A								
					T4500A					T4500A							
Carbide A28					A30N						A30N				G10E		
Ceramic A34														NB90M			
Uncoated CBN Coated CBN A30																BNS800	
																BN7000	

Cutting Process	S Exotic Alloy						H Hardened Steel					N Non-Ferrous Metal				
	Wear Resistance ← Fracture Resistance						Wear Resistance ← Fracture Resistance					Wear Resistance ← Fracture Resistance				
ISO Classification	—	S01	S10	S20	S30	S40	—	H01	H10	H20	H30	—	N01	N10	N20	N30
Coated Carbide A24		ACM100												DL1000		
			ACM200													
				ACM300												
		ACK300														
Carbide A28				EH520											H1	
Uncoated CBN A30									BN7000							
								BN350								
PCD A32															DA1000	




Grade Comparison Chart

Coated Carbide

Application	Work Materials	Classification	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	Mitsubishi Hitachi	NTK	Sandvik	Kennametal	SECO Tools	WALTER	ISCAR	TaeguTec
Turning		P05	AC810P	UE6105	T9105	CA510	HG8010		GC4305 GC4205	KCP05 KC9105	TP0501 TP0500	WPP05S WPP05	IC8005 IC428	TT8115
		P10	AC810P	MC6015 UE6110	T9115	CA515	HG8010	TM1.VM1 CP7.DT4 DM4	GC4315 GC4215	KCP10 KC9110	TP1501 TP1500	WPP10S WPP10	IC8150 IC9015	TT8115
		P20	AC8025P AC820P	MC6025 UE6020	T9125	CA525	IP2000 HG8025 GM25	TM1.VM1 CP7.QM3	GC4325 GC4225	KCP25 KC9125	TP2501 TP2500	WPP20S WPP20	IC8250 IC9015	TT8125 TT5100
		P30	AC830P AC630M	MC6035 UE6035 VP15TF	T9135	CA530	IP3000 GM8035	TM4 QM3	GC4235	KCP30 KC9140	TP3500	WPP30S WPP30	IC8350 IC8025	TT8135 TT7100
		P40	AC830P AC630M	UE6035 UH6400	T9135	PR660	IP3000 GM8035	QM3	GC4235	KC9140	TP3500	WTN53	IC8350 IC8025	TT8135 TT7100
		M10 S10	AC610M AC6020M AC510U	MC7015 US7020 MP9005 US905 VP05RT VP10RT	T9115 AH110 AH905 AH8005	CA6515 PR915 PR1025 PR1215 PR1225 PR1305 PR1310	IP050S IP100S	TM1 VM1 DT4 DM4 ZM3	GC2015 GC1105 GC1115	KCM15 KC5510 KCU10	TS2000	WSM10 WSM10S	IC807 IC8025 IC907	TT9215 TT5080
		M20 S20	AC6020M AC6030M AC610M AC520U	MC7025 US7020 MP9015 VP20MF UP20M	T6120 T6020 T9125 AH630 AH120 AH725 AH8015	CA6525 PR915 PR930 PR1025 PR1125 PR1215 PR1225 PR1325	IP100S HG8025	DT4 DM4 ZM3 QM3 TM4	GC2025 GC1125	KCM25 KC5525 KCU25 KC5020	TP2501 TP2500 TM2000 TS2500	WMP20S WSM20 WSM20S	IC808 IC8080 IC908	TT9225 TT9080 TT9020
		M30	AC6030M AC6040M AC630M AC830P AC1030U	MC7025 MP7035 US735 VP15TF VP20MF MS6015	AH725 T6130 T6030 AH630 AH645	CA6525 PR1125 PR1535	GM8035 GX30	QM3 TM4 DT4 DM4	GC2035	KCM35 KC9240	TP3500 TM4000	WSM30 WSM30S	IC8080 IC830	TT9235 TT8020
		M40	AC6040M AC530U	MP7035 US735 VP15TF MS6015	AH645	PR1125 PR1535	GX30	QM3.TM4 DT4.DM4	GC235		TM4000		IC830 IC928	TT8020
		K05	AC405K	MC5005 UC5105 UC5115	T5105 T5115	CA4505 CA4010	HG3305 HX3305		GC3205	KCK05	TK1001 TK1000	WKK10S WAK10	IC5005	TT7005
		K10	AC415K	MC5005 UC5015 UC5105 UC5115	T515 T5115 T5125	CA4505 CA4515 CA4115	HX3305 HG3305 HG3315 HX3315	CP1	GC3210	KCK15	TK1001 TK1000	WKK10S WKK20S WAK10 WAK20	IC5010 IC5100	TT7015 TT7310
		K20	AC420K	MC5015 UC5115 VP15TF UE6110	T5125 T9125	CA4515 CA4120 CA4115	HX3315 HG3315 HG8010		GC3215	KCK20	TK2001 TK2000	WKK20S WAK20 WAK30	IC8150	
Milling		P10	ACP100	FH7020 F7030	T3130 T3030		JP4005 JP4105 JP4020 JP4115 JP4120		GC4220 GC4230	KC715M KC930M KC935M KCPK10	T250M T350M MP1500 MP2500	WKP25S WKP25 WPP20 WKP35S	IC4100 IC520M IC4050 DT7150 IC903	TT7080 TT7030
		P20	ACP200	MV1020 VP15TF VP20RT MP6120	AH9030 AH120 AH725	PR1525 PR1225 PR830	JS4045 GX2140	TM1 DT4 DM4	GC1010 GC1025 GC2040 GC4240	KTPK20 KCPM20 KCU25	MP3000 F25M F30M	WSM20	IC808 IC810 IC380	TT9080 TT9030
		P30	ACP300	VP30RT MP6130	AH3035 AH130 AH140 SH730	PR1525 PR1230	JS4060 JX1045 JX1060 CY150 CY250	ZM3	GC1030 GC1130 GC2030	KCPK30 KCPM30 KC725 KC730 KC735 KC7140 KCU40	MM4500 F40M	WSM30 WSM35 WSP45S WSP45	IC830 IC928 IC330	TT8080 TT8020 TT7800
		M10	ACM100 ACK300			PR1025 PR1225	JX1020 CY9020 JP4020 JP4120		GC1025 GC1030 GC1130	KC522M			IC903	
		M20	ACM200	F7030 VP15TF VP20RT MP7130 MP9120	GH330 AH330 AH120 AH130	PR1525 PR1025 PR1225	JX1015 CY150 CY15	DT4 DM4	GC2030	KC730M KC525M KCU25	F25M F30M MS2050	WSM35 WSM35S WXM35	IC908 IC928	TT9080 TT9030
		M30	ACM300	F7030 VP30RT MP7030 MP7140 MP9130	AH130 AH140	CA6535 PR1535	JX1045 JX1060 GX2160 JM4060 JM4160	ZM3	GC2040	KC994M KC725M KC7140 KCU40	F30M F40M	WSM35 WSM35S WXM35	IC328 IC330 IC830	TT8080 TT8020
		K20	ACK200	MV1020 MC5020 F5010 F5020	T1115	PR905	JP4020 JP4120		GC3330 GC3220 GC3020 GC3040 K15W K20D K20W GC3330	KCK15 KCK20 KC915M KC930M KC935M KCPK10	MK1500 MK3000 T150M	WAK15 WKK25 WKP25S	IC5100 DT7150	TT6800
		K30	ACK300	VP15TF VP20RT	AH725 AH120 AH110 AH330 GH110 GH130	PR1510 PR1210	GX2140 JS4045 JX1045 CY150 CY250		GC1010 GC1020 GC1025 GC1030 GC1130	KTPK20 KCPK30 KC510M KC520M KC525M KCU40	MK2500 MK2000 MK2050 MH1000	WKP35S WPP20	IC830 IC810 IC908 IC910 IC928 IC950	TT6080





Grade Comparison Chart

Cermet




Application	Work Materials	Classification	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	Mitsubishi Hitachi	NTK	Sandvik	Kennametal	SECO Tools	WALTER	ISCAR	TaeguTec
Turning		P10	T1000A T110A	AP25N* NX2525	GT720* NS520	TN30,PV30* TN6010,TN610 PV710*,PV7005* PV7010*	CZ25*	Q15* Z15* T15 C7Z*	CT5015	KT125 HTX KT1120			IC20N IC520N	PV3030 PV3010 CT3000
		P20	T1500A T1500Z* T2000Z*	AP25N* NX2525 NX3035	NS530 GT530* NS730 GT730* NS9530 GT9530*	TN60 TN6020 PV60* PV7020* PV7025*	CH550	T15 C7Z* C7X	GC1525*	KT6215 KT315* KT175 KT5020*	CM CMP C15M TP1020		IC30N IC530N	CT7000
		P30	T3000Z*	NX3035 MP3025*		PV7025* PV90*		N40 C7X						
		K10	T1000A T110A	AP25N* NX2525	GT720* NS520	TN30 PV30* TN6010* PV7010*			CT5015	KT125 HTX				PV3030 CT3000
Milling			T250A T4500A	NX4545 VP45N*	NS540 NS740	TC60M TN100M	MZ1000* MZ2000* MZ3000* CH7030 CH7035		CT530	KT530M*	C15M		IC30N	

★ Coated Cermet

Carbide

Work Materials	Classification	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	Mitsubishi Hitachi	NTK	Sandvik	Kennametal	SECO Tools	WALTER	ISCAR	TaeguTec
	P10	ST10P				WS10		S1P					
	P20	ST20E	UTi20T	UX30		EX35		SMA	K125M			IC07 IC50M	
	P30	A30 A30N	UTi20T	UX30	PW30	EX40		SM30				IC54 IC28	
	P40	ST40E				EX45		S6				IC54 IC28	
	M10	U10E EH510				WA10B		H10A	KU10,K313 K68,KYSM10	890		IC07,IC20 IC08	
	M20	U2 EH520	UTi20T	UX30				H13A	K313 K68	HX 883		IC07,IC20 IC08	
	M30	A30 A30N	UTi20T	UX30				H10F SM30				IC28	
	K01	H2 H1	HTi05T			WH01 WH05			KU10,K313 K68,K115M			IB50,IB85 IS8	
	K10	H1 EH10 EH510	HTi10	TH10	KW10 GW15	WH10	KM1	H13A	KU10,K313 K68,K115M K110M KY3500	890		IB50,IB85 IB55,IB90 IC20,IS8	
	K20	G10E EH20 EH520	UTi20T	UX30	GW25	WH20	KM3	H13A	KMF KY3500 KYHS10	890 883 HX		IC20 IS8	
	K30	G10E	UTi20T			WH30			KY3500	883			
	—	EH510 EH520	RT9005 RT9010 MT9015 TF15	TH10 KS20	SW05,SW10 SW25,KW10 GW15	WH10		H10A H10F H13A	KU10,K313 K68,KMF K110M,KYHS10 K1025(KMF)	HX H25		ID5,IB85 IC20,IC07 IC08,IC28	
	Fine-grained Carbide	F0	SF10,MF07 MF10	F,MD1508 MD08F		NM08						IC07	
		F1,AFU XF1	HTi10 MF20	M,MD10 MD05F,MD07F	FW30	NM15		6UF,8UF PN90,H6FF		890		IC07	
		AF0,AF1 SF2	TF15 MF30	EM10,MD20 MD15		BRM20 EF20N		12UF		890 883		IC08	
		A1		UM		NM25		N6F H10F		883		IC08	

Ceramic

Work Materials	Sumitomo Electric	Tungaloy	Kyocera	NTK	Sandvik	Kennametal	TaeguTec
	NB100C	WG300 LX11	A66N A65 KT66	HC4,HC7 ZC7,WA1	GC6050 CC650 CC670	KY1615 KY4300	AB20 AB2010
	WX120	WG300	CF1	WA1 SX9	CC6060 CC6065 CC670	KY4300 KY1540	TC430 AS20
	NB90S	LX11,LX21 CXC73,FX105 CX710	A65,A66N KA30,KS500 KS6000,KT66	HC1,HW2,HC2,HC6 HC7,WA1,SX1,SX2 SP2,SX9,SX8	CC620,CC650 CC6090 GC1690	KY1615,KY1310 KY1320,KY3500 KY4300	AW120,AB30 AS500,AS10 SC10

(Note) The data on pages A4 and A5 was collected from the various published catalogues therefore the information may not be updated.

A

Grades

Grade Comparison Chart

■ CBN

Work Materials	Classification	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	NTK	Chukyo	Sandvik	Kennametal	SECO Tools
<div>A</div> <div>Grades</div> <div>K Cast Iron</div>	K01	BNC500* BN7000 BN500	MB710 MB5015	BX910 BX930 BX870	KBN475 KBN60M	B30 B16		CB50 CB7525	KB1340	
	K10	BN7000 BN500	MB710,MB5015 MB4020	BX470,BX480 BX950	KBN60M KBN900	B23 B16	HB55,HB569 HB580,HB57	CB7925		CBN200,CBN300 CBN300P,CBN400C
	K20	BN7000 BNS800	MB730,MB4020 MBS140	BX470,BX480 BXC90,BX90S	KBN900		HB56,HB569 HB580,HB57			
	K30	BNS800	MBS140	BXC90 BX90S			HB57		KB5630	CBN500
<div>S Exotic Alloy</div>	S01	BN7000	MB730 MB4020	BX940 BX950 BX470 BX480			HB55 HB580 HB52		KB5630 KB1340	
<div>H Hardened Steel</div>	H01	BNC2010 BNC100 BN1000 BN2000 BNX10	BC8105 BC8110 MBC010 MB810	BXM10 BX310	KBN05M KBN10M KBN510	B5K B52	HB55 HB550 HB580		KB5610	CH0550 CBN10 CBN100 CBN060K
	H10	BNC2010 BNC2020 BNC160 BNC200 BN2000	BC8110 BC8120 MBC020 MB8025 MB825	BXM10 BX330	KBN05M KBN25M KBN525	B5K B6K B52 B36	HB55 HB59 HB550 HB580 HB52	CB7015 CB20	KBH20 KB5610 KB5625	CBN10 CBN100 CBN150 CBN060K CBN160C
	H20	BNC2020 BNC200 BNX20	BC8120,BC8020 MBC020 MB8025	BXA20 BXM20 BX360	KBN30M KBN35M KBN900	B36 B40 B6K	HB57,HB59 HB590 HB580	CB7025 CB50	KBH20 KB5625 KB5630	CH2540 CBN150 CBN160C
	H30	BNC300 BN350 BNX25	BC8130 MB835	BXM20 BXC50 BX380		B40	HB57 HB580	CB7525	KB5630	CH3515

* For cutting ductile cast iron

■ Polycrystalline Diamond

Work Materials	Classification	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	NTK	Chukyo	Sandvik	Kennametal	SECO Tools
<div>N Non-Ferrous Metal</div>	N01	DA1000 DA90	MD205	DX180 DX160	KPD001	PD1		CD05 CD10	KD1400	
	N10	DA1000 DA150	MD205 MD220	DX140 DX110	KPD001 KPD010 KPD230	PD2	HD100 HD30 HD60	CD1810	KD1400 KD1425	PCD05 PCD10
	N20	DA1000 DA2200	MD220 MD230	DX120 DX110	KPD230	PD2	HD100,HD30 HD50		KD1400 KD1425	PCD05 PCD20
	N30	DA1000 DA2200	MD2030 MD230	DX110			HD30,HD50 HD700 HD100		KD1400	PCD05 PCD30 PCD30M

(Note) The above data was collected from the various published catalogues therefore the information may not be updated.

Chipbreaker Comparison Chart

Negative

Work Materials	Application	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	Mitsubishi Hitachi	NTK	Sandvik	Kennametal	SECO Tools	WALTER	ISCAR	TaeguTec
<div>P</div> <div>Steel</div>	Fine Finishing	FA	FH	TF	GP			QF	FF	FF1		SF	
		FL,FB	FS,FY	NS,ZF	XP,XF,VF	FE	WM			FF2	FP5		FA
	Finishing	LU,FE	SA,SY	NM	PP,XQ,CQ	BE	ZF1	LC	FN		NF3		FG
		SU	SH	TS,TSF	HQ	CE,B,BH	UL, WV	XF,MF	CT	MF2		NF	FC
	Wiper Edge	LUW		AFW,FW	WP			WL,WP		W-FF2			
		SEW	SW	ASW,SW	WQ			WF,WMX	FW	W-MF2	NF	WF	WS
	Finishing to Light	SE,SX	LP	AS,ZM	CJ,XS	AB,CT	ZW1, WR	PF,KF	LF,33		MP3,NS6	F3P,TF	
	Medium	GU(UG)	MA,MV	TM,TQ	HS,PS	AH	ZP	XM,QM,PMC	P,MG	M3		GN	ML,MP,MC
		GE,UX	MH,MP	DM,AM	PQ,GS,PT,PG	AE,AY	Z5	PM,SM,KM,HM	MN,MP1		MP5,NM4,NM6	RF,LF	PC,MT
	Wiper Edge	GUW	MW					WM	MW,RW	W-M3,W-M3	NM	WG	WT
	Rough	MU,ME	RP,GH	TH,S	HT,GT,PH	RE,AR	G	PR,XMR,KR	RP	M5,MR7	RP5,NM9,RP7	M3P,NR	RT
		MX	HAS,MT	CH					RN	MR6			
	Heavy	HG	HZ,HX,HL	THS,TRS	PX,Standard	TE,UE		QR	RM,MR	R4,R5,M6	NR6,NRF	NM	RX
		HP	HH,HXD,HR	65				HR,SR	RH	R7,MR7	NR8	TNM	RH
		HU,HW	HV			H							HT,HD,HY
		HF	HCS	TUS		HX,HE		MR		RR9	NRR	R3P	HZ
<div>M</div> <div>Stainless Steel</div>	Finishing	SU,EF	LM,SH	SS	MQ,GU	SE,MP	ZF1	MF	FP,FS,LF	MF2	NF4		EA,SF
	Light to Medium	EX,EG	GM,MS	SF,SA	MS,MU	PV	ZP	23	MS	MF1,M1		TF,VL	EM
	Medium	GU	MM	SM		DE		MM,MMC,SMR	MP	MF3,M3	NM4	M3M,PP	ET
	Rough	HM	ES,1M,2M,HL	S					UP	MF4,MF5	NR4,RM5		VF
		EM,MU	RM,GH,HM	SH	TK			MR,MRR		M5,MR3,MR4		MR	SU
<div>K</div> <div>Cast Iron</div>	Light	UZ	LK,MA,MK	CM,CF	Standard,C	V,VA		KF	UN	M4	NM5	GN	MT
	Medium	GZ(UX)	GK,RK,GH	Standard,CH,33	ZS,GC	Y,RE		KM,KR,KRR		MR7	RK5,RK7		RT
<div>N</div> <div>Non-Ferrous Metal</div>	Finishing	AX		P	AH				MS				
<div>S</div> <div>Exotic Alloy</div>	Finishing	EF	LS,FJ	HRF				SF,SGF			NFT		
	Medium	EG,EX	MS,MJ	HMM,SA,HRM		VI		SM,SMC			NMT		
	Rough	MU	RS,GJ					SMR			NRT		
<div>H</div> <div>Hardened Steel</div>	Finishing	GH,FV *											
	Light	LV *											
	Carburized Layer Removal	SV *											

() indicates a discontinued item. ★ CBN/PCD tool chipbreakers

Positive

Work Materials	Application	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	Mitsubishi Hitachi	NTK	Sandvik	Kennametal	SECO Tools	WALTER	ISCAR	TaeguTec
<div>P</div> <div>Steel</div>	Finishing	FC	FJ,AM	01,JRP,JTS	CF,GF,VF		AZ7, AMX	UM		GT-F1	FM4		
		FB,LU (FP,FK)	FP,FM,FV,SQ	PSF,PF,23,SS,JSS	GP,XP,MP,PP,DP	JQ,MP	ZR	PF,UF,MF,KF,XF	11,UF,FP	FF1	FP4	PF	FA
	Wiper Edge	LUW	SW					WF	FW	W-F1	PF	WF	WT
<div>M</div> <div>Stainless Steel</div>		SDW						WK,WM	MW	W-F2		WG	
	Finishing to Light	SI	SMG	JS	CK		YL, 1L						SA
<div>K</div> <div>Cast Iron</div>	Light	LB,SU (SK,SF)	LP,LM,SV,MQ	PSS,PS,TS,TJS,CM	HQ,XQ,GK	JE	AZ8,AM3,AM5	PM,UM,MM,XM	LF	F1	MP4,MM4,FK6	SM,14	FG, PC
		SC			GQ,SK,Standard		AF1, CL		MP	MF2			
	Light to Medium	MU	MP,MM,MK,MV	PM				PR,UR,MR,KR,MMC,MPC,XR	MF	F2,M3,M5	PM5,RP4,RM4	19	MT
<div>N</div> <div>Non-Ferrous Metal</div>	Finishing	AG,AW,AY	AZ	AL,PP	AH			AL	HP	AL	PM2	AS,AF	FL
	Finishing to Light	LD *,GD *											
<div>H</div> <div>Hardened Steel</div>	Finishing	FV *											
	Light	LV *											

() indicates a discontinued item. ★ CBN/PCD tool chipbreakers

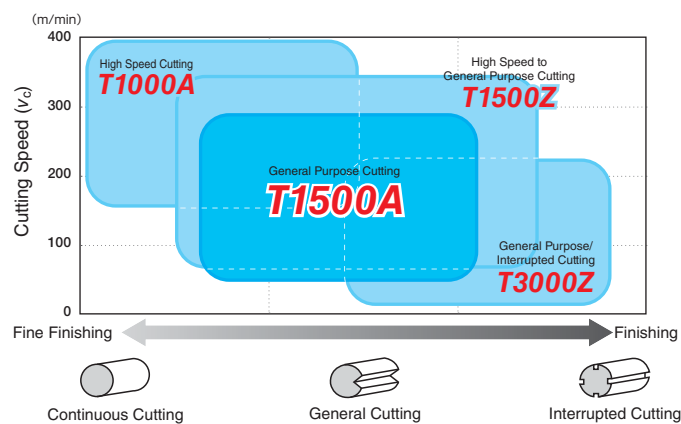
(Note) The above data was collected from the various published catalogues therefore the information may not be updated.

A

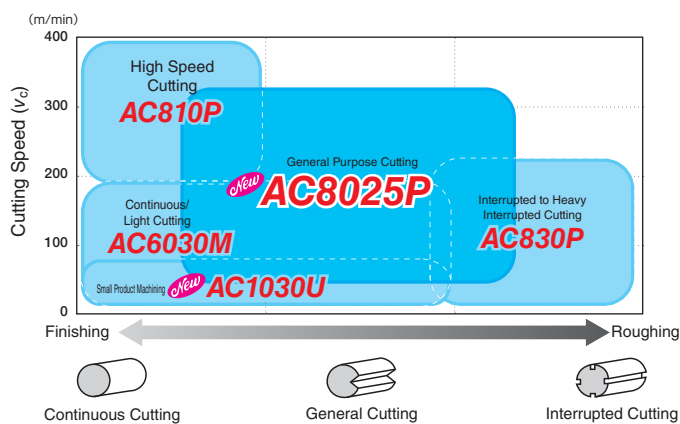
Grades

Grades

● Fine Finishing to Finishing

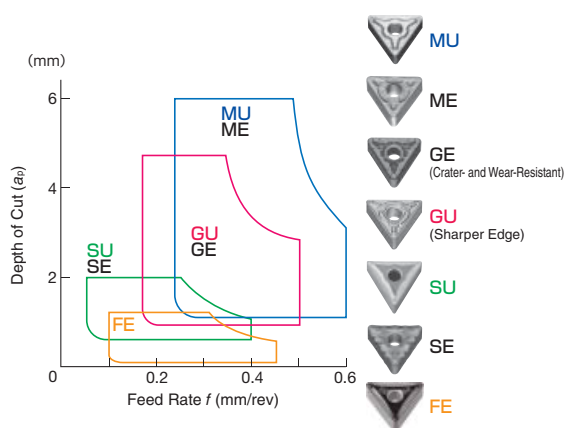


● Finishing to Rough Cutting

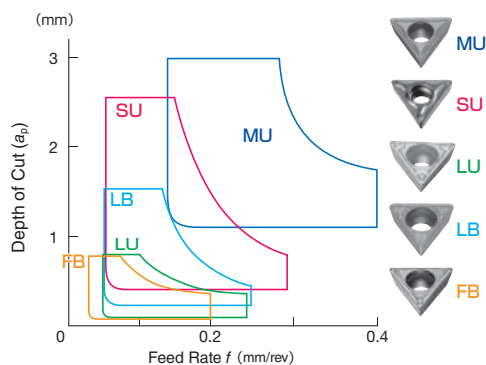


Main Chipbreakers

Negative Type

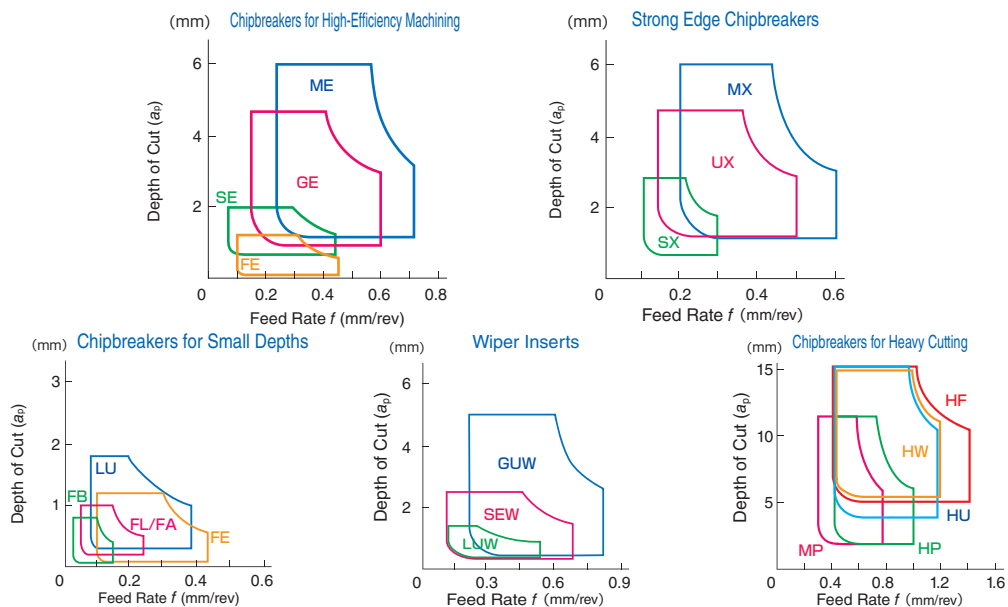


Positive Type



Sub-Chipbreakers

Negative Type



Representative Chipbreakers/ Recommended Cutting Conditions



Steel

Work
Material



Recommended Cutting Conditions

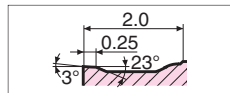
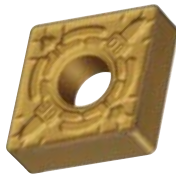
(Red text indicates 1st recommendation.)

Work Materials	Cutting Process	Chipbreakers	Grades	Cutting Conditions		
				Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Min. - Optimum - Max. Cutting Speed V_c (m/min)
Soft Steel	Fine Finishing	FL	T1500Z	0.2- 0.6 -1.0	0.05- 0.15 -0.25	100- 250 -400
	Finishing	LU	AC810P	0.5- 1.0 -1.5	0.1- 0.25 -0.4	260- 340 -420
	Medium	GU	AC8025P	1.0- 2.5 -4.0	0.2- 0.35 -0.5	200- 260 -320
	Rough	MU	AC830P	2.0- 4.0 -6.0	0.3- 0.45 -0.6	140- 180 -220
Medium Carbon Steel	Fine Finishing	FL	T1500Z	0.2- 0.6 -1.0	0.05- 0.15 -0.25	100- 200 -300
	Finishing	LU	AC810P	0.5- 1.0 -1.5	0.1- 0.25 -0.4	210- 275 -340
	Medium	GU	AC8025P	1.0- 2.5 -4.0	0.2- 0.35 -0.5	150- 190 -230
	Rough	MU	AC830P	2.0- 4.0 -6.0	0.3- 0.45 -0.6	110- 135 -160
High Carbon Steel	Fine Finishing	FL	T1500Z	0.2- 0.6 -1.0	0.05- 0.15 -0.25	50- 150 -250
	Finishing	LU	AC810P	0.5- 1.0 -1.5	0.1- 0.25 -0.4	170- 225 -280
	Medium	GU	AC8025P	1.0- 2.5 -4.0	0.2- 0.35 -0.5	130- 165 -200
	Rough	MU	AC830P	2.0- 4.0 -6.0	0.3- 0.45 -0.6	90- 120 -150

Breaker

● GE Type for General Purpose

Achieves high efficiency and longer tool life with reduced rake face wear.
Delivers stable chip control performance from shallow cutting depths onwards.



Cross Section of Chipbreaker

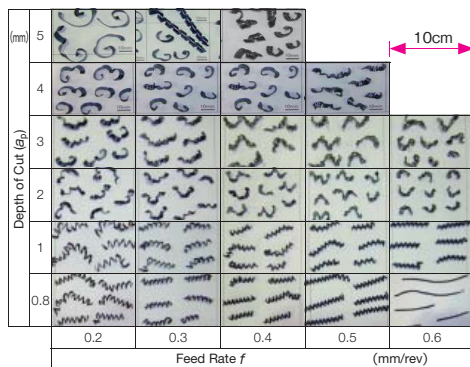
The center ridge provides stable chip control

The side ridges alleviate stress concentration and reduce rake face wear



● GE Type Chip Control

Work Material: SCM415 Cutting Conditions: $v_c=200$ m/min Dry

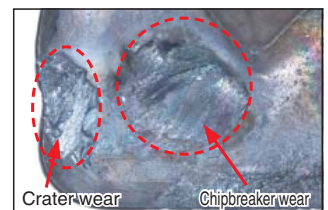


● Wear Resistance

Work Material: SCM435 Cutting Conditions: $v_c=250$ m/min $f=0.4$ mm/rev $a_p=2.0$ mm



GE Type Chipbreaker

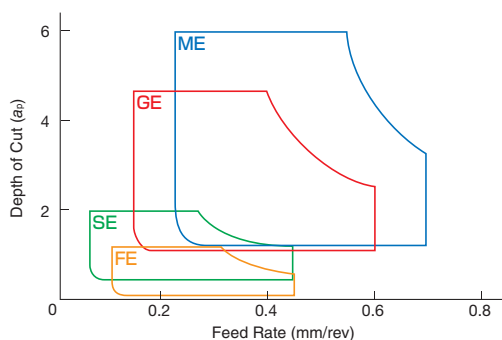


Conventional Chipbreaker

**Reduces rake face wear (crater wear and chipbreaker wear).
Achieves longer tool life and reduces machining costs.**

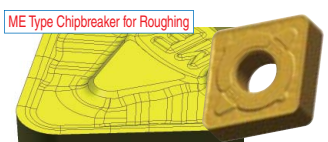
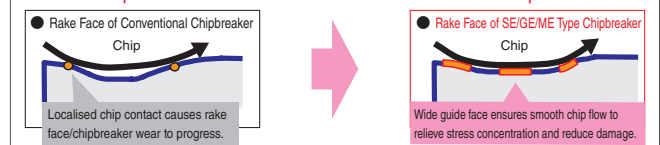
● Features of the High Efficiency Chipbreaker Series

● Application Range



● Characteristics

Rake face profile relieves stress concentration with smooth chip evacuation



A

Grades

Steel

Stainless Steel

Cast Iron

Exotic Alloy

Hardened Steel

Non-Ferrous Metal

Small Product Machining

Grades

High Speed Cutting

AC810P /

General Purpose Cutting

AC8025P /

Interrupted Cutting

AC830P /

Small Product Machining

AC1030U

Covers a range of machining applications from high speed to interrupted cutting and small product machining.

AC810P : In addition to FF-TiCN, which has excellent peel-off and wear resistance, this grade features a tough, thick Alumina coating enhanced by newly developed grain growth control technology, excellent wear resistance and long tool life in high-speed, high-feed cutting.

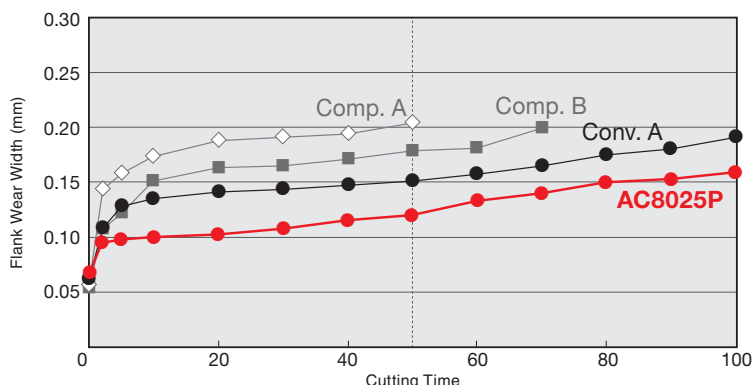
AC8025P : Employs Absotech Platinum, a new CVD coating. This grade has excellent adhesion and chipping resistance thanks to a smooth surface treatment and reduction in tensile stress within the coating layer to achieve a stable, and long tool life.

AC830P : In addition to FF-TiCN, which has excellent peel-off and wear resistance, this grade features a strengthened FF-Al₂O₃ layer using new stress control technology, and moreover provides excellent reliability and wear resistance in heavy interrupted cutting to achieve long tool life.

AC1030U : Employs Absotech Bronze, a new PVD coating, and exclusive tough carbide substrate. This grade reduces adhesion and microchipping with a high-quality cutting edge to achieve excellent machined surface quality.

AC8025P Cutting Performance

● Wear Resistance (Medium-Speed $v_c=200\text{m/min}$) **Excellent wear resistance in medium-speed cutting**



Work Material: SCM435
Insert: CNMG120408N-SE Toolholder: PCLNR2525M12
Cutting Conditions: $v_c=200\text{m/min}$ $f=0.2\text{mm/rev}$ $a_p=1.5\text{mm}$ Wet



AC8025P



Conv. A



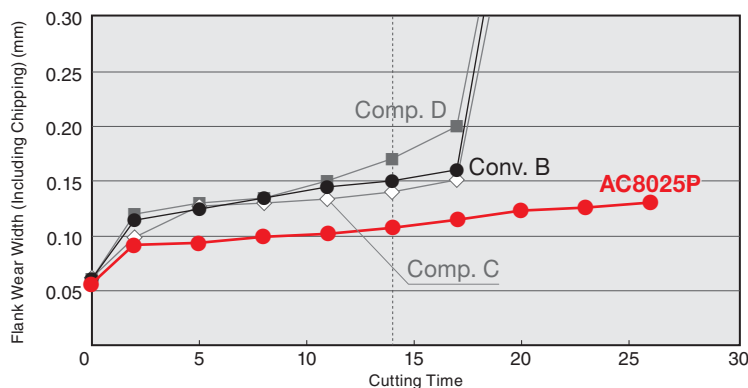
Comp. A



Comp. B

● Adhesion and Chipping Resistance

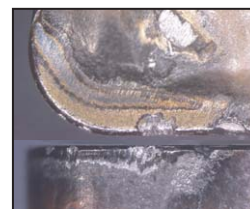
Greatly improved adhesion and chipping resistance with an advanced coating and smooth surface treatment



Work Material: SCM415
Insert: CNMG120408N-GU Toolholder: PCLNR2525M12
Cutting Conditions: $v_c=300\text{m/min}$ $f=0.3\text{mm/rev}$ $a_p=1.5\text{mm}$ Wet



AC8025P



Conv. B



Comp. C



Comp. D

Grades

Uncoated Cermet **T1000A / T1500A / T1500Z**
Coated Cermet

T1000A : A high hardness cermet that combines excellent wear resistance and toughness. Achieves high accuracy in continuous cutting of steel and finishing of powder metal and cast iron.

T1500A : A general purpose cermet made from hard grains with different sizes and functions that provide good surface finish and a good balance of wear resistance and toughness.

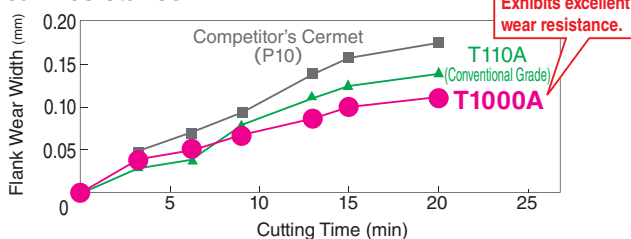
T1500Z : Employs the "Brilliant Coat" PVD coating with excellent lubricity to provide better wear resistance and stable surface finish in low-cutting-speed applications such as small product or low carbon steel machining.



Performance

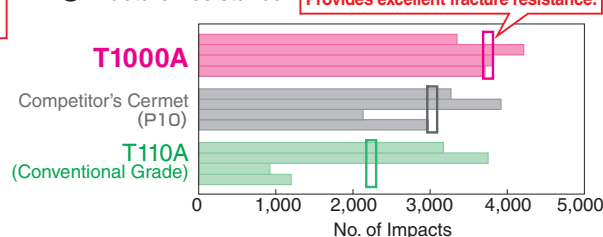
T1000A Performance

● Wear Resistance



Work Material : SCM435 Insert : CNMG120408N-SU
Cutting Conditions: $v_c=320\text{m/min}$ $f=0.20\text{mm/rev}$ $a_p=1.5\text{mm}$ Dry

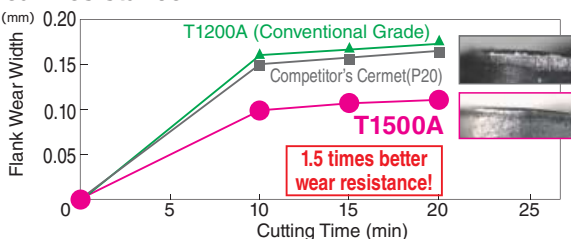
● Fracture Resistance



Work Material : SCM435 Insert : CNMG120408N-SU
Cutting Conditions: $v_c=230\text{m/min}$ $f=0.20\text{mm/rev}$ $a_p=1.0\text{mm}$ Wet

T1500A Performance

● Wear Resistance



Work Material : SCM435 Insert : CNMG120408N-SU
Cutting Conditions: $v_c=230\text{m/min}$ $f=0.20\text{mm/rev}$ $a_p=1.0\text{mm}$ Wet

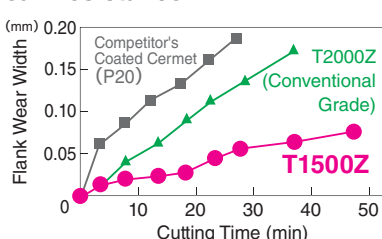
● Machined Surface Finish



Work Material : S45C Insert : DNMG150404N-LU
Cutting Conditions: $v_c=150\text{m/min}$ $f=0.12\text{mm/rev}$ $a_p=0.1\text{mm}$ Wet

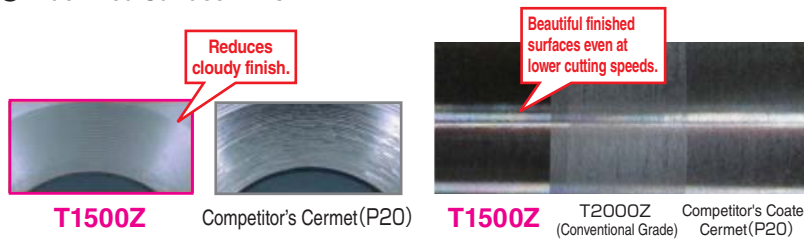
T1500Z Performance

● Wear Resistance



Work Material : SCM435 Insert : CNMG120408N-SU
Cutting Conditions: $v_c=230\text{m/min}$ $f=0.20\text{mm/rev}$ $a_p=1.0\text{mm}$ Wet

● Machined Surface Finish



Work Material : SNCM220H Insert : DNMG150408N-SU
Cutting Conditions: $v_c=150\text{m/min}$ $f=0.20\text{mm/rev}$ $a_p=1.0\text{mm}$ Wet

Work Material : STKM13A Insert : CNMG120408N-SU
Cutting Conditions: $v_c=100\text{m/min}$ $f=0.15\text{mm/rev}$ $a_p=1.0\text{mm}$ Wet

Recommended Cutting Conditions

Work Materials	Cutting Process	Chipbreakers	Grades	Cutting Conditions		
				Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Min. - Optimum - Max. Cutting Speed V_c (m/min)
Soft Steel (SS41 and others)	Fine Finishing	FA/FL	T1500Z	0.2-0.5-1.0	0.05-0.15-0.25	150-280-400
	Finishing	LU	T3000Z	0.3-1.0-1.8	0.08-0.20-0.35	150-280-400
Alloy Steel Carbon Steel (S45C, SCM435, and others)	Fine Finishing	FA/FL	T1500A	0.2-0.5-1.0	0.05-0.15-0.25	100-200-300
	Finishing	SU/SE	T1500A	0.5-1.0-2.0	0.08-0.20-0.35	100-200-300
	Medium	GU	T1500Z	0.8-2.2-4.0	0.15-0.25-0.50	100-200-300
High Carbon Steel Carbon Steel (SCM440H and others)	Fine Finishing	FA/FL	T1000A	0.2-0.5-1.0	0.05-0.15-0.25	50-150-250
	Finishing	SU/SE	T1500Z	0.5-1.0-2.0	0.08-0.20-0.35	50-150-250
	Medium	GU	T1500Z	0.8-2.2-4.0	0.15-0.25-0.50	50-150-250

A

Grades

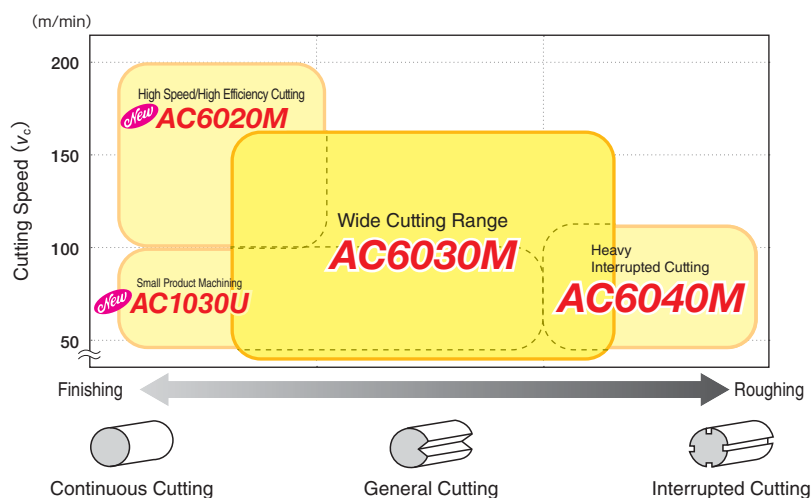
Steel

Stainless
Steel

Cast Iron

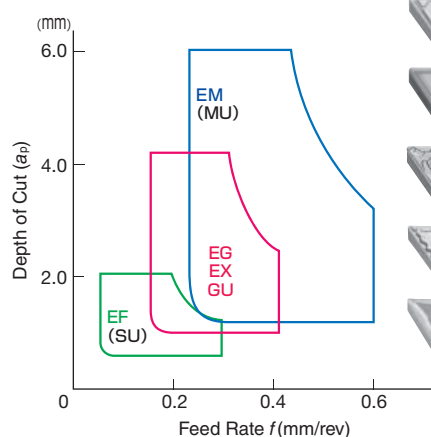
Exotic
AlloyHardened
SteelNon-Ferrous
MetalSmall Product
Machining

Grades

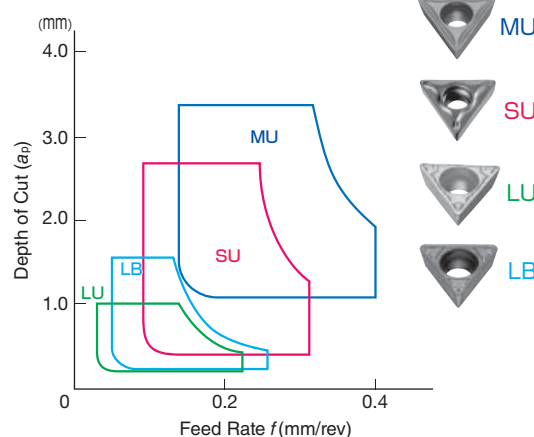


Chipbreakers

Negative Type



Positive Type



Refer to the chapter on Small Product Machining (page D7) for the Chipbreaker Selection Guide for ground (G Class) inserts.

M
Stainless Steel

Recommended Cutting Conditions

(Red text indicates 1st recommendation.)

Work Materials			Cutting Process	Chipbreakers	Grades	Cutting Conditions		
						Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Cutting Speed V_c (m/min)
Cr-based	Ferritic	SUS405, SUS410L, SUS430, SUS430F, SUS434, SUS447FJ1	Finishing	EF (SU)	AC6020M	0.5-1.5-2.0	0.05-0.15-0.25	170-230-300
			Medium	EG · GU · EX	AC6030M	1.0-2.5-4.0	0.10-0.25-0.40	140-170-250
			Rough	EM	AC6040M	1.5-3.5-6.0	0.20-0.35-0.60	140-170-200
	Martensitic	SUS403, SUS410, SUS420J2, SUS420F, SUS440F	Finishing	EF (SU)	AC6020M	0.5-1.5-2.0	0.05-0.15-0.25	120-180-240
			Medium	EG · GU · EX	AC6030M	1.0-2.5-4.0	0.10-0.25-0.40	100-150-200
			Rough	EM	AC6040M	1.5-3.5-6.0	0.20-0.35-0.60	80-130-180
Cr/Ni-based	Austenitic	SSU304, SUS304L, SUS316, SUS316L, SUS303, SUS321	Finishing	EF (SU)	AC6020M	0.5-1.5-2.0	0.05-0.15-0.25	120-180-240
			Medium	EG · GU · EX	AC6030M	1.0-2.5-4.0	0.10-0.25-0.40	100-150-200
			Rough	EM	AC6040M	1.5-3.5-6.0	0.20-0.35-0.60	80-130-180
	Two-Phase Austenitic/Ferritic	SUS329J1, SUS329J3L, SSU329J4L	Finishing	EF (SU)	AC6020M	0.5-1.5-2.0	0.05-0.15-0.25	100-145-180
			Medium	EG · GU · EX	AC6030M	1.0-2.5-4.0	0.10-0.25-0.40	80-120-160
			Rough	EM	AC6040M	1.5-3.5-6.0	0.20-0.35-0.60	70-100-140
	Deposition Hardened Structures	SUS630, SUS631, SUS632J1	Finishing	EF (SU)	AC6020M	0.5-1.5-2.0	0.05-0.15-0.25	90-115-140
			Medium	EG · GU · EX	AC6030M	1.0-2.5-4.0	0.10-0.25-0.40	70- 90-130
			Rough	EM	AC6040M	1.5-3.5-6.0	0.20-0.35-0.60	50- 80-120

Grades

AC6020M / AC6030M / AC6040M / AC1030U

AC6020M: Employs Absotech Platinum, a new CVD coating, coupled with a wear resistant hard substrate to achieve both excellent wear fracture resistance.

AC6030M: Employs Absotech Platinum, a new CVD coating. The first recommended grade stainless steel machining that drastically reduces typical abnormal damage in stainless steel machining, and achieves long and stable machining thanks to the improved coating strength and excellent adhesion.

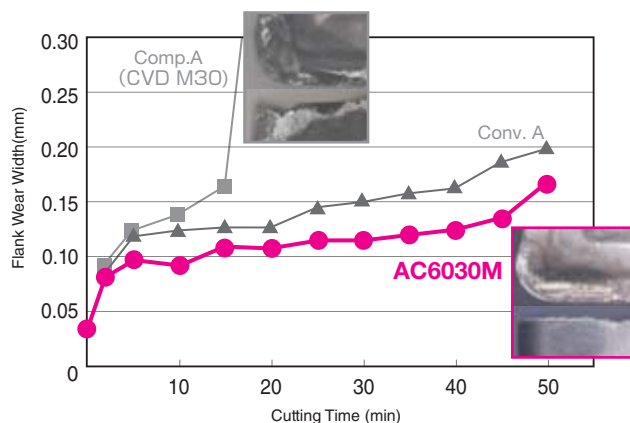
AC6040M: Employs Absotech Bronze, a new PVD coating, and exclusive tough carbide substrate. The excellent adhesion and peel-off resistance of the new PVD coating as well as the improved fracture resistance of the exclusive carbide substrate drastically improves the reliability in unstable machining.

AC1030U: Employs Absotech Bronze, a new PVD coating, with a special tough carbide substrate. Achieving excellent machined surface quality with a high-quality cutting edge that reduces adhesion and micro-chipping.

Performance

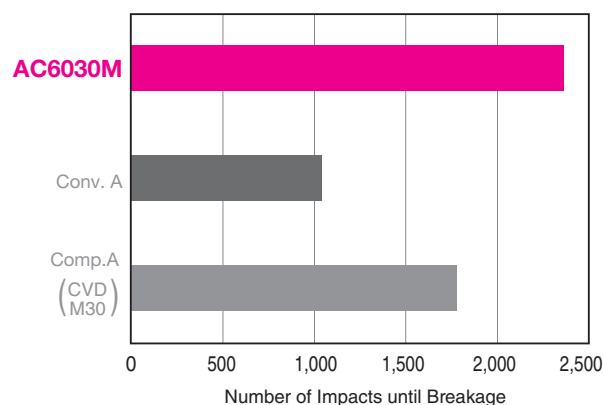
AC6030M Cutting Performance

Continuous Cutting



Work Material : SUS316 Insert : CNMG120408N-EX
Cutting Conditions : $v_c=200\text{m/min}$ $f=0.2\text{mm/rev}$ $a_p=2.0\text{mm}$ Wet

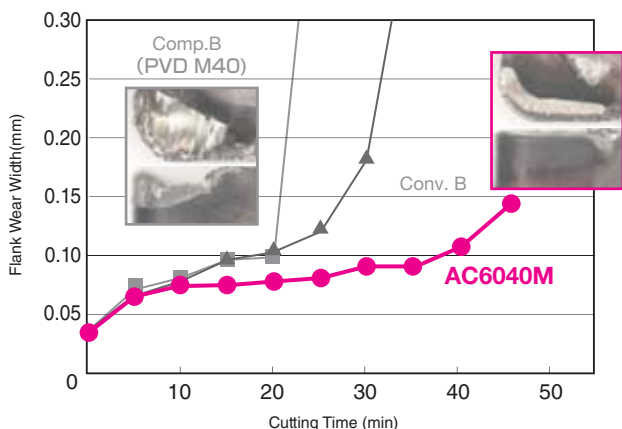
Interrupted Cutting



Work Material : SUS316 Insert : CNMG120408N-GU
Cutting Conditions : $v_c=100\text{m/min}$ $f=0.1\text{mm/rev}$ $a_p=1.0\text{mm}$ Wet

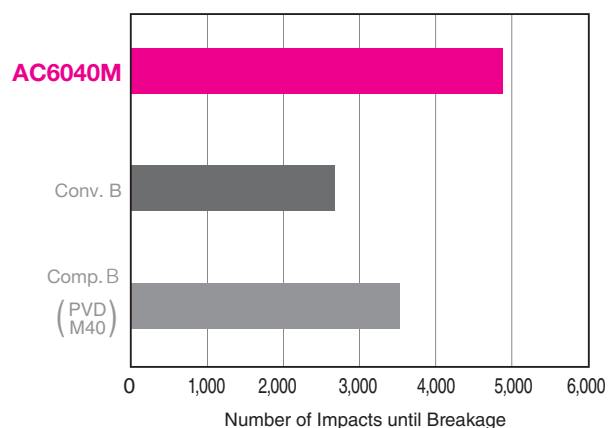
AC6040M Cutting Performance

Continuous Cutting



Work Material : SUS316 Insert : CNMG120408N-GU
Cutting Conditions : $v_c=150\text{m/min}$ $f=0.2\text{mm/rev}$ $a_p=2.0\text{mm}$ Wet

Interrupted Cutting



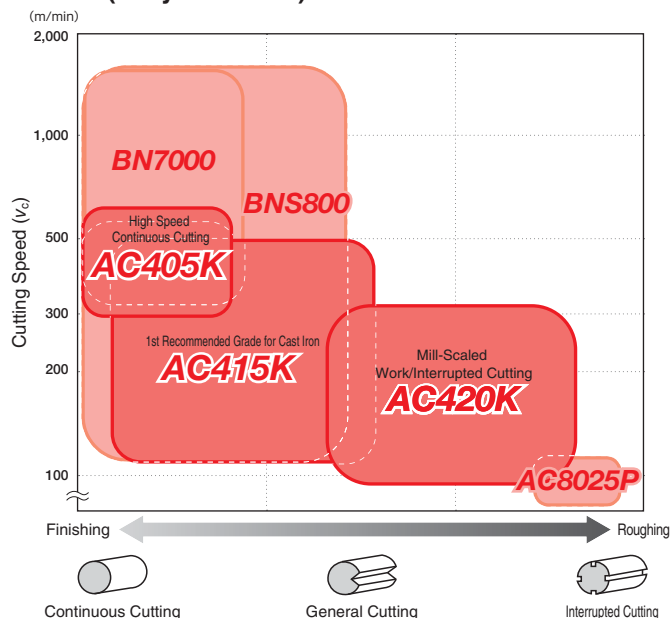
Work Material : SUS316 Insert : CNMG120408N-GU
Cutting Conditions : $v_c=230\text{m/min}$ $f=0.23\text{mm/rev}$ $a_p=0.80\text{mm}$ Dry

Grades

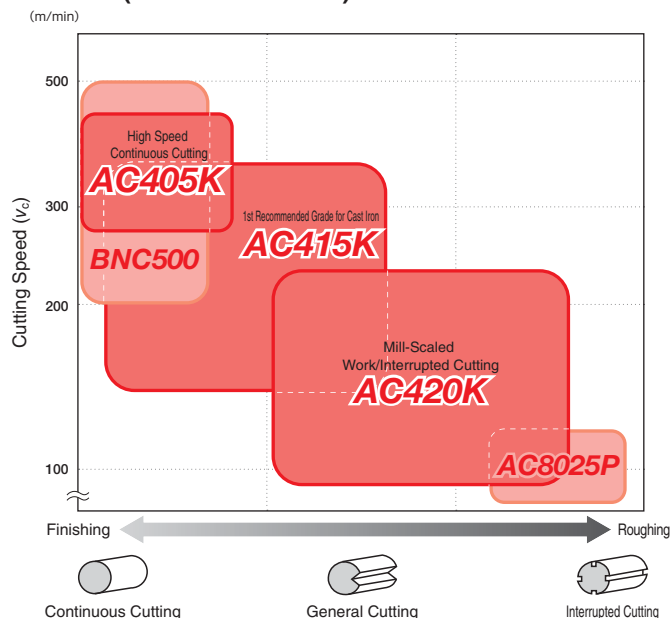
CBN Coated SUMIBORON / SUMIBORON / Solid SUMIBORON
BNC500 / **BN7000** / **BNS800** ...

Page L7

● FC (Grey Cast Iron)

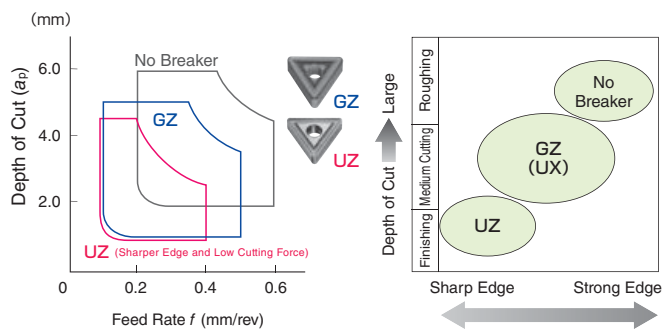


● FCD (Ductile Cast Iron)

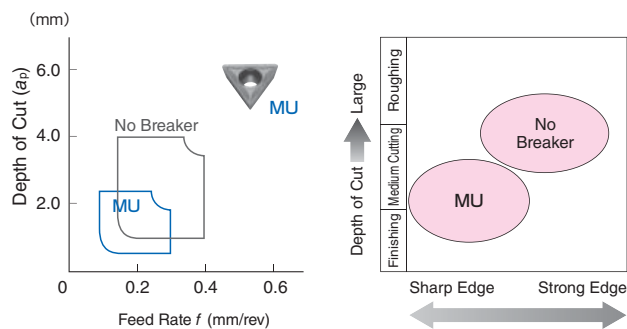


Chipbreakers

Negative Type



Positive Type



Recommended Cutting Conditions

(Red text indicates 1st recommendation.)

Applications	Cutting Process	Chipbreakers	Grades	FC (Grey Cast Iron) Min. - Optimum - Max.		FCD (Ductile Cast Iron) Min. - Optimum - Max.	
				Feed Rate f (mm/rev)	Cutting Speed v_c (m/min)	Feed Rate f (mm/rev)	Cutting Speed v_c (m/min)
High Speed Cutting	Continuous to General	No	BN7000	0.1-0.2-0.5	500-1,500-2,000	—	—
	Continuous	No	BNC500	—	—	0.1-0.20-0.4	200-350-500
Finishing	Continuous	UZ	AC405K	0.1-0.25-0.4	230-400-570	0.1-0.25-0.4	170-350-500
	General	UZ	AC415K	0.1-0.25-0.4	200-350-500	0.1-0.25-0.4	150-300-450
	Interrupted	GZ	AC415K	0.1-0.30-0.5	150-275-400	0.1-0.30-0.5	150-250-350
Light Interrupted Medium	Continuous	GZ	AC405K	0.1-0.30-0.5	170-315-460	0.1-0.30-0.5	170-285-400
	General	GZ	AC415K	0.1-0.30-0.5	150-275-400	0.1-0.30-0.5	150-250-350
	Interrupted	GZ	AC420K	0.1-0.30-0.5	100-200-300	0.1-0.30-0.5	80-150-220
Roughing (Mill-Scaled Work)	Continuous	GZ	AC415K	0.1-0.30-0.5	150-275-400	0.1-0.30-0.5	150-250-350
	General	GZ	AC420K	0.1-0.30-0.5	100-200-300	0.1-0.30-0.5	80-150-220
	Interrupted	No	AC420K	0.2-0.35-0.6	100-175-250	0.2-0.35-0.6	80-130-180

Grades

High Speed Continuous Cutting General Purpose Mill-Scaled Work/Interrupted Cutting

AC405K / AC415K / AC420K

AC405K : Suitable for high-speed continuous cutting with excellent resistance to wear and plastic deformation.

AC415K : First recommended grade for cast iron turning provides stability and long tool life in a wide range of processes.

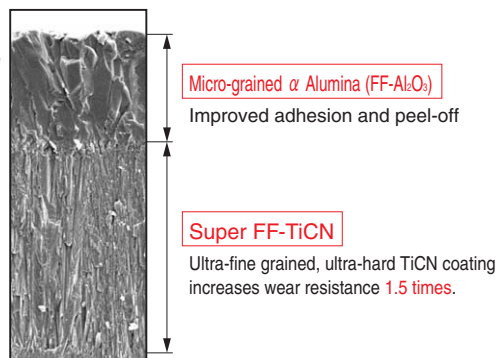
AC420K : Superior fracture resistance provides excellent stability in interrupted unstable cutting and when cutting mill-scaled work.

- Improvements to super FF-TiCN coating grain and hardness provide significantly improved wear resistance.

Newly developed stress control technology enhances micro-grained α Alumina (FF- Al_2O_3) coating for superior reliability.



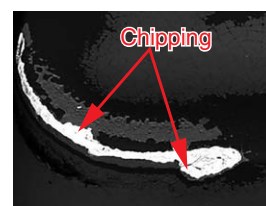
Coating Structure



Coating stress control technology reduces abnormal damage caused by chipping.

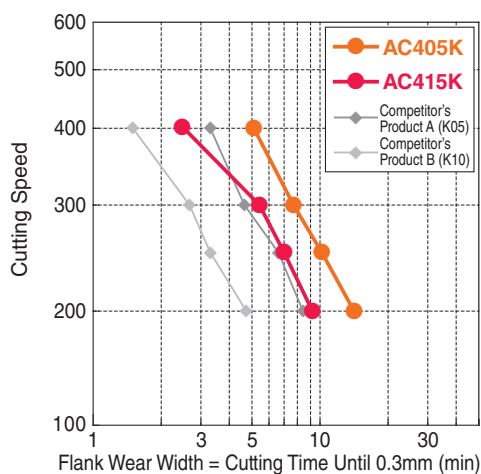


AC400K Series Coating



Conventional Coating

AC405K/AC415K Wear Resistance



Work Material : FCD450(Round Bar) Insert : CNMG120408N-GZ
Cutting Conditions : $v_c=200$ to 400m/min $f=0.30$ mm/rev $a_p=1.5$ mm Wet

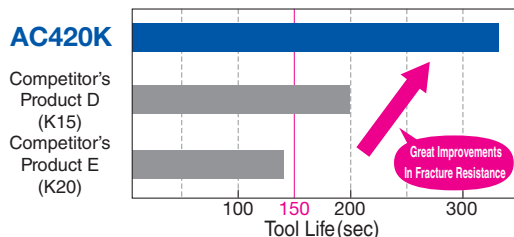
AC415K Chipping Resistance



Work Material : FCD450 Insert : CNMG120408N-GZ
Cutting Conditions : $v_c=300$ m/min $f=0.25$ mm/rev $a_p=1.5$ mm Wet

AC420K Fracture Resistance

FCD450 Grooved (Heavy Interrupted Acceleration Test)



Edge Wear Comparison (After 150 sec)



Work Material : FCD450 Toolholder : PCLNR2525-43 Insert : CNMG120408N-GZ
Cutting Conditions : $v_c=350$ m/min $f=0.25$ mm/rev $a_p=1.5$ mm Wet

A

Grades

Steel

Stainless
Steel

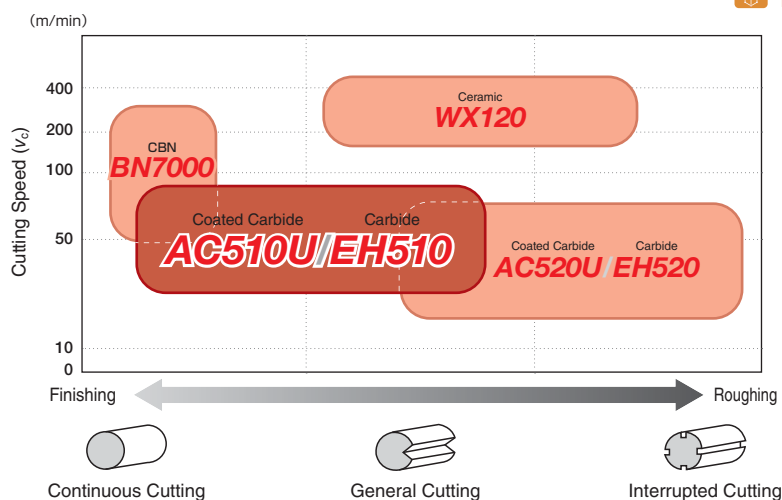
Cast Iron

Exotic
AlloyHardened
SteelNon-Ferrous
MetalSmall Product
Machining

Grades

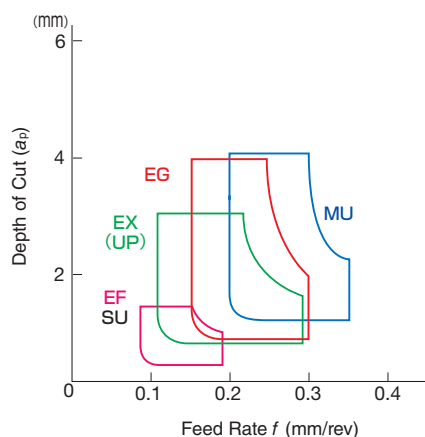
SUMIBORON
BN7000

Page L10



Chipbreakers

Negative Type



Recommended Cutting Conditions

(Red text indicates 1st recommendation.)

Work Materials	Cutting Process	Chipbreakers	Grades	Cutting Conditions		
				Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Min. - Optimum - Max. Cutting Speed V_c (m/min)
Heat-Resistant Alloy (Ni-based Alloy Fe-based Alloy Co-based Alloy)	Finishing	EF(SU)	AC510U	0.2-0.5-1.5	0.1-0.12-0.2	50-60-90
	Light	EX	AC510U	0.5-1.0-3.0	0.1-0.20-0.3	40-50-80
	Medium	EG	AC510U	0.5-2.0-4.0	0.15-0.25-0.3	40-50-80
	Rough	MU	AC520U	1.0-2.0-4.0	0.2-0.25-0.35	30-45-60
Titanium Alloy (Pure Titanium (99.5%) $\alpha + \beta$ Alloy)	Finishing	EF(SU)	EH510 (AC510U)	0.2-0.5-1.5	0.1-0.15-0.2	50-65-80
	Light	EX	AC510U	0.5-1.0-2.5	0.1-0.20-0.25	40-55-70
	Medium	EG	EH510 (AC510U)	0.5-2.0-3.5	0.15-0.25-0.3	40-55-70
	Rough	MU	AC520U	1.0-2.0-3.5	0.2-0.25-0.3	30-40-50

Grades AC510U / AC520U / EH510 / EH520

- PVD (Super ZX Coat) grade with excellent wear and thermal resistance.

AC510U : Excellent sharpness and reliability. A general purpose grade suitable for a wide range of applications from roughing to finishing.

AC520U : Excellent fracture resistance. A tough grade that is perfect for heavy interrupted cutting and mill-scaled workpiece.

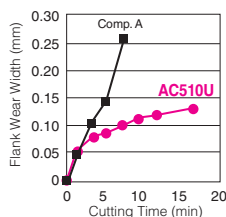
- Carbides with excellent thermal, wear, and fracture resistance for use with titanium alloys.

EH510 : General purpose grade for titanium machining that features excellent wear and thermal resistance. For applications from roughing to finishing.

EH520 : Tough grade for titanium machining with excellent fracture and thermal resistance. Perfect for interrupted cutting and mill-scaled workpiece.

AC510U Cutting Performance

- Turning of Thermal Resistant (Ni-based) Alloys



Half the wear of competitor's grade with 2x tool life!



AC510U

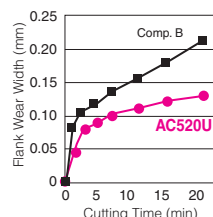


Comp. A

Work Material: Inconel 718 (45HRC)
Insert: CNMG120408N-EX (AC510U)
Cutting Conditions: $v_c=80\text{m/min}$ $f=0.12\text{mm/rev}$ $a_p=0.8\text{mm}$ Wet

AC520U Cutting Performance

- Turning of Thermal Resistant (Fe-based) Alloys



Stable turning with no notch wear!



AC520U



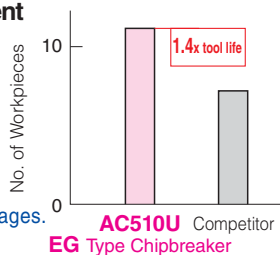
Comp. B

Work Material: Heat resistant ferrous alloy
Insert: CNMG120408N-MU (AC520U)
Cutting Conditions: $v_c=40\text{m/min}$ $f=0.2\text{mm/rev}$ $a_p=2.0\text{mm}$ Wet

Application Examples

AC510U/EH510

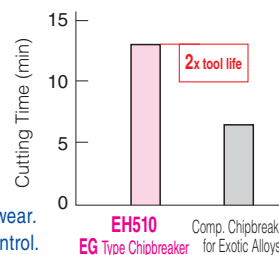
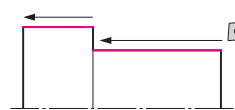
Inconel 718 Shaft Component



Stable, long tool life with no breakages.
Small chips.

Insert: CNMG120408N-EG (AC510U)
Cutting Conditions: $v_c=45\text{m/min}$ $f=0.23\text{mm/rev}$ $a_p=2\text{mm}$ Wet

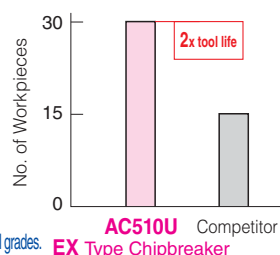
Titanium Ti-6Al-4V



Tool life doubled with reduced crater wear.
Now with drastically improved chip control.

Insert: CNMG120412N-EG (EH510)
Cutting Conditions: $v_c=65\text{m/min}$ $f=0.2\text{mm/rev}$ $a_p=2.5\text{mm}$ Wet

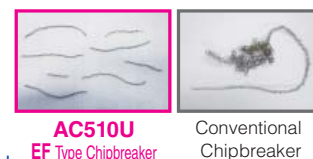
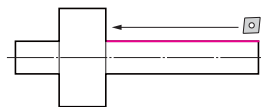
Inconel 718 Pin



Achieving 13x higher efficiency and stable tool life with cutting speeds of 40m/min as compared to 30m/min for conventional grades.

Insert: CNMG120408N-EX (AC510U)
Cutting Conditions: $v_c=40\text{m/min}$ $f=0.25\text{mm/rev}$ $a_p=2.0\text{mm}$ Wet

Inconel 718 Shaft Component

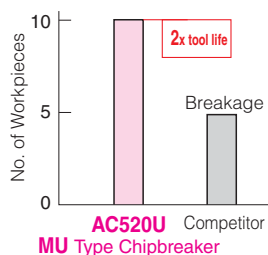
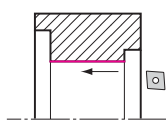


Drastically improved chip control.
Eliminate final polishing process without damaging work.

Insert: CNMG120408N-EF (AC510U)
Cutting Conditions: $v_c=45\text{m/min}$ $f=0.1\text{mm/rev}$ $a_p=0.25\text{mm}$ Wet

AC520U

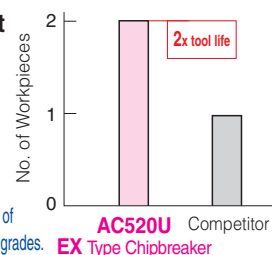
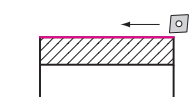
Inconel 718 Machine Component



Stable, long tool life with no breakage.

Insert: CNMG120412N-MU (AC520U)
Cutting Conditions: $v_c=35\text{m/min}$ $f=0.2\text{mm/rev}$ $a_p=2.5\text{mm}$ Wet

Stellite Machine Component



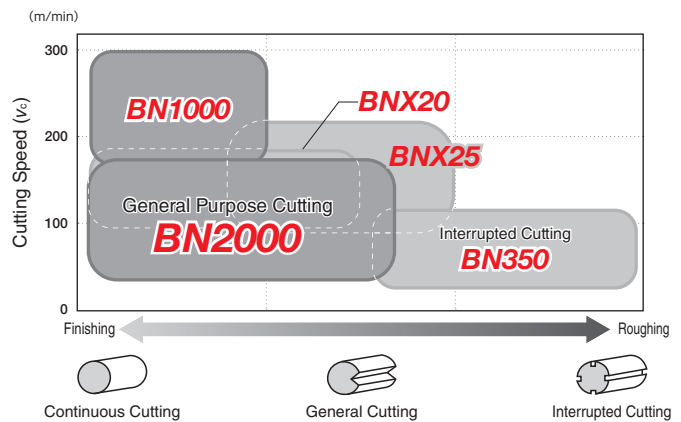
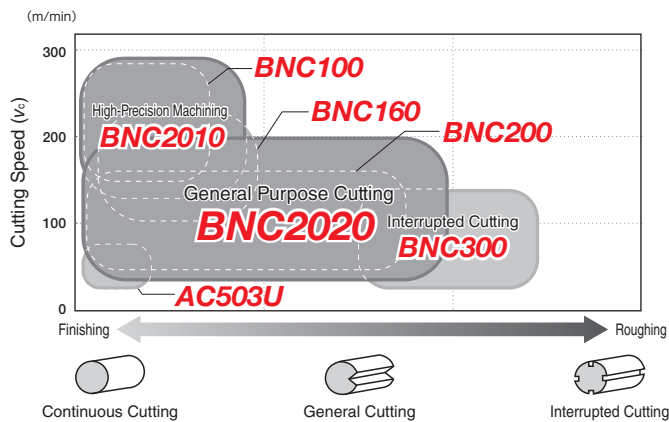
Achieving 1.5x higher efficiency with cutting speeds of 30m/min as compared to 20m/min for conventional grades.

Insert: CNMG120408N-EX (AC520U)
Cutting Conditions: $v_c=30\text{m/min}$ $f=0.1\text{mm/rev}$ $a_p=1.0\text{mm}$ Wet

Grades

● Coated SUMIBORON, Coated Carbide

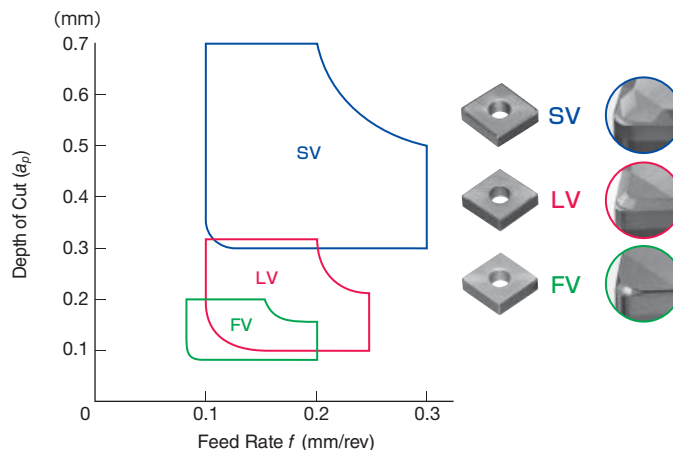
● Uncoated SUMIBORON

CBN SUMIBORON ...  Page L2

Chipbreakers

LV Type / FV Type Chipbreaker : For chip control during finishing of hardened steel

SV Type Chipbreaker : For chip control during carburized layer removal

CBN SUMIBORON Break Master ...  Page L26

Recommended Cutting Conditions

(Red text indicates 1st recommendation.)

Cutting Process	Grades	Cutting Conditions		
		Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Min. - Optimum - Max. Cutting Speed V_c (m/min)
Continuous Cutting	BNC2010	0.03- 0.20 -0.35	0.03- 0.10 -0.20	120- 200 -300
	BNC100	0.03- 0.20 -0.30	0.03- 0.10 -0.20	120- 200 -300
	BN1000	0.03- 0.15 -0.20	0.03- 0.10 -0.15	100- 150 -300
	BNX10	0.03- 0.10 -0.20	0.03- 0.10 -0.15	120- 180 -300
	AC503U	0.03- 0.50 -1.00	0.02- 0.05 -0.10	40- 70 -100
General Turning	BNC2020	0.03- 0.30 -0.50	0.03- 0.20 -0.40	50- 130 -220
	BNC160	0.03- 0.20 -0.35	0.03- 0.10 -0.25	120- 180 -220
	BNC200	0.03- 0.30 -0.50	0.03- 0.10 -0.30	50- 130 -220
	BN2000	0.03- 0.20 -0.30	0.03- 0.10 -0.20	50- 100 -200
	BNX20	0.03- 0.20 -0.35	0.03- 0.15 -0.30	70- 130 -170
Interrupted Cutting	BNC300	0.03- 0.20 -0.30	0.03- 0.10 -0.20	50- 100 -150
	BN350	0.03- 0.20 -0.30	0.03- 0.10 -0.20	50- 100 -150
	BNX25	0.03- 0.20 -0.50	0.03- 0.15 -0.30	120- 160 -220

Grades BNC2010 / BNC2020 / BN1000 / BN2000

BNC2010 : For high-precision finishing requiring good surface roughness and dimensional accuracy. Enables stable machining and provides excellent surface roughness thanks to coating and CBN substrate with excellent notch wear resistance.

BNC2020 : General purpose grade suitable for typical hardened steel machining applications. Achieves long tool life thanks to highly-wear-resistant and highly-adhesive coating and tough CBN substrate with excellent wear resistance and bonding strength.

BN1000 : For high speed machining. Provides the highest wear resistance of all uncoated SUMIBORON grades. Features improved fracture resistance while still placing a priority on wear resistance.

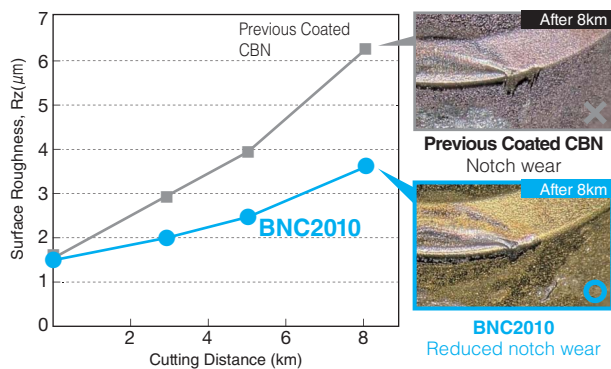
BN2000 : General purpose grade suitable for typical hardened steel machining applications. Provides a high degree of fracture and wear resistance.



BNC2010 / BNC2020

BNC2010 Cutting Performance

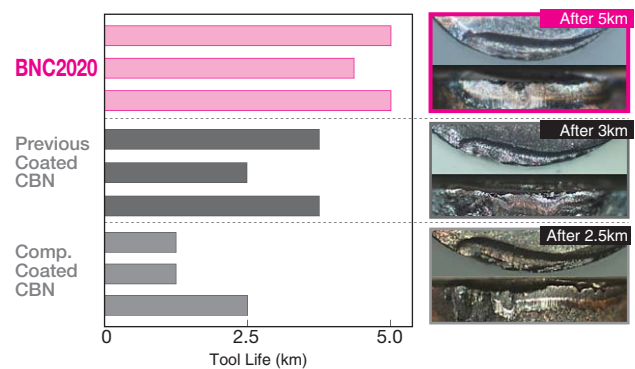
Continuous Cutting of Hardened Steel



Work Material : SCM415 58-62HRC (Continuous)
 Insert : 4NC-DNGA150408 Edge Treatment : S01225
 Cutting Conditions : $v_c=160\text{m/min}$ $f=0.08\text{mm/rev}$ $a_p=0.1\text{mm}$ Wet

BNC2020 Cutting Performance

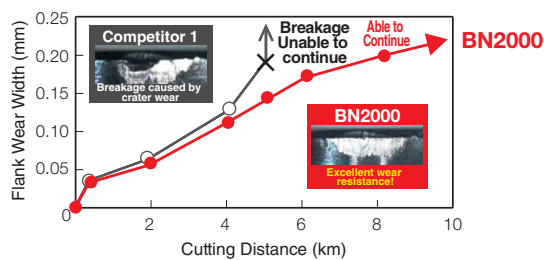
Interrupted Cutting of Hardened Steel



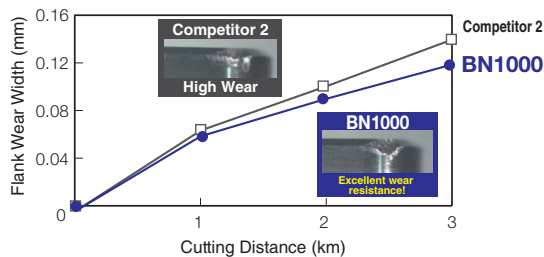
Work Material : SCM415-5V 58-62HRC (Interrupted Cutting)
 Insert : 4NC-CNGA120412 Edge Treatment : S01225
 Cutting Conditions : $v_c=130\text{m/min}$ $f=0.1\text{mm/rev}$ $a_p=0.6\text{mm}$ Dry

BN1000 / BN2000 Cutting Performance

Wear Resistance (Continuous Cutting)



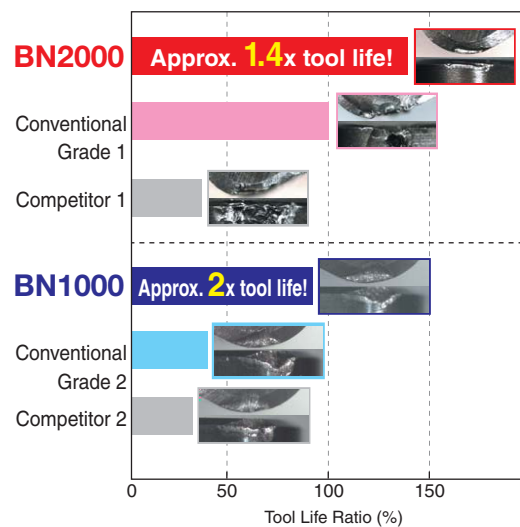
Work Material: SCM415H Round Bar (58-62HRC)
 Cutting Conditions : $v_c=100\text{m/min}$ $f=0.1\text{mm/rev}$ $a_p=0.2\text{mm}$ Dry



Work Material: SUJ2 Round Bar (58-62HRC)
 Cutting Conditions : $v_c=150\text{m/min}$ $f=0.1\text{mm/rev}$ $a_p=0.2\text{mm}$ Dry

Chipping Resistance (Interrupted Cutting)

(Comparison based on conventional BN2000 as 100%.)



Work Material: SCM415H 8V Grooved Material (58-62HRC)
 Insert: 2NU-CNGA120408
 Cutting Conditions : $v_c=150\text{m/min}$ $f=0.1\text{mm/rev}$ $a_p=0.2\text{mm}$ Dry

Grades

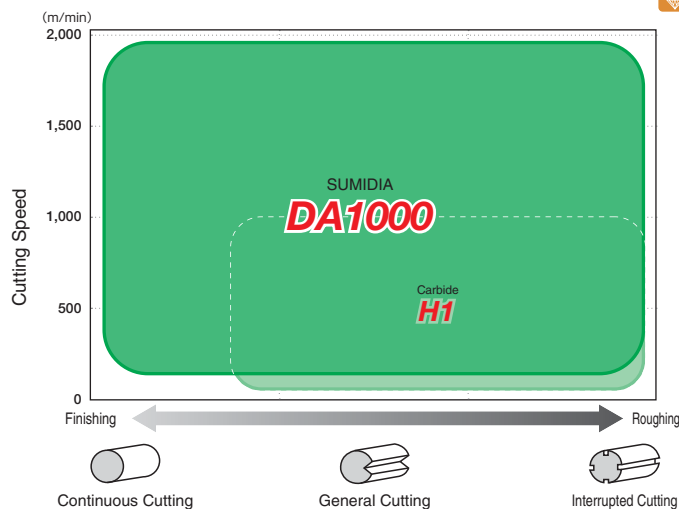


SUMIDIA

DA1000

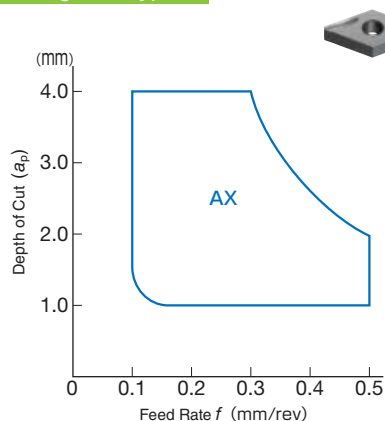


Page M6

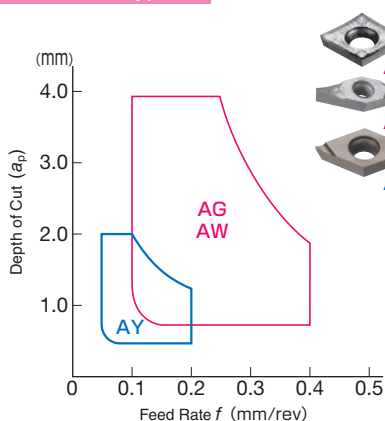


Chipbreakers

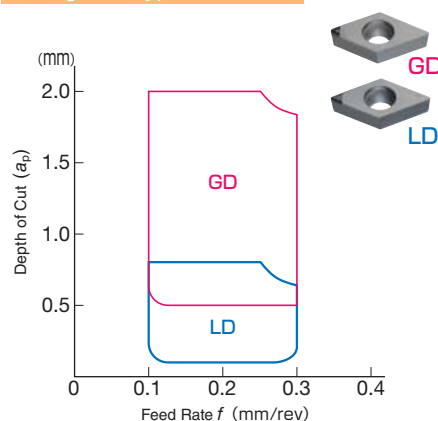
Negative Type



Positive Type



Negative Type (PCD)



Recommended Cutting Conditions

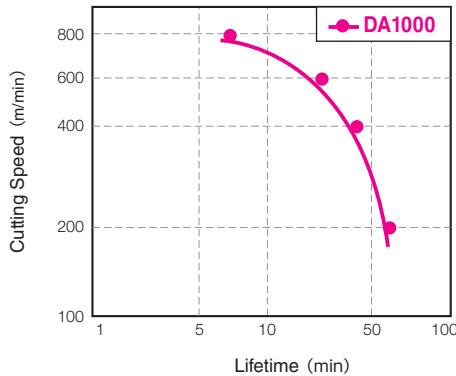
Cutting Process	Category	Grades	Cutting Conditions		
			Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Min. - Optimum - Max. Cutting Speed V_c (m/min)
Continuous Cutting General Turning Interrupted Cutting	SUMIDIA	DA1000	0.1-0.5-3.0	0.05-0.10-0.20	Up to 2,000
	Carbide	H1	0.3-1.0-5.0	0.1-0.20-0.5	Up to 1,000

Grades

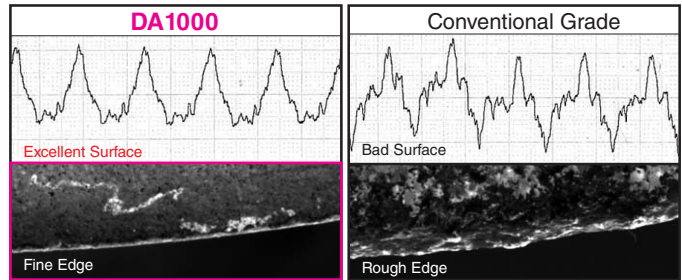
DA1000

- Ultra-high-density, sintered ultra-fine diamond particles
- Significantly improved surface roughness on machined surfaces
- World's best wear resistance and strength
- Suitable for use with all aluminum and non-ferrous alloys

DA1000 Wear Resistance

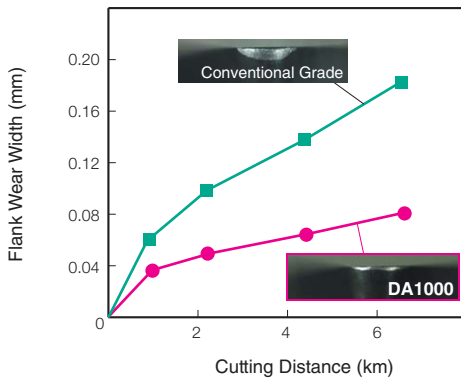


Comparison of Surface Roughness



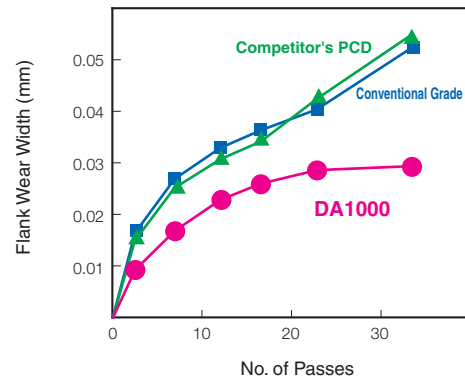
Insert: TPGW160308
Cutting Conditions: $v_c=1,000\text{m/min}$ $f=0.15\text{mm/rev}$ $a_p=0.2\text{mm}$ Wet

Wear Resistance in Turning Applications



Insert: TPGN160304
Cutting Conditions: $v_c=800\text{m/min}$ $f=0.12\text{mm/rev}$ $a_p=0.5\text{mm}$ Wet

Wear Resistance in Milling Applications



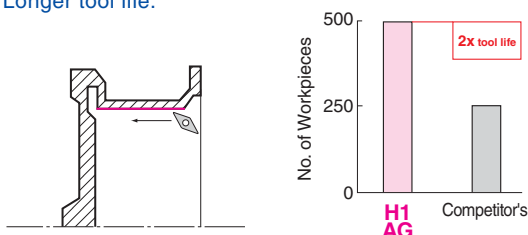
Insert: NF-SNEW1204ADFR
Cutting Conditions: $v_c=2,000\text{m/min}$ $f=0.15\text{mm/rev}$ $a_p=3.0\text{mm}$ Wet

Application Examples

H1 + AG Type Breakers

ADC12 Aluminum Wheel

Excellent adhesion resistance.
Longer tool life.

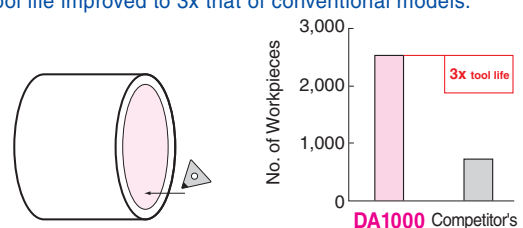


Insert: VCGT160408N-AG(H1)
Cutting Conditions: $v_c=2,200\text{m/min}$ $f=0.25\text{mm/rev}$ $a_p=2.0\text{mm}$ Wet

DA1000

Copper Alloy Bush

Stable surface roughness with no edge breakage (3.2S).
Tool life improved to 3x that of conventional models.



Insert: NF-TPGN160308(DA1000)
Cutting Conditions: $v_c=300\text{m/min}$ $f=0.07\text{mm/rev}$ $a_p=0.08\text{mm}$ Wet

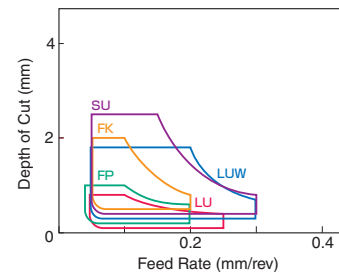
Grades

Insert Grades	Application Range			Work Materials					
	High Precision	Finishing to Light	Medium	General Steel	Stainless Steel	Cast Iron	Heat-Resistant Alloy	Hardened Steel	Non-Ferrous Metal
Coated Carbide (PVD)	ACZ150			◎	◎				○
	AC510U			○	◎	○	◎		
	AC520U			○	◎	○	◎		
	AC530U			◎	◎	○	○		○
	AC1030U			◎	◎	○	○		○
Uncoated Cermet Coated Cermet	T1000A			◎	○	◎			○
	T1500A/T1500Z			◎	○	○			○
Carbide	BL 130			○	○	○			○
		H1		○	○	○			◎
		EH510		○	○	○	◎		○
CBN (SUMIBORON)		BN1000/BN2000						◎	
PCD (SUMIDIA)	DA1000								◎
	DA2200								◎

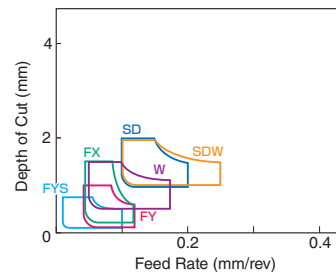
◎1st recommendation ○2nd recommendation

Chipbreakers

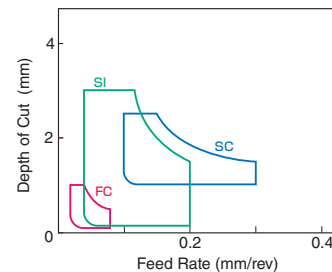
● M Class Finishing to Light



● G Class Ground Type



● G Class Chipbreakers



Recommended Cutting Conditions

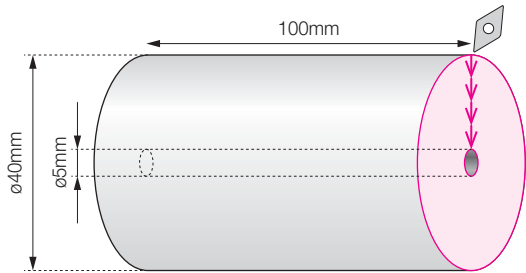
Grades	P Free-Cutting Steel		P Alloy Steel		M Stainless Steel		H Hardened Steel		N Aluminum		N Brass	
	v_c (m/min)	f (mm/rev)	v_c (m/min)	f (mm/rev)	v_c (m/min)	f (mm/rev)	v_c (m/min)	f (mm/rev)	v_c (m/min)	f (mm/rev)	v_c (m/min)	f (mm/rev)
ACZ150	50 to 200	0.02 to 0.10	50 to 150	0.01 to 0.08	50 to 150	0.01 to 0.05			70 to 300	0.05 to 0.20	70 to 300	0.05 to 0.20
AC510U	50 to 200	0.02 to 0.15	50 to 200	0.02 to 0.10	50 to 200	0.02 to 0.10					70 to 300	0.05 to 0.20
AC520U	50 to 200	0.02 to 0.15	50 to 200	0.02 to 0.10	50 to 200	0.02 to 0.10					70 to 300	0.05 to 0.20
AC530U	50 to 200	0.02 to 0.15	50 to 200	0.02 to 0.10	50 to 200	0.02 to 0.10					70 to 300	0.05 to 0.20
AC1030U	50 to 200	0.02 to 0.15	50 to 200	0.02 to 0.10	50 to 150	0.02 to 0.10					70 to 300	0.05 to 0.20
T1000A	50 to 200	0.02 to 0.15	50 to 200	0.02 to 0.10	50 to 150	0.02 to 0.10			70 to 300	0.05 to 0.20	70 to 300	0.05 to 0.20
T1500A	50 to 200	0.02 to 0.15	50 to 200	0.02 to 0.10	50 to 150	0.02 to 0.10			70 to 300	0.05 to 0.20	70 to 300	0.05 to 0.20
T1500Z	50 to 200	0.02 to 0.15	50 to 200	0.02 to 0.10	50 to 150	0.02 to 0.10			70 to 300	0.05 to 0.20	70 to 300	0.05 to 0.20
BN1000							50 to 200	0.02 to 0.10				
BN2000							50 to 120	0.02 to 0.10				
DA1000									70 to 300	0.02 to 0.10	70 to 300	0.02 to 0.10
DA2200									70 to 300	0.02 to 0.10	70 to 300	0.02 to 0.10

Values in red: 1st recommendation Values in blue: 2nd recommendation

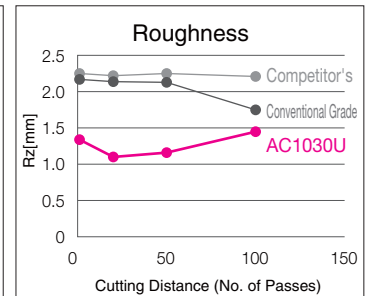
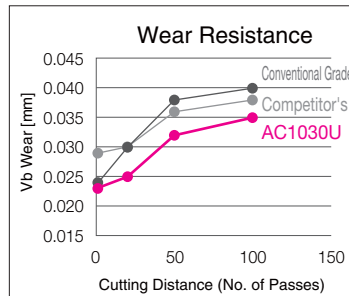
Performance

New AC1030U Employs Absotech Bronze, a new PVD coating, with a special tough carbide substrate. Achieving excellent machined surface quality with a high-quality cutting edge that reduces adhesion and micro-chipping.

AC1030U Performance

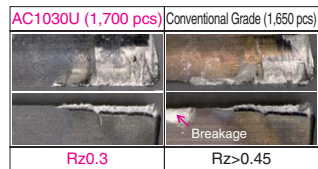
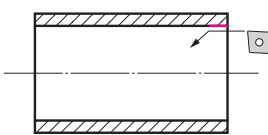


Work Material : SUS304 Insert : DCGT11T302R-FY
Cutting Conditions: $v_c=100\text{m/min}$ $f=0.05\text{mm/rev}$ $a_p=0.1\text{mm}$ Wet(Oil based)



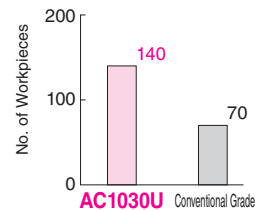
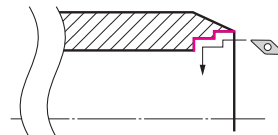
Application Examples

[STKM12C-EC Pipe]



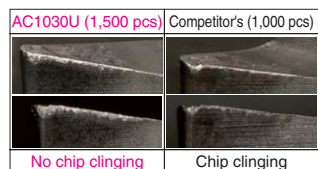
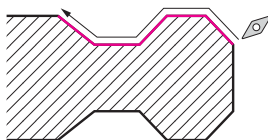
Insert: CCGT060201L-FX
Cutting Conditions: $v_c=196\text{m/min}$ $f=0.04\text{mm/rev}$ $a_p=0.4\text{mm}$

[S45C Shaft Stator]



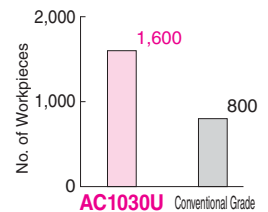
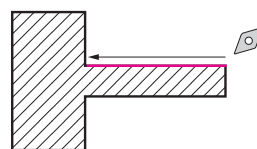
Insert: VPGT110302R-FX
Cutting Conditions: $v_c=195\text{m/min}$ $f=0.12\text{mm/rev}$ $a_p=0.175 - 0.25\text{mm}$ Wet

[SUS304 Body Valve]



Insert: VCGT110301R-FY
Cutting Conditions: $v_c=31.5\text{m/min}$ $f=0.025\text{mm/rev}$ $a_p=0.2\text{mm}$ Wet

[SUS430 Sensor Housing]



Insert: DCMT11T304MN-FC
Cutting Conditions: $v_c=50\text{m/min}$ $f=0.06\text{mm/rev}$ $a_p=0.2\text{mm}$

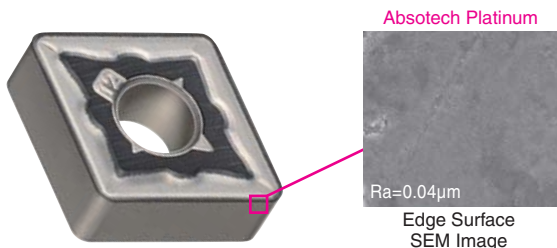
Our Coated Carbide Grades are high-quality, high-performance grades that combines a proprietary, special ultra-hard carbide substrate with a multi-layered coating that provides excellent wear and heat resistance plus superior adhesion strength. Utilised in high-speed, high-efficiency applications on a wide range of work material including steel, cast iron and exotic alloys.

A

Characteristics

Absotech Platinum

CVD

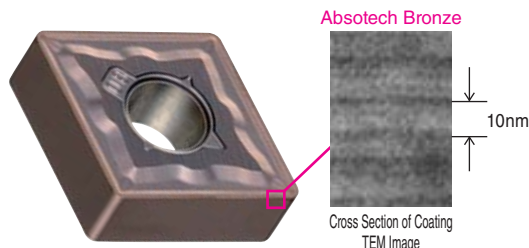


Achieves a good balance between drastically-improved coating strength and excellent surface smoothness and enables stable machining thanks to newly-developed titanium compound coating.

- Achieves over 2 times chipping resistance compared with conventional coating thanks to the improved coating strength.
 - Drastically improves the adhesion resistance and reduces the occurrence of abnormal damage thanks to excellent surface smoothness.
 - Improves the corner visibility with a unique color tone.
- Applicable Grades : (For Steel Turning) AC8025P
(For Stainless Steel Turning) AC6020M, AC6030M

Absotech Bronze

PVD

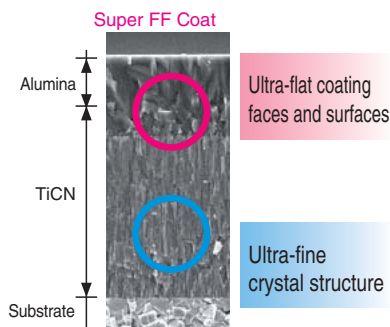


Employing our unique super multi-layered thin coating structure, similar to the Super ZX Coat, this new composition is a highly thermal resistant coating with improved coating adhesion strength to the substrate.

- Utilizing a new super multi-layered composition structure to achieve excellent wear and oxidation resistance.
 - Drastically improves the peel-off resistance of the coating by improving the boundary control technology between the carbide substrate and coating.
 - Achieves over 2 times greater fracture resistance in stainless steel machining compared with conventional grades.
- Applicable Grades : (For Stainless Steel Turning) AC6040M
(For Small Product Machining) AC1030U

Super FF Coat

CVD



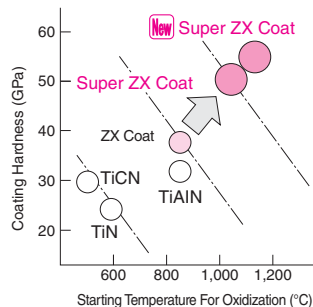
Our unique CVD process achieves ultra-flat boundary faces between coating layers and super ultra-fine coating particles.

- Smooth coating surface provides excellent adhesion and chipping resistance. Improved coating adhesion strength.
- Harder than conventional coatings with huge improvements in wear resistance.
- High speed, high efficiency machining of more than 1.5 times that of conventional grades is possible.
- Achieving more than double the tool life of conventional grades under conventional cutting conditions.

- Applicable Grades : (For Steel Turning) AC810P, AC820P, AC830P
(For Cast Iron Turning) AC405K, AC415K, AC420K
(For Stainless Steel Turning) AC610M, AC630M
(For Milling) ACP100, ACM200, ACK100, ACK200

NEW Super ZX Coat / Super ZX Coat

PVD



Utilising our proprietary thin layer coating technology and advanced nanotechnology, high coating hardness and excellent oxidation resistance are achieved by a coating structure that consist of approximately 1,000 alternating, nanometre-thin (1 nanometre = 1 billionth of a metre) layers.

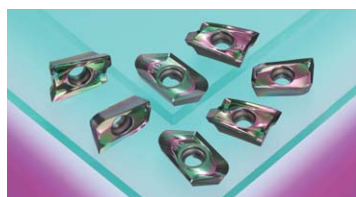
- Coating hardness increased by 40% and starting temperature for of oxidation increased by 200°C compared to conventional grades.
- At least 1.5x improvement in high-speed and high-efficiency cutting compared to conventional grades.
- Achieving more than double the tool life of conventional grades under conventional cutting conditions.

- Applicable Grades : (For Turning) AC503U, AC510U, AC520U, AC530U
(For Milling) ACK300, ACM100, ACM300, ACP200, ACP300

AURORA Coat (DLC:Diamond Like Carbon)

PVD

Using our proprietary PVD process technology, we have developed a hydrogen-free DLC coating that is extremely hard and smooth.



ADC12 Comparison of Cutting Edge Adhesion After Cutting



Work Material : ADC12
Cutting Conditions : v_c : 300m/min
 f_z : 0.15mm/t
 a_p : 5mm
 a_e : 5mm Dry

- Second only to diamond in terms of hardness, this smooth coating has a low coefficient of friction and provides excellent adhesion resistance to deliver better-quality machined surfaces.
- Can be used for high-speed, high-efficiency cutting of aluminum alloys, copper alloys, resins, and more.

- Adopted Grades (For Milling) DL1000
(For Endmilling) DL1000, DL1200
(For Drilling) DL1300, DL1500

Properties



For Turning(CVD)

Work Materials	Grades	Hardness (HRA)	TRS (GPa)	Coating	Coating Thickness (μm)	Characteristics	Old Grades
	AC810P	91.0	2.2	Super FF Coat	18	A P10 grade with excellent wear resistance that utilises a special carbide substrate with Super FF Coat for high to medium speed cutting.	AC700G
	AC820P	90.1	2.2	Super FF Coat	14	A P20 grade that features stability and longer tool life. Employs special carbide substrate and Super FF Coat to improve on P20 wear and fracture resistance.	AC2000
	AC8025P	90.1	2.3	Absotech Platinum	12	A P20 grade that drastically reduces the occurrence of abnormal insert damage to achieve long and stable tool life by employing a special carbide substrate with the new Absotech Platinum coating.	AC820P
	AC830P	89.4	2.6	Super FF Coat	8	Stable long-life grade employs special tough, carbide substrate and Super FF Coat. Improves on P30 grade fracture resistance and approaches P20 grade in terms of wear resistance.	AC3000
	AC630M	89.5	2.7	Super FF Coat	5	Superior performance in continuous and light cutting, and other low-speed applications that require sharp edges.	AC230
	AC610M	91.0	2.2	Super FF Coat	5	A high efficiency M10 grade featuring improved wear resistance during stainless steel cutting. Employs special, ultra-hard substrate and thin Super FF Coat.	—
	AC6020M	90.1	2.3	Absotech Platinum	5	An M20 grade that maintains wear resistance in stainless steel machining while drastically reducing the occurrence of abnormal damage by employing a special carbide substrate and the new Absotech Platinum coating.	—
	AC6030M	89.5	2.7	Absotech Platinum	5	The first recommended grade for general machining of stainless steel that drastically reduces the occurrence of abnormal damage in stainless steel machining and achieves long and stable tool life by employing a new coating: Absotech Platinum.	—
	AC630M	89.5	2.7	Super FF Coat	5	A general purpose grade featuring improved wear and fracture resistance during stainless steel cutting. Utilises a special tough carbide substrate with a thin Super FF Coat.	AC304
	AC405K	92.0	2.4	Super FF Coat	18	Employs an ultra-hard substrate and ultra-hard Super FF Coat to provide excellent resistance to wear and plastic deformation. Suitable for high-speed continuous cutting of cast iron.	AC410K
	AC415K	91.1	2.5	Super FF Coat	18	Employs a special dedicated ultra-hard substrate that is also suitable for interrupted cutting and ultra-hard Super FF Coat to provide stability and long tool life in a wide range of processes. First recommended grade for cast iron turning.	AC410K
	AC420K	91.1	2.5	Super FF Coat	12	A new, extremely versatile grade that can be used for rough, interrupted cutting of ductile and grey cast iron. Employs special, ultra-hard carbide substrate and Super FF Coat to provide stability and long tool life.	AC700G
	AC820P	90.1	2.2	Super FF Coat	14	A grade suited to heavy interrupted cutting of ductile cast iron.	AC2000



For Milling(CVD)

Work Materials	Grades	Hardness (HRA)	TRS (GPa)	Coating	Coating Thickness (μm)	Characteristics	Old Grades
	ACP100	89.3	3.1	Super FF Coat	6	A grade that employs a tough carbide substrate and thin-layer Super FF Coat to provide superior thermal crack and wear resistance in high-speed milling of steel.	AC230
	ACM200	89.8	3.4	Super FF Coat	6	A grade ideal for hardened steel machining that provides excellent wear and heat resistance by employing a newly-developed ultra-hard carbide and Super FF Coat.	AC230
	ACK100	92.0	2.4	Super FF Coat	6	A grade that employs a high-strength carbide substrate with Super FF Coat to provide excellent wear resistance in high-speed milling.	—
	ACK200	91.7	2.5	Super FF Coat	6	A grade that employs a tough carbide substrate and thin-layer Super FF Coat to provide superior thermal crack and wear resistance for high-speed milling.	AC211

A

Grades

Coated Carbide

Cermets

Ceramic


Carbide

CBN Layer





PCD

Properties

For Turning (PVD)

Work Materials	Grades	Hardness (HRA)	TRS (GPa)	Coating	Thickness (μm)	Characteristics	Old Grades
 Steel	T1500Z (Cermet)	92.0	2.2	Brilliant Coat*	3	• Brilliant Coat* PVD coating gives excellent lubricity for higher quality machining. • General-purpose coated cermet grade that can maintain high-quality machined surfaces and also gives excellent wear resistance.	T2000Z
	T3000Z (Cermet)	91.3	2.4	ZX Coat	3	• An ultra-reliable coating grade with tough cermet substrate.	—
	AC530U	91.4	3.3	Super ZX Coat	3	• For interrupted and general steel cutting. • Utilizing the super multi-layered PVD coating of nanometre thick TiAlN and AlCrN layers, coupled with a fine-grained super tough substrate for excellent fracture resistance.	ACZ310
	AC520U	91.7	3.0	Super ZX Coat	3	• Interrupted machining and stainless steel machining. • Utilizing the super multi-layered PVD coating of nanometre thick TiAlN and AlCrN layers, coupled with a super tough substrate for excellent fracture resistance.	EH520Z EH20Z
 Stainless Steel	AC6040M	91.6	3.8	Absotech Bronze	3	• The first recommended grade for interrupted machining of stainless steel that drastically improves the reliability in unstable machining thanks to the excellent adhesion and peel-off resistance of the new Absotech Bronze PVD coating, as well as the improved fracture resistance of the exclusive ultra-hard carbide substrate.	AC530U
	AC530U	91.4	3.3	Super ZX Coat	3	• Heavy interrupted machining and stainless steel machining. • Utilizing the super multi-layered PVD coating of nanometre thick TiAlN and AlCrN layers, coupled with a fine-grained super tough substrate for excellent fracture resistance.	ACZ310
 Cast Iron	AC510U	92.6	2.6	Super ZX Coat	3	• General to interrupted machining of cast iron and ductile cast iron. • Utilizing the super multi-layered PVD coating of nanometre thick TiAlN and AlCrN layers, coupled with a fine-grained super tough substrate for excellent fracture resistance.	EH510Z EH10Z
 Exotic Alloy	AC510U	92.6	2.6	Super ZX Coat	3	• Finishing to medium cutting of exotic alloys. • Utilizing the super multi-layered PVD coating of nanometre thick TiAlN and AlCrN layers. Superior wear and heat resistance, and stable, long tool life.	EH510Z EH10Z
	AC520U	91.7	3.0	Super ZX Coat	3	• Medium to rough cutting of exotic alloys. • Utilizing the super multi-layered PVD coating of nanometre thick TiAlN and AlCrN layers. Superior wear and heat resistance, and stable, long tool life even in interrupted cutting.	EH520Z EH20Z
 Hardened Steel	AC503U	93.2	1.7	Super ZX Coat	3	• For hardened steel. • Utilizing the super multi-layered PVD coating of nanometre thick TiAlN and AlCrN layers, coupled with an ultra-hard substrate for excellent wear resistance.	—
Small Product Machining	AC1030U	91.6	3.8	Absotech Bronze	2	• For precision machining that supports a wide range of work materials. • Employs the new Absotech Bronze coating with excellent adhesion and peel-off resistance to deliver excellent machined surface quality with improvements in cutting edge quality and superb stability.	—
	ACZ150	91.4	3.3	ZX Coat	1	• For small tools, and high-precision finishing to general finishing applications. • TiN ultra-thin coating and fine-grained, super tough substrate combine to give good edge sharpness and superior cut finish.	—

For Milling (PVD)

Work Materials	Grades	Hardness (HRA)	TRS (GPa)	Coating	Thickness (μm)	Characteristics	Old Grades
 Steel	ACP200	89.5	3.2	(New) Super ZX Coat	3	• For general machining of general and die steel. • Employs PVD coating consisting of multiple nanometre-thin layers. A general grade that achieves a good balance between fracture resistance and wear resistance when combined with an exclusive tough substrate.	ACZ330
	ACP300	89.3	3.1	(New) Super ZX Coat	3	• For interrupted machining and stainless steel machining. • Employs PVD coating consisting of multiple nanometre-thin layers. Provides excellent fracture resistance when combined with an ultra-tough substrate.	ACZ350
 Stainless Steel	ACM100	91.4	3.3	(New) Super ZX Coat	3	• A grade that provides excellent wear resistance by employing an ultra-hard fine-grained carbide and New Super ZX Coating.	ACZ310
	ACM300	89.8	3.4	(New) Super ZX Coat	3	• The first recommended grade for stainless steel machining that achieves a good balance between wear resistance and fracture resistance by employing a newly-developed ultra-hard carbide and New Super ZX Coating.	—
 Cast Iron	ACK300	91.4	3.3	(New) Super ZX Coat	3	• For general and interrupted machining of cast iron and ductile cast iron. • Employs PVD coating consisting of multiple nanometre-thin layers. Provides excellent fracture resistance when combined with a fine-grained tough substrate.	ACZ310
 Non-Ferrous Metal	DL1000	92.9	2.1	AURORA Coat (DLC Coat)	0.5	• For machining of non-ferrous metals including aluminum and copper alloy as well as resin. • Coated with DLC, which provides a low friction coefficient and excellent adhesion resistance.	—

*There may be minor differences in the colour tone/lustre of Brilliant Coat grades due to the interference of light. Such differences have no effect on performance.



Various grades and expanded lineup of catalog items meet a wide range of finishing needs.

Lineup includes wear-resistant **T1000A**, general purpose **T1500A**, general purpose coated cermet **T1500Z**, and tough **T3000Z** grades.

Expanded lineup of catalogue items for a wide variety of finishing applications.

A

Grades

Coated
Cermet

Cermet

Ceramic

Carbide

CBN
Layer

PCD

Characteristics

Uncoated Cermet

T1000A (Exclusive Grade)

Exclusive cermet grade with excellent wear resistance

- Improved wear and fracture resistance.
- Solid solution hard phase reduces reaction with steel.
- Perfect for high-speed continuous finishing of steel, cast iron, and powdered metal.



T1500A (New General Purpose Grade)

General purpose coated cermet grade that employs new Brilliant Coat* PVD coating with excellent lubricity

- Excellent wear resistance provides long tool life.
- Reduces adhesion of work material for beautiful finished surfaces.



Coated Cermet

T1500Z (General Purpose Grade)

General purpose cermet grade that provides both wear and fracture resistance with better quality finished surfaces

- Excellent wear resistance provides long tool life.
- Improved edge treatment technology provides beautiful finished surfaces.

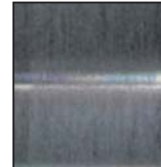


Surface Finish Comparison



T1500Z

Excellent Wear Resistance



Conventional
Coated Cermet

Glossy Finished Surfaces

Work Material : STKM13A
Insert : CNMG120408N-LU
Cutting Conditions : $v_c=100\text{m/min}$
 $f=0.15\text{mm/rev}$
 $a_p=1.0\text{mm}$ Wet

Reduced Blemishes

Properties



For Turning

Work Materials	Grades	Hardness (HRA)	TRS (GPa)	Coating	Thickness (μm)	Characteristics	Old Grades
P Steel	T1000A	93.3	1.8	—	—	Uncoated cermet grade with excellent wear resistance that provides good cost efficiency. Demonstrates excellent wear resistance in continuous finishing applications, and stable finishing of cast iron and sintered alloy as well as steel.	T110A
	T1500A	92.0	2.2	—	—	A general purpose grade that employs a substrate with improved balance of fracture and wear resistance to deliver superior finished surfaces in a wide variety of cutting conditions.	T1200A
	T1500Z	92.0	2.2	PVD Brilliant Coat*	3	Brilliant Coat's* new PVD coating gives excellent lubricity for higher quality machining. General-purpose coated cermet grade that can maintain high-quality machined surfaces and also gives excellent wear resistance.	T2000Z
	T3000Z	91.3	2.4	PVD ZX Coat	3	An ultra-reliable coating grade with tough cermet substrate.	—
K Cast Iron	T1000A	93.3	1.8	—	—	Exclusive uncoated cermet grade with excellent cost efficiency suitable for cast iron finishing, which requires high hardness.	T110A



For Milling

Work Materials	Grades	Hardness (HRA)	TRS (GPa)	Coating	Thickness (μm)	Characteristics	Old Grades
P Steel	T1500A	92.0	2.2	—	—	A general-purpose grade that employs a substrate with an improved balance between fracture and wear resistance to deliver superior finished surfaces in a wide variety of cutting conditions.	T1200A
M Stainless Steel	T250A	91.4	2.1	—	—	Tough cermet grade with enhanced crack advancement resistance.	—
	T4500A	91.0	2.3	—	—	Cermet grade with excellent fracture resistance and reduced occurrence of thermal cracking.	—

*There may be minor differences in the colour tone/lustre of Brilliant Coat grades due to the interference of light. Such differences have no effect on performance.

Igetalloy carbides have a solid history and a wide variety of grades to suit many different applications. They are widely used and appreciated for their superior performance.

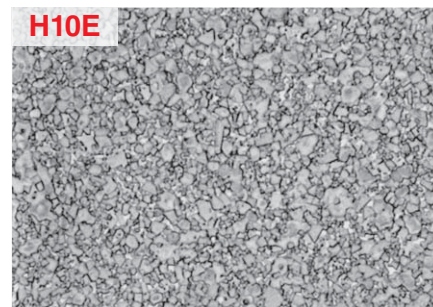
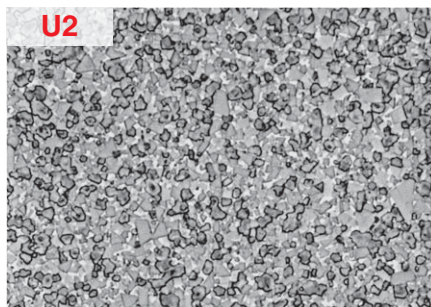
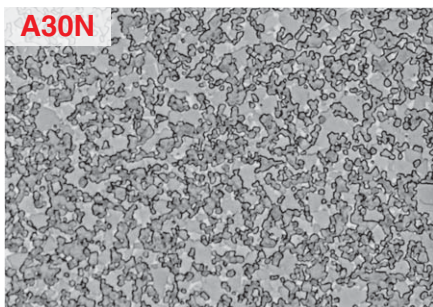
The Igetalloy line-up consists of a variety of characteristics that correspond to the uses of the tools. This is possible by varying the components: the WC structure (the main component) and the additives amounts such as TiC, TaC, and Co (the binder).

The wide selection of Igetalloy grades provide excellent wear resistance and toughness in various cutting conditions.

● For Steel

● For Stainless Steel

● For Cast Iron



Properties

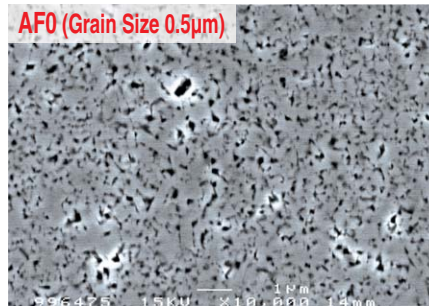
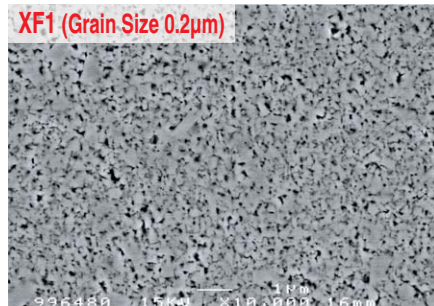
Work Materials	Grades	Hardness (HRA)	TRS (GPa)	Thermal Conductivity (W/m·K)	Young Modulus (GPa)	Compressive Strength (GPa)	Linear-Thermal Expansion Coefficient (X 10 ⁻⁶ /°C)
P Steel	ST10P	92.1	1.9	25	470	4.9	6.2
	ST20E	91.8	1.9	42	550	4.8	5.2
	A30	91.3	2.1	35	520	—	5.2
	A30N	91.2	2.2	35	520	—	—
	ST40E	90.4	2.6	75	—	—	—
M Stainless Steel	U10E	92.4	1.8	—	460	5.9	—
	EH510	92.6	2.6	76	—	—	—
	U2	91.5	2.2	88	—	—	—
	EH520	91.7	3.0	78	—	—	—
	A30	91.3	2.1	35	520	—	5.2
	A30N	91.0	2.4	35	—	—	—
K Cast Iron	BL130	94.3	2.9	56	—	—	—
	H2	93.2	1.8	105	600	6.1	4.4
	H1	92.9	2.1	109	650	6.1	4.7
	EH10	92.4	3.4	105	640	—	4.5
	EH510	92.6	2.6	76	—	—	—
	H10E	92.3	2.0	67	—	—	—
	EH20	91.3	3.5	105	620	—	4.5
	EH520	91.7	3.0	78	—	—	—
	G10E	91.1	2.2	105	620	5.7	—
N Non-Ferrous Metal	H1	92.9	2.1	109	650	6.1	4.7
S Exotic Alloy	EH510	92.6	2.6	76	—	—	—
	EH520	91.7	3.0	78	—	—	—

The Igetalloy micro-fine grained carbide series provides world class levels of micro-fine grain structure and delivers superior performance in small drills and other tools.

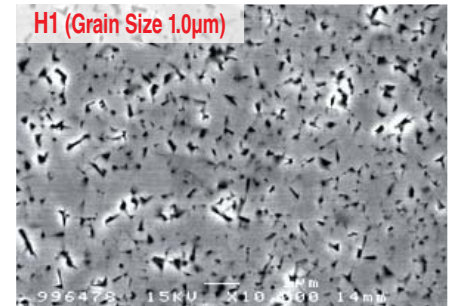
Igetalloy micro-fine grained carbides feature a WC structure of between 0.2 to 1µm, and are extremely strong and hard. They also provide excellent sharpness and superb surface quality on worked surfaces.

These features give excellent performance in a variety of applications from ø0.1mm PCB drills and endmill materials, to thin slitting blades and precision dies.

● Ultra-fine Grain



● Fine-grained Carbide



Properties

Classification	Grades	Properties					Characteristics	Applications
		Grain Size (µm)	Co Content (wt%)	TRS (GPa)	Hardness (HRA)	Hardness HV (GPa)		
Ultra-fine Grain	XF1	0.2	9.0	4.0	93.5	19.2	World's smallest grained carbide.	Micro drills, Small diameter drills
	AF1	0.5	12.0	4.4	92.5	17.3	World's toughest ultra-fine grained carbide.	Micro drills, Mini tools, Punches
	AF0	0.5	10.0	4.1	93.0	18.0	High toughness and wear resistant ultra-fine grained carbide.	Micro drills, Routers
	AFU	0.5	8.0	3.8	93.6	19.4	Enhanced wear resistant ultra-fine grained carbide.	Micro drills, Endmills for ultra-hard materials
Micro-fine Grained Carbide	A1	0.7	13.0	3.2	91.4	15.6	Tough micro-grained carbide.	Endmills, Taps, Drills for cast iron, Punches
	KH12	0.7	10.0	4.0	92.4	17.2	Micro-fine grained carbide with good balance of hardness and toughness.	Endmills, Drills for steel
	F0	0.7	5.0	2.0	93.6	20.1	Superior wear resistant micrograined carbide.	Micro drills, Routers
Fine-grained Carbide	KH03	1.0	10.0	3.3	91.4	15.2	Fine-grained carbide with good hardness and toughness.	Dies, Drills, Endmills
	KH05	1.0	13.0	3.5	90.4	13.6	High toughness fine grained carbide.	Dies
	H1	1.0	5.0	2.1	92.9	17.7	Superior wear resistant finegrained carbide.	Drills for cast iron, Reamers
	EH10	1.2	6.0	3.4	92.4	17.3	Fine-grained carbide with good balance of hardness and toughness. Fine-grained carbide.	Drills for exotic alloy, Reamers
	ZF16	1.0	6.0	3.5	93.0	18.6	Wear and chipping resistant fine-grained carbide for high speed machining.	Micro drills



High hardness and heat resistance for cutting high hardness steel and hard cast iron. Long tool life with high-speed finishing of grey cast iron.

In 1977, Sumitomo Electric successfully developed a revolutionary CBN sintered tool - SUMIBORON. The main component in SUMIBORON is Cubic Boron Nitride with a special ceramic binder sintered under super high pressure and temperature. As compared to other conventional tool materials, CBN has higher hardness and excellent heat resistance.

With these distinct characteristics, SUMIBORON can perform machining of hardened steel, high hardness cast iron and exotic metals where previously only grinding was done. Furthermore, excellent efficiency and longer tool life can also be achieved from high speed machining of cast irons.

Characteristics



Classifications	Structure	CBN Content	Hardness (GPa)	Grades	Application	Characteristics
Mainly CBN grains fused together		High ↑	44 ↑	BN700 BN7000 BN7500 BNS800	<ul style="list-style-type: none"> Carbide Chilled cast iron Ni-Hard cast iron Heat-resistant alloy, Cast iron Sintered ferrous alloy 	<ul style="list-style-type: none"> High carbon content. Structure consists of strongly fused CBN grains. Suited to cutting cast iron, heat-resistant alloy, ultra-hard alloy, and other hard materials.
Mainly CBN grains held together with a binder		Low ↓	21 ↓	BN500 · BNC500 BN1000 · BN2000 BN350 · BNX10 BNX20 · BNX25 BNC210 · BNC2020 BNC300 · BNC100 BNC160 · BNC200	<ul style="list-style-type: none"> Alloy steel Case hardened steel Carbon tool steels Bearing steel, Die steel Ductile cast iron 	<ul style="list-style-type: none"> CBN grains are fused together strongly with a special ceramic binder. Strong CBN binding force gives superior wear resistance and toughness when cutting hardened steel and cast iron.

Grade Range Map

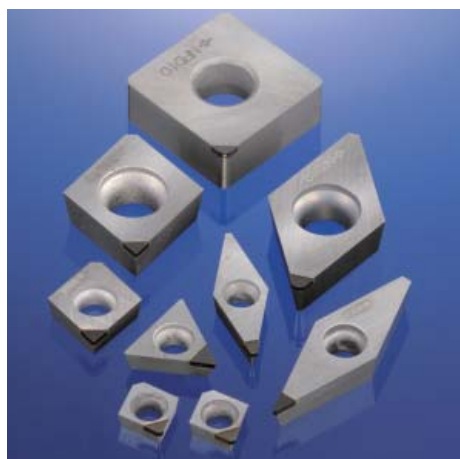
Work Materials	Series	Finishing to Light		Medium	Medium	Rough to Heavy
<div>H</div> <div>Hardened Steel</div>	Classification	—	H01	H10	H20	H30
	Coated SUMIBORON	BNC2010				
				BNC2020		
		BNC100				BNC300
				BNC160		
				BNC200		
	Uncoted SUMIBORON	BN1000				
			BN2000			
		BNX10			BNX20	
						BNX25,BN350
<div>Sintered alloy</div>	Classification	—	01	10	20	30
	Uncoted SUMIBORON	BN7500				
				BN7000		
<div>K</div> <div>Cast Iron</div>	Classification	—	K01	K10	K20	K30
	Coated SUMIBORON	BNC500*				
	Uncoted SUMIBORON				BNS800	
		BN7000				
			BN500			

*For Ductile Cast Iron

Characteristic Values

Work Materials	Grades	Binder	CBN Content (%)	Grain Size (μm)	Hardness HV (GPa)	TRS (GPa)	Main Coating Components	Coating Thickness (μm)	Characteristics
	BNC2010	TiCN	50 to 55	2	30 to 32	1.10 to 1.20	TiCN multi-layered	1.5	Improves the wear resistance of coating and substrate and stably achieves excellent surface roughness.
	BNC2020	TiN	70 to 75	5	34 to 36	1.20 to 1.30	TiAlN multi-layered	1.5	Provides long tool life in general and high-efficiency cutting thanks to tough substrate coated with a highly wear-resistant and highly adhesive layer.
	BNC300	TiN	60 to 65	1	33 to 35	1.15 to 1.25	TiAlN	1	Suited for finishing when there is a combination of continuous and interrupted cutting.
	BNC100	TiN	40 to 45	1	29 to 32	1.05 to 1.15	TiAlN/TiCN	2	Highly wear resistant coating makes this grade suited for high speed finishing.
	BNC160	TiN	60 to 65	3	31 to 33	1.10 to 1.20	TiAlN/TiCN	2	Stable, high precision finishing of hardened steel.
	BNC200	TiN	65 to 70	4	33 to 35	1.15 to 1.25	TiAlN	2	Tough substrate with high wear resistant coating provide longer tool life.
	BN1000	TiCN	40 to 45	1	27 to 31	0.90 to 1.00	—	—	Ultimate wear and fracture resistance. Suited to high-speed cutting.
	BN2000	TiN	50 to 55	2	31 to 34	1.05 to 1.15	—	—	A general purpose grade for hardened steel that provides a high degree of fracture and wear resistance.
	BNX20	TiN	55 to 60	3	31 to 33	0.95 to 1.10	—	—	Crater resistant grade, suitable for high efficiency cutting under high temperature conditions.
	BN350	TiN	60 to 65	1	33 to 35	1.20 to 1.30	—	—	High cutting edge strength, suited to heavy interrupted cutting.
	BNX10	TiCN	40 to 45	3	27 to 31	0.80 to 0.90	—	—	Optimum wear resistance. Suited to continuous, high-speed cutting.
	BNX25	TiN	65 to 70	4	29 to 31	1.00 to 1.10	—	—	Excellent fracture resistance during high speed cutting. Suited to high speed interrupted cutting of hardened steel.
	BN7500	Co Compound	90 to 95	1	41 to 44	1.40 to 1.50	—	—	Maintains optimum cutting edge sharpness. Suited for finishing of sintered alloy.
	BN7000	Co Compound	90 to 95	2	41 to 44	1.30 to 1.40	—	—	Improved wear and fracture resistance in rough cutting of sintered components.
	BNS800	Al Alloy	85 to 90	8	39 to 42	0.95 to 1.10	—	—	100% solid CBN structure with good thermal impact resistance.
	BN7000	Co Compound	90 to 95	2	41 to 44	1.30 to 1.40	—	—	Improved wear and fracture resistance in rough cutting of cast iron and exotic alloy.
	BN500	TiC	65 to 70	6	32 to 34	1.00 to 1.10	—	—	Optimized for cast iron cutting. Maintains good wear and fracture resistance.
	BNC500 (For Ductile Cast Iron)	TiC	60 to 65	4	32 to 34	1.00 to 1.10	TiAlN	2	Substrate with excellent wear resistance and coating makes this grade suited for hard-to-cut cast iron.





SUMIDIA Binderless Series uses nano-polycrystalline diamond for the cutting edge and demonstrates excellent wear and fracture resistance compared to conventional sintered diamond tools. In particular, SUMIDIA Binderless Series allows for improvements in tool life and machining precision that go far beyond conventional diamond tools in the machining of hard brittle materials, such as carbide.

● Excellent for High Precision Machining of Carbide

Nano-polycrystalline diamond with excellent wear resistance achieves high precision machining of carbide.

● Maintains Superior Dimensional Tolerances Over Many Hours

Greatly reduces the number of tool replacements compared to conventional diamond tools, and increases work efficiency while reducing total costs.

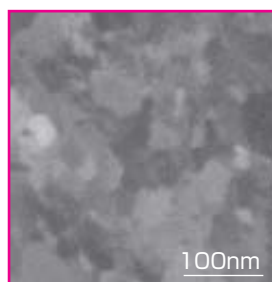
● Suitable for Hard Brittle Material Machining

Hard brittle materials (such as ceramics) that could only be ground before can now be cut.

Characteristics

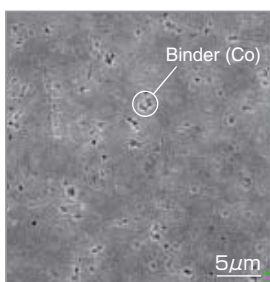
■ Comparison of Structures

Nano-Polycrystalline Diamond
SEM Structure



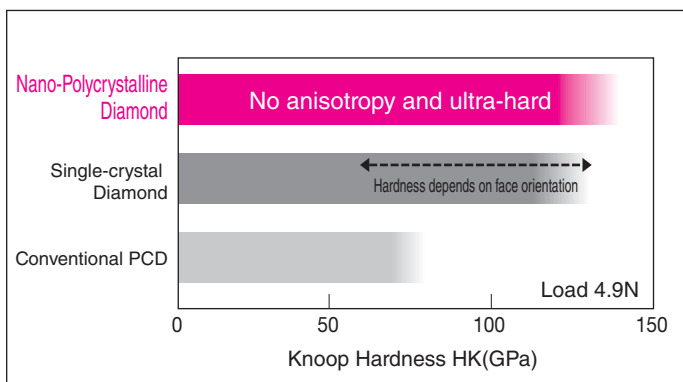
Diamond Particles
(30 to 50nm)

Conventional PCD
SEM Structure



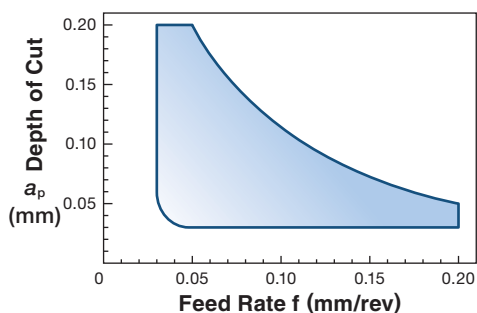
Diamond Particles
(1 to 10μm)

■ Hardness

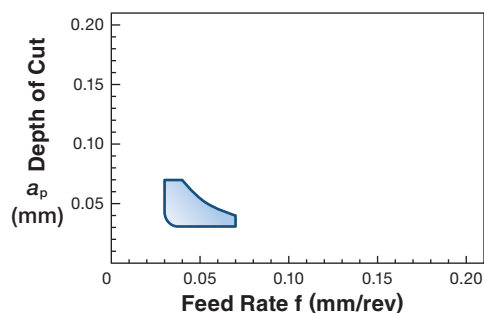


■ Application (Carbide Machining)

1. Hardness Less Than 88HRA



2. Hardness 88HRA and Greater



■ Recommended Cutting Conditions (Carbide Machining)

Work Materials				Cutting Conditions			Min. - Optimum - Max.
Classification	Hardness (HRA)	SEH Grade		Cutting Speed v_c (m/min)	Feed Rate f (mm/rev)	Depth of Cut a_p (mm/rev)	
VM VC	70 60 50	83 to 87	G7 G6	5 - 20 - 30	0.03 - 0.10 - 0.20	0.03 - 0.10 - 0.20	
VM VC	40	88 and above	G5 G2	5 - 15 - 30	0.03 - 0.05 - 0.07	0.03 - 0.05 - 0.07	

Coolant : Dry

Grade Range Map

From page A33

Characteristic Values

From page A33



Excellent wear resistance with longer tool life in high-speed, high-efficiency and high-precision cutting of non-ferrous metals and non-metals.

SUMIDIA is a polycrystalline diamond material made from sintered diamond powder that was first created using our proprietary technology in 1978.

SUMIDIA's superior wear resistance achieves longer tool life in high speed, high efficiency and high precision non-metal cutting and non-ferrous metal applications including aluminum, copper, magnesium and zinc alloys.

A

Grades

Coated
Carbide

Cermets

Ceramic

Carbide

CBN
Layer

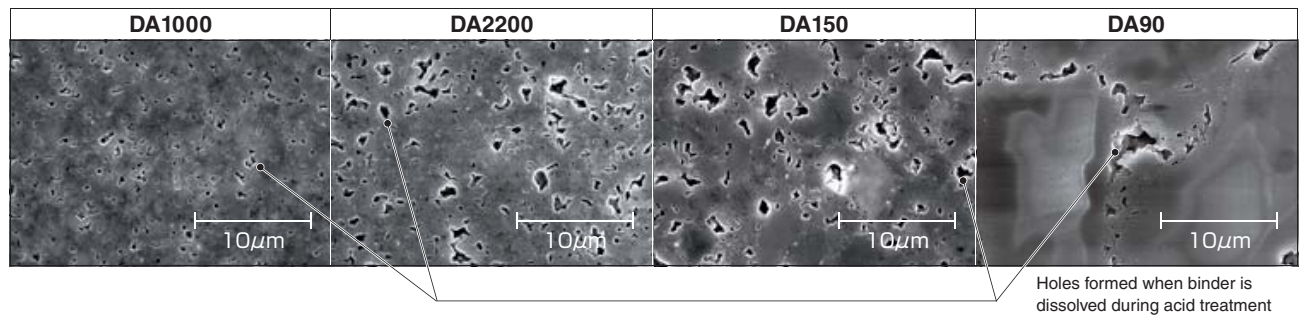
PCD

Characteristics

● Conventional Polycrystalline Diamond

High density sintered material made of diamond particles with particle sizes ranging from submicron to tens of microns.

Structure of Conventional Polycrystalline Diamond after Acid Treatment



Grade Range Map

Work Materials	Series	Finishing to Light		Medium	Rough to Heavy
Hard Brittle Material	Classification	01	10	20	30
	SUMIDIA Binderless	NPD10			
	SUMIDIA		DA90		
Non-Ferrous Metal	Classification	N01	N10	N20	N30
	SUMIDIA	DA1000			
		DA2200			
		DA90	DA150		

Characteristic Values

Work Materials	Grades	Binder	Diamond Content (%)	Grain Size (µm)	Hardness HV (GPa)	TRS (GPa)	Characteristics
Hard Brittle Material	NPD10	Co	100	Up to 0.05	120 to 130	≈ 3.15	100% diamond grade that directly binds nanometer-level diamond particles with high strength. Demonstrates the highest wear and fracture resistance and the best edge sharpness.
Non-Ferrous Metal	DA1000	Co	90 to 95	Up to 0.5	110 to 120	≈ 2.60	High density sintered material made of ultra-fine diamond particles that demonstrates optimum wear and fracture resistance, and edge sharpness.
	DA2200	Co	85 to 90	0.5	90 to 100	≈ 2.45	Sintered material made of ultra-fine diamond particles that demonstrates optimum wear and fracture resistance, and edge sharpness.
	DA150	Co	85 to 90	5	100 to 120	≈ 1.95	Sintered material made of fine diamond particles that provides a good balance of workability and wear resistance.
	DA90	Co	90 to 95	50	100 to 120	≈ 1.10	Sintered material made of coarse diamond particles with high diamond content and excellent wear resistance.






Superb wear for ultra-high speed machining.

Sumitomo Electric Hardmetal's "Advanced Ceramic" is created through a unique process that ensures excellent sharpness, making possible stable ultra-high speed cutting of cast iron, and cutting of heat-resistant alloys and ultra-hard rolled materials.

Grade Range Map



For Turning

Work Materials	High-Speed	Finishing to Light	Medium	Rough to Heavy		
	—	01	10	20	30	40
<div></div>	<div>NB90S</div>					
<div></div>	<div>WX120</div>					
<div></div>	<div>NB100C</div>					

Properties



For Turning

Work Materials	Grades	Hardness (HRA)	TRS (GPa)	Main Coating Components	Coating Thickness (μm)	Characteristics
K Cast Iron	NB90S	94.8	0.9	—	—	Contains Al ₂ O ₃ and carbide. Suitable for medium to finishing of cast iron.
S Exotic Alloy	WX120	90.0	1.2	—	—	Enhanced with SiC whiskers. For heat-resistant alloy and ultra-hard roll cutting.
H Hardened Steel	NB100C	95.0	1.0	TiAlN	2	Ultra-strong. Contains Al ₂ O ₃ and ZX Coat. Continuous low-speed turning of hardened steel.

Material Properties

Materials		Specific Gravity	Hardness (mHv) (GPa)	Young Modulus (GPa)	Thermal Conductivity (W/m·°C)	Linear-Thermal Expansion Coefficient (X 10 ⁻⁶ /°C)	Melting Point (°C)
Tungsten Carbide	WC	15.6	21	690	126	5.1	2,900
Titanium Carbide	TiC	4.94	31	450	17	7.6	3,200
Tantalum Carbide	TaC	14.5	18	280	21	6.6	3,800
Nobium Carbide	NbC	8.2	20	340	17	6.8	3,500
Titanium Nitrate	TiN	5.43	20	260	29	9.2	2,950
Aluminum Oxide	Al₂O₃	3.98	29	410	29	8.5	2,050
Silicon Nitride	Si₃N₄	3.17	25	310	29	3.0	>1,900 (decomposes)
Cubic Boron Nitride	cBN	3.48	44	700	1,300	4.7	—
Diamond	C	3.52	>90	970	2,100	3.1	—
Cobalt	Co	8.9	—	100 to 180	69	12.3	1,495
Nickel	Ni	8.9	—	200	92	13.3	1,455
Carbide	WC-5% Co	15.0	18	630	79	5.0	—
	WC-10% Co	14.6	14	580	75	5.0	—
	WC-20% Co	13.5	10	530	67	6.0	—
High Speed Steel		8.7	8	210	17	11.0	—

