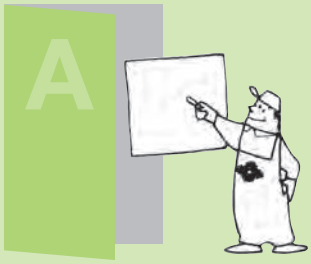
Insert Grades A

A1 to A37



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Grades for Turning

P General Steel (Carbon Steel, Alloy Steel), Mild Steel

Wear Resistance ← → Fracture Resistance

Classification	—	P01	P10	P20	P30	P40
Coated Carbide (A26)		AC8015P	New AC8020P	AC8025P	AC8035P	
		AC810P	AC820P		AC830P	
For Small Lathes (A24)			AC1030U			
			AC530U			
Coated Cermet (A29)		T1500Z	New T2500Z			
			T3000Z			
Cermet (A29)		T1000A	T1500A	T2500A		
Cemented Carbide (A30)			ST10P	ST20E	A30	
Ceramic (A36)						
Uncoated CBN Coated CBN (A32)						

M Stainless Steel

Wear Resistance ← → Fracture Resistance

—	M01	M10	M20	M30	M40
		AC6020M			
			AC6030M		
				AC6040M	
		AC610M	AC630M		
				AC1030U	
				AC530U	
	T1000A				
		T1500A			

K Cast Iron

Wear Resistance ← → Fracture Resistance

—	K01	K10	K20	K30
	AC4010K			
		AC4015K		
			AC420K	
				AC8025P
	AC405K			
		AC415K		
			AC1030U	
			AC530U	
	T1000A			
		G10E		
NB90S				
BN7000				
			New BNC8115	
			New BNS8125	
	BN500			
BNC500 (Dedicated for Ductile Cast Iron)				

S Exotic Alloy

Wear Resistance ← → Fracture Resistance

—	S01	S10	S20	S30
	New AC5005S			
	AC5015S			
		AC5025S		
	AC510U			
		AC520U		
	EH510			
		EH520		
	WX120			
NCB100				
	BN7000			
			BNS800	

H Hardened Steel

Wear Resistance ← → Fracture Resistance

—	H01	H10	H20	H30
		AC503U		
		NB100C		
	BNC2010			
		BNC2020		BNC300
		New BNC2125		
		New BNC2115		
	BN1000			
		BN2000		
			BNX20	
				BN350
BNX10				

N Non-ferrous Metal

Wear Resistance ← → Fracture Resistance

Classification	—	N01	N10	N20	N30
Carbide (A30)					H1
PCD (A34)		DA90			
			DA150		
			DA1000		

Powdered Metal

Wear Resistance ← → Fracture Resistance

Classification	—	01	10	20	30
Coated Carbide (A26)		New AC5005S			
Cermet (A29)		T1000A			
Uncoated CBN (A32)	New BN7115				
			BN7000		

Cemented Carbides and Hard Brittle Materials

Wear Resistance ← → Fracture Resistance

Classification	—	01	10	20	30
PCD (A34)		NPD10			
			DA90		

★WX120 is only sold in Japan.

: 1st Recommended Grade : 2nd Recommended Grade : CVD Coating, : PVD Coating, Blank: Uncoated

Grades for Milling

Work Material	P General Steel (Carbon Steel, Alloy Steel), Mild Steel	M Stainless Steel	K Cast Iron
Classification	Wear Resistance ← → Fracture Resistance	Wear Resistance ← → Fracture Resistance	Wear Resistance ← → Fracture Resistance
	— P01 P10 P20 P30 P40	— M01 M10 M20 M30 M40	— K01 K10 K20 K30
Coated Carbide A26	Expansion ACU2500 (P) New XCU2500 (P) ACP2000 (P) ACP3000 (P) ACP100 (P) ACP200 (P) ACP300 (P)	Expansion ACU2500 (P) New XCU2500 (P) ACM100 (P) ACM200 (P) ACM300 (P) ACK300 (P) ACP300 (P)	Expansion ACU2500 (P) New XCU2500 (P) New XCK2000 (K) ACK2000 (K) ACK3000 (P) ACK100 (K) ACK200 (K) ACK300 (P)
Cermet A29	T2500A (P) T250A T4500A (P)	T2500A (P) T250A T4500A (P)	
Cemented Carbide A30	A30N (P)	A30N (P)	G10E (K)
Uncoated CBN **Coated CBN** A32			BN7000 (K) New BNC8115 (K) New BNS8125 (K)

Work Material	S Exotic Alloy	H Hardened Steel	N Non-ferrous Metal
Classification	Wear Resistance ← → Fracture Resistance	Wear Resistance ← → Fracture Resistance	Wear Resistance ← → Fracture Resistance
	— S01 S10 S20 S30 S40	— H01 H10 H20 H30	— N01 N10 N20 N30
Coated Carbide A26	Expansion ACU2500 (P) ACM100 (P) ACM200 (P) ACM300 (P) ACK300 (P)		DL1000 (P) DL2000 (P)
Cemented Carbide A30	EH520 (P)		H1 (K) H20 (K)
Uncoated CBN A32		BN350 (H) BN7000 (H)	
PCD A34			DA1000 (N)

: 1st Recommended Grade / : 2nd Recommended Grade ▽: CVD Coating, △: PVD Coating, Blank: Uncoated

Grade Comparison Chart

■ CVD Coated Grades

Applications	Work Material	Classification Code	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	MOLDINO	NTK	Sandvik	Kennametal	SECO Tools	WALTER	ISCAR	TaeguTec
For Turning	P Steel	P05	**AC8015P AC810P**	UE6105 MC6115	T9105 T9205	CA510 CA5505	HG8010		GC4305 GC4205	KCP05 KCP05B	TP0501 TP0500	WPP05S WPP05 WPP01	IC8005 IC8150 IC9015	TT8105
		P10	**AC8020P AC8015P AC810P**	MC6115 MC6015 UE6110	T9105 T9115 T9205 T9215	CA510 CA515 CA5515	HG8010	CP7	GC4415 GC4305 GC4315 GC4215	KCP10 KCP10B	TP1501 TP1500	WPP10S WPP10	IC8150 IC8080 IC9015 IC9150 IC9080	TT8115
		P20	**AC8020P AC8025P AC820P**	MC6025 UE6020	T9115 T9125 T9215 T9225	CA025P CA525	GM25 HG8025 GM8020	CP7	GC4425 GC4325 GC4225	KCP25 KCP25B	TP2501 TP2500	WPP20S WPP20	IC8150 IC8250 IC9015 IC9150 IC9250	TT5100 TT8125
		P30	**AC8035P AC830P AC6030M AC630M**	MC6035 UE6035	T9125 T9135 T9235	CA025P CA525 CA530	GM25 GM8035		GC4325 GC4335 GC4235	KCP30 KCP30B	TP3501 TP3500	WPP30S WPP30	IC8080 IC9350	TT7100 TT8135
		P40	**AC8035P AC830P AC6030M AC630M**	MC6035	T9135 T9235 T6130	CA530 CA5535	GX30 GM8035		GC4335 GC4235 GC30	KCP40 KCP40B	TP3501 TP3500		IC9350	TT7100
	M Stainless Steel / S Exotic Alloy	M10 S10	**AC6020M AC610M**	MC7015 US7020 US905	T9115 T9215	CA6515	HS9105		GC2015 GC1515 S05F	KCM15	TM1501		IC9250 IC520M	TT9215 TT3005
		M20 S20	**AC6020M AC6030M AC610M AC630M**	MC7025 US7020	T6120 T9125 T9215	CA6525	HG8025		GC2025 GC1515	KCM25	TP2501 TM2000 TM2501		IC9025 IC9325 IC4050	TT5100 TT9225
		M30	**AC6030M AC630M AC8035P AC830P**	MC7025 US735	T6130	CA6535	GM8035 GX30 GM25		GC2035 GC235	KCM35	TP3501 TM3501 TM4000		IC9350 IC4050 IC635	TT9235
		M40	**AC6030M AC630M**	US735					GC235 GC2035		TM4000			TT7800
	K Cast Iron	K05	**AC4010K AC405K**	MC5005 UC5105 UC5115	T5105	CA310 CA4505 CA4010	HX3505	CP1	GC3205 GC3210	KCK05	TK0501 TK1001	WKK10S WAK10	IC5005	TT7005 TT7505
		K10	**AC4010K AC4015K AC405K AC415K**	MC5005 MC5015 MC5020 UC5105 UC5115	T515 T5105 T5115	CA315 CA4505 CA4515 CA4115	HX3305 HX3515 HG8010	CP1	GC3210	KCK15	TK1001 TK1501	WKK10S WKK20S WAK10 WAK20	IC5100 IC9150 IC4100	TT7015
		K20	**AC4015K AC415K AC420K AC425K AC8025P**	MC5015 UC5115 UE6110	T515 T5115 T5125	CA320 CA4515 CA4120 CA4115	HX3515 GM8020		GC3225	KCK15 KCK20	K2001	WKK20S WAK20 WAK30	IC9150 IC5100 IC4100	TT7015
For Milling	P Steel	P10	**XCU2500 ACP2000 ACP100**	F7030 MC7020 MV1020	T3130				GC4220 GC4330	KCPM20	MP1501 MP1500 MP2501 MP2500	WKP25S WKP25 WKP35S WKP35G	IC4100 IC5400 IC9015 IC8080 IC9080 IC5100	TT7080 TT7515 TT9300
		P20	**XCU2500 ACP2000 ACP100**	F7030 MC7020 MV1020	T3130 T3225		GX2140		GC4330 GC4340	KSPM20 KCPK30	MP2501 MP2500	WKP25S WKP25 WKP35S WKP35G	IC8080 IC9080 IC9250	TT7400
		P30	**XCU2500 ACP2000 ACP100**				GX2160		GC4340	KCPK30 KCPM30			IC9250 IC4050	TT7800 TT8525
	M Stainless Steel	M10	**XCU2500 ACM200**							KCPM20				
		M20	**XCU2500 ACM200**	F7030 MC7020 MV1020	T3130 T3225	CA6535	GX2160 AX2040		GC2040	KCPM20 KCPM30	MP2500 MP2501 MS2500	WMP45G WSM45X		TT7800 TT8525
		M30	**XCU2500 ACM200**							KCPM20 KCPM30	MP2500 MP2501 T350M		IC5820	TT7800 TT8525
	K Cast Iron	K10	**XCK2000 ACK2000 ACK200**		T1215					KCK15			IC5100	TT6800
		K20	**XCK2000 XCU2500 ACK2000 ACK200**	MV1020 MC5020 F5010 F5020	T1115 T1215	CA420M	GX2120		GC3330 GC3220 GC3225 GC3020 GC3040	KC915M KC930M KC935M	MP1501 MK1500	WAK15 WKP25S WKP35S WKP35G	IC5100 DT7150 IC4010 IC4050 IC4100	TT6800

■ PVD Coated Grades

Applications	Work Material	Classification Code	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	MOLDINO	NTK	Sandvik	Kennametal	SECO Tools	WALTER	ISCAR	TaeguTec
For Turning	P Steel	P10	**AC1030U ACZ150 AC5005S AC5015S AC5025S AC520U**	VP15TF MS6015	AH110 AH120 AH710 AH725	PR915 PR930 PR1005 PR1215 PR1225 PR1705		TM1 VM1 DT4 DM4	GC1525	KCU10 KC5510	TS2000	WSM10	IC507 IC807 IC907	
		P20	**AC1030U AC5025S AC520U AC530U**	VP15TF VP20RT	AH120 AH725 AH3135	PR1225 PR1425 PR1725	IP2000	TM1 TM4 VM1 QM3 DM4	GC15 GC1125 GC1525	KCU25 KC5525	TS2500	WSM20	IC507 IC807 IC907	TT9030
		P30	**AC1030U AC530U**	VP15TF VP20RT	AH120 AH725 SH730 AH730	PR1425 PR1525 PR1535	IP3000 CY250	QM3	GC1125				IC328 IC928	TT8020 TT9030
		P40	**AC1030U**			PR660	IP3000		GC4335 GC4235				IC830	TT8020

Note: The above data was collected from various published catalogues. The information may therefore not be up to date.

Grade Comparison Chart

■ PVD Coated Grades (continued)

Applications	Work Material	Classification Code	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	MOLDINO	NTK	Sandvik	Kennametal	SECO Tools	WALTER	ISCAR	TaeguTec
For Turning	M Stainless Steel / S Exotic Alloy	M10 S10	**AC5005S AC5015S AC5025S AC510U AC520U ACZ150**	MP9005 MP9015 VP15TF VP05RT VP10RT	AH110 AH710 AH725 AH905 AH8005	PR005S PR015S PR915 PR1025 PR1215 PR1225 PR1305 PR1310	IP050S IP100S JP9105 JP9115	TM1 VM1 DT4 DM4 ZM3 ST4	H5D6 GC1105 GC1115	KCS10 KCS10B KC5510 KCU10	TH1000 TS2000	WSM01 WSM10 WSM10S	IC804 IC807 IC808 IC907 IC908	TT3010 TT5080 TT8010
		M20 S20	**AC5015S AC5025S AC1030U AC520U**	MP9015 MP9025 VP15TF VP20RT VP20MF UP20M MS9025	AH630 AH120 AH725 AH8015	PR015S PR915 PR930 PR1025 PR1125 PR1215 PR1225 PR1325 PR1725	IP100S HS9115	DT4 DM4 ZM3 QM3 TM4 ST4	GC15 GC1115 GC1125	KC5525 KCU25 KC5025	TS2500	WSM20 WSM20S	IC330 IC806 IC808 IC830 IC908 IC928	TT3020 TT8010 TT8020 TT9030
		M30	**AC5025S AC6040M AC1030U AC520U AC530U**	MP7035 VP15TF VP20MF MS9025	AH630 AH645 AH725	PR1125 PR1525 PR1535		QM3 TM4 DT4 DM4	GC1125			WSM30 WSM30S	IC328 IC330 IC830 IC840 IC882	TT8020
		M40	**AC6040M AC1030U AC530U**	MP7035 VP15TF MS6015	AH645	PR1125 PR1535	GX30						IC830 IC928	TT8020
	K Cast Iron	K10	**AC1030U AC510U ACZ150 AC5015S**	VP10RT	AH110 AH120	PR905	HX3305 HG3305 HG3315 HX3515 HG8010 TH315 ATH10E		GC15				IC810	TT9030
		K20	**AC1030U AC510U ACZ150 AC5015S AC5025S**	VP10RT VP20RT VP15TF	AH120	PR905		DM4 QM3						TT9030
		K30	**AC1030U AC530U**	VP15TF VP20RT	AH110 AH120 AH725								IC830 IC908 IC910 IC928	
For Milling	P Steel	P10	**ACU2500 ACP200**	VP15TF MP6120	AH110 AH120 AH710 AH725	PR1225	PN215 PN15M JP4105 JP4115 JP4120 CY9020	DT4 DM4	GC1010	KC505M KC510M KC515M	F25M			TT2510 TT7080
		P20	**ACP3000 ACU2500 ACP200 ACP300**	VP15TF VP20RT MP6120 MP6130 UP20M	AH9030 AH120 AH725 AH3035 AH3225	PR1525 PR1225 PR1230 PR830	JP4120 CY150 CY9020 JS4045	TM4 DT4 DM4	GC1010 GC1025	KC522M KC525M KCSM30 SP6519	MP3000 F30M F32M F40M	WSM35 WSM35S	IC808 IC810 IC908 IC910	TT7080 TT9030 TT9080
		P30	**ACP3000 ACU2500 ACP200 ACP300**	VP15TF VP30RT MP6130 UP20M	AH3035 AH3135 AH3225 AH120 AH130 AH140 AH725	PR1525 PR1230 PR830	JS4045 JS4060 CY25 CY150 CY250 CY250V HC844 PTH30E	DM4 TM4 ZM3	GC1030 GC1130 GC2030	KC725M KC735M KC525M KC530M KCPM40 KCSM30 SP6519 X400	F40M T60M MP3000	WSM35 WSM35S WSP45 WSP45S	IC328 IC330 IC830 IC928	TT8080 TT8020 TT8525B
		P40	**ACP3000 ACU2500 ACP300**	VP30RT	AH140		JS4060 JM4160 PTH40H			KC725M KC735M KCPM40		WSP45 WSP45S	IC830 IC845 IC928	TT8020 TT8080 TT8525B
	M Stainless Steel / S Exotic Alloy	M10	**ACM100 ACU2500 ACK300 ACP300**	MP9120 VP15TF	AH110 AH120 AH330 AH725 AH8005 AH8015	PR1210 PR1225	CY9020 JP4120 PN08M PN15M PN208 PN215	DT4 DM4 ZM3	GC1010 GC1025 GC1030 GC1130	KC515M SP4019 SP6519			IC808 IC908	
		M20	**ACM300 ACU2500 ACP300**	MP7030 MP7130 MP9030 MP9120 MP9130 UP20M VP15TF VP20RT	AH120 AH130 AH330 AH725 AH3225 AH8015	PR1210 PR1225 PR1525 PR830	JP4120 CY150 JS1025	DT4 DM4 ZM3	S30T	KC522M KC525M SP4019 SP6519 X700	F25M F30M F32M MP3000 MS2050 MM4500	WSM35 WSM35S	IC328 IC330 IC808 IC830 IC840 IC908 IC928	TT9080 TT9030
		M30	**ACM300**	MP7030 MP7130 MP7140 MP9030 MP9130 MP9140 UP20M VP15TF VP20RT	AH130 AH140 AH330 AH725 AH3135	PR1525 PR1535 PR830	JM4160 PTH30E JS1025	DT4 DM4 ZM3	GC2030 GC1040 S30T	KC522M KC525M KC530M KC725M KC735M KCPM40 KCSM30 KCSM40 X700	F30M F32M F40M MP2050 MS2050	WSM35 WSM35S WSP45 WSP45S	IC328 IC330 IC830 IC840 IC882 IC928	TT8020 TT8080 TT9080
		M40	**ACM300**	MP7140 MP9140 VP30RT	AH140	PR1535	JM4160 PTH40H			KC725M KCPM40 KCSM40		WSP45 WSP45S	IC328 IC330 IC882	TT8020 TT8080
	K Cast Iron	K05	**ACK3000**	MP8010	AH110 AH710		TH303 TH308 ATH80D PTH08M		GC1010	SP4019	MH1000			
		K10	**ACK3000 ACU2500**	MP8010	AH110 AH120 AH330 AH710	PR1210	ATH10E TH315 CY100H		GC1010 GC1020	KC514M KC515M KC520M KCK20 SP4019 SP6519	MH1000		IC810 IC910	TT7080 TT7515
		K20	**ACK3000 ACU2500 ACK300**	MP8010 VP15TF	AH110 AH120 AH330 GH330	PR1210 PR1510	JP4120 PTH13S CY100H CY9020	DM4	GC1020 GC1025	KC514M KC524M KCK20 SP6519	MK2050 MK3000	WKK25S	IC808 IC810 IC830 IC908 IC910 IC928	TT6080 TT7515
		K30	**ACK3000 ACU2500 ACK300**	VP15TF VP20RT	AH725 AH120 AH330 GH110 GH130 GH330	PR1510 PR1210	JS4045 CY150 CY250		GC1025 GC1030 GC1130	KC520M KC522M KC524M	MK2050		IC830 IC810 IC910 IC928	TT6080

Note: The above data was collected from various published catalogues. The information may therefore not be up to date.

Grade Comparison Chart

■ Cermet

Applications	Work Material	Classification Code	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	MOLDINO	Sandvik	Kennametal	SECO Tools	WALTER	ISCAR	TaeguTec
For Turning	P Steel	P10	**T1500Z* T1000A T1500A**	AP25N* VP25N* NX2525	GT720* GT9530* AT9535* J9530* NS520	TN60 TN6020 TN610 TN620 PV710* PV720* CCX*	CZ25* CH550	CT5015	KT125 HTX KT1120			IC20N IC30N IC520N	PV3030 PV3010 CT3000
		P20	**T1500Z* T2500Z* T3000Z* T1500A T2500A**	AP25N* NX2525 NX3035 MP3025*	NS9530 GT9530* AT9530* J9530*	TN90 TN620 TN6020 PV720* CCX*	CZ25* CH550	GC1525*	KT6215 KT315* KT175 KT5020*	CM CMP C15M TP1020		IC20N IC30N IC520N IC530N	CT7000
		P30	**T2500Z* T3000Z* T2500A**	NX2525 MP3025* VP45N*	NS9530 GT9530* AT9530*	TN620 PV720* PV730*							
	K Cast Iron	K10	**T1000A**	AP25N* VP25N* NX2525	GT720* GT9530* NS9530 J9530* NS520	TN610 PV7005* PV710* CCX*	CH550	CT5015	KT125 HTX				PV3030 CT3000
For Milling	P Steel	P30	**T2500A T250A T4500A**	NX2525 MX3030 NX4545 VP45N*	NS540 NS740	TN60 TN90 TN100M TN620M	MZ1000* MZ2000* MZ3000* CH7030 CH7035	CT530	KT530M* KTPK20*	C15M		IC30N	

* mark indicates coated cermet

■ Cemented Carbide

Applications	Work Material	Classification Code	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	MOLDINO	NTK	Sandvik	Kennametal	SECO Tools	WALTER	ISCAR	TaeguTec
For Turning / For Milling	P Steel	P10	**ST10P**		TH10		WS10		S1P					
		P20	**ST20E**	UTi20T	KS20		EX35		SMA	K125M			IC07 IC50M	UF10
		P30	**A30 A30N**	UTi20T	KS15F UX30	PW30	EX35 EX40		SM30				IC54 IC28	P30
		P40	**ST40E**		TX40		EX45		S6				IC54 IC28	
	M Stainless Steel	M10	**EH510**		TH10		EX35 WA10B	KM1	H10A	KU10,K313 K68,KYSM10	890		IC07,IC20 IC08	
		M20	**EH520**	UTi20T	KS20		EX35		H13A	K313 K68	HX 883		IC07,IC20 IC08	UF10
		M30	**A30 A30N**	UTi20T	UX30				H10F SM30				IC28	
	K Cast Iron	K01	**H2 H1**	HTi05T	KS05F		WH01 WH05			KU10,K313 K68,K115M			IS8	
		K10	**H1 EH510**	HTi10	TH10	KW10 GW15	WH10	KM1	H13A	KU10,K313 K68,K115M K110M KY3500	890		IC20,IS8	K10
		K20	**G10E,H10E EH520**	UTi20T	KS15F KS20	GW25	WH20	KM3	H13A	KMF KY3500 KYHS10	890 883 HX		IC20 IS8	
		K30	**G10E,H10E**	UTi20T			WH30			KY3500	883			
	S Exotic Alloy	S10 S20	**EH510 EH520**	RT9005 RT9010 MT9015 TF15	TH10 KS05F KS15F KS20	SW05,SW10 SW25,KW10 GW15	WH10		H10A H10F H13A	KU10,K313 K68,KMF K110M,KYHS10 K1025	HX H25		IC20,IC07 IC08,IC28	K10
	Micro-fine Grained Carbide	Z01	**F0**	SF10,MF07 MF10,TBA16A	F,MD1508 MD08F		NM08						IC07	UF1A
		Z10	**AFU XF1**	HTi10 MF20	M,MD10 MD05F,MD07F	FW30	NM15		6UF,8UF PN90,H6FF		890		IC07	UF1A
		Z20	**AF0 AF1**	TF15 MF30	EM10,MD20 MD15		BRM20 EF20N		12UF		890 883		IC08	UF10
		Z30	**A1**		UM		NM25		N6F,H10F		883		IC08	

■ Ceramic

Applications	Work Material	Sumitomo Electric	Tungaloy	Kyocera	NTK	Sandvik	Kennametal	TaeguTec
For Turning / For Milling	H Hardened Steel	**NB100C**	WG300 LX11	A66N A65 KT66 PT600M	HC4,HC7 ZC7,WA1	GC6050 CC650 CC670	KY1615 KY4300	AB20 AB2010
	S Exotic Alloy	**WX120***	WG300	CF1 KS6030 KS6040	WA1 SX9	CC6060 CC6065 CC670	KY4300 KY1540	TC430 AS20
	K Cast Iron	**NB90S**	LX11,LX21 CXC73,FX105 CX710	A65,A66N KA30,KS500 KS6000,KT66 PT600M CS7050,KS6050	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

★WX120 is only sold in Japan.

Note: The above data was collected from various published catalogues. The information may therefore not be up to date.

Grade Comparison Chart

■ CBN

Applications	Work Material	Classification Code	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	NTK	Chukyo	Sandvik	Kennametal	SECO Tools	ISCAR
For Turning / For Milling	K Cast Iron	K01	**NCB100 BNC500* BN7000 BN500**	MB710 MB5015	BX910 BX930 BX870	KBN475 KBN60M	B30 B16		CB50 CB7525	KB1340		IB50 IB85
		K10	**BN7000 BN500**	MB710,MB730 MB5015,MB4020	BX470,BX480 BX950	KBN60M KBN900	B23 B16	HB55,HB56 HB569 HB580,HB57	CB7925		CBN200,CBN300 CBN300P,CBN400C	IB55 IB90
		K20	**BN7000 BNC8115 BNS8125**	MB730,MB4020 MB4120,MBS140	BX470,BX480 BXC90,BX90S	KBN900		HB56,HB569 HB580,HB57				
		K30	**BNC8115 BNS8125**	MB4120,MBS140 BC5030	BXC90 BX90S			HB57		KB5630	CBN500	
	S Exotic Alloy	S01	**NCB100 BN7000**	MB730 MB4020 MB4120	BX940,BX950 BX470,BX480 M714B			HB55 HB580 HB52		KB5630 KB1340		IB85 IB05S IB10S
	H Hardened Steel	H01	**BNC2010 BNC2115 BN1000 BN2000 BNX10**	BC8105 BC8110 MBC010 MB810 MB8110	BXA10 BXM10 BX310	KBN05M KBN10M KBN510	B5K B52	HB55 HB550 HB580 HB590	CB7105	KB5610	CH0550 CBN10 CBN100 CBN060K	IB05H IB50 IB10HC
		H10	**BNC2010 BNC2020 BNC2115 BNC2125 BN2000**	BC8110 BC8120 MBC020 MB8025 MB8110 MB825	BXA10 BXM10 BX330 BX530	KBN05M KBN25M KBN525	B5K B6K B52 B36	HB55 HB59 HB550 HB580 HB52	CB7015 CB7115 CB20	KBH20 KB5610 KB5625	CBN10 CBN100 CBN150 CBN060K CBN160C	IB10H IB55 IB25HA
		H20	**BNC2020 BNC2125 BNX20**	BC8120,BC8020 MBC020 MB8025,MB8120	BXA20 BXM20 BX360	KBN30M KBN35M KBN900	B36 B40 B6K	HB57,HB59 HB590 HB580	CB7025 CB7125 CB50	KBH20 KB5625 KB5630	CH2540 CBN150 CBN160C	IB20H,IB20HC IB25H,IB25HC
		H30	**BNC300 BN350**	BC8130 MB8130 MB835	BXM20 BXA20 BXC50 BX380	KBN30M KBN35M KBN900	B40	HB57 HB580	CB7135 CB7525	KB5630	CH3515	IB90

* mark: For ductile cast iron cutting

■ Polycrystalline Diamond

Applications	Work Material	Classification Code	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	NTK	Chukyo	Sandvik	Kennametal	SECO Tools	ISCAR
For Turning / For Milling	N Non-Ferrous Metal	N01	**DA1000 DA90**	MD205	DX180 DX160	KPD001	PD1		CD05 CD10	KD1400		ID5
		N10	**DA1000 DA150**	MD205 MD220	DX140	KPD001 KPD010 KPD230	PD2	HD100 HD30 HD60	CD1810	KD1400 KD1425	PCD05 PCD10	ID5
		N20	**DA1000 DA2200**	MD220 MD230	DX120 DX110	KPD230 KPD250	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 various published catalogues. The information may therefore not be up to date.

Chipbreaker Comparison Chart

■ Negative Type Inserts

Work Material	Applications	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	MOLDINO	NTK	Sandvik	Kennametal	SECO Tools	WALTER	ISCAR	TaeguTec
P Steel	Fine Cutting	**FA**	FH,FP	TF	GP			QF	FF	FF1		SF	
		FL,FB	FS,FY	NS,ZF	XP,XF,VF VC,SK	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
	Finishing (Wiper Edge)	**LUW**		AFW,FW	WP,WF			WL,WP		W-FF2			
		SEW	SW	ASW,SW	WQ			WF,WMX	FW	W-MF2	NF	WF	WS
	Finishing to Light Cutting	**SE,SX**	LP	AS,ZM	CJ,XS	AB,CT	ZW1,WR	PF,KF	LF,33		MP3,NS6	F3P,TF	
	Medium Cutting	**GU(UG)**	MA,MV	TM,TQ	HS,PS	AH	ZP	XM,QM PMC	P,MG	M3	MU5	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
	Medium Cutting (Wiper Edge)	**GUW**	MW		WE			WM	MW,RW	W-M3	NM	WG	WT
	Roughing	**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,MP	HAS,MT	CH					RN	MR6			
	Heavy Cutting	**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
M Stainless Steel	Finishing	**SU,EF**	LM,SH	SS	MQ,GU	SE,MP,AB	ZF1	MF	FP,FS,LF	MF2	NF4,FM5	F3M	EA,SF
	Light to Medium Cutting	**EX,EG**	GM,MS	SF,SA	MS,MU	PV	ZP	23	MS	MF1,M1	MM5	TF,VL	EM
	Medium Cutting	**GU**	MM	SM		DE		MM,MMC SMR	MP	MF3,M3	NM4,MS3 MU5	M3M PP	ET
	Roughing	**HM**	ES,1M,2M,HL	S		AE			UP	MF4,MF5	NR4,RM5		VF
		EM,MU	RM,GH,HM	SH	TK			MR,MRR		M5,MR3 MR4	HU5	MR,R3M M4MW	SU
K Cast Iron	Light Cutting	**UZ**	LK,MA,MK	CM,CF	Standard, C, KQ	V,VA		KF	UN	M4	NM5	GN	MT
	Medium Cutting	**GZ(UX),ME**	GK,RK,GH	Standard, CH 33	ZS,GC KG,KH	Y,RE		KM,KR KRR		MR7	RK5,RK7		RT
N Non-Ferrous Metal	Finishing	**AX**		P	AH				MS				
S Exotic Alloy	Finishing	**EF**	LS,FJ	HRF				SF,SGF			NFT	F3S	
	Medium Cutting	**EG,EX**	MS,MJ	HMM,SA,HRM	SQ	VI		SM,SMC		M1	NMT,NMS NMT	VL	
	Roughing	**MU,EM**	RS,GJ		SG,SX			SMR		MR3,MR4	NRT,HU5 NRS		
H Hardened Steel	Finishing	**GH,FV***		HP*									
	Light Cutting	**LV***	BF*	HF*	HH*,HL*								
	Carburised Layer Removal	**SV***	BM*	HM*	HD*								

( ) indicates a discontinued item. * mark indicates CBN/PCD tool breaker

Note: The above data was collected from various published catalogues. The information may therefore not be up to date.

Chipbreaker Comparison Chart

■ Positive Type Inserts

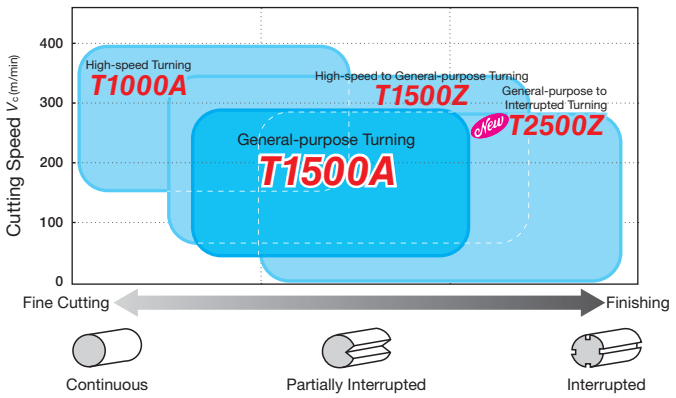
Work Material	Applications	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	MOLDINO	NTK	Sandvik	Kennametal	SECO Tools	WALTER	ISCAR	TaeguTec
P Steel	Finishing	**FC**	FJ,AM	01,JRP,JTS	CF,GF,VF P,PF		AM3,AZ7 AMX,FG	UM		GT-F1	FM4		
		FB,LU (FP,FK)	FP,FM FV,SQ	PSF,PF,23 SS,JSS	GP,XP,PP MQ,DP	JQ,MP	ZR	PF,UF MF,XF	11,UF,MF KF,XF	FF1	FP4	PF	FA,FX
	Finishing (Wiper Edge)	**SDW**						WK,WM	MW	W-F2		WG	
		LUW	SW		WP			WF	FW	W-F1	PF	WF	WT
	Finishing to Light Cutting	**SI**	SMG	JS,CM,PSS	CK,SKS		YL,1L						SA
		LB	LP,LM		XQ		AM2		LF				
	Light to Medium Cutting	**SC**			GQ, SK,Standard		AF1,CL		MP	MF2			
		SU,GU (SK,SF)	SV,MQ	PS,TSF TM	HQ,XQ GK	JE	AZ8,AM2 AM5	PM,UM XM		F1	MP4,MM4 FP6,PM5	SM,14	FG,PC
	Medium Cutting	**MU**	MP,MM MK,MV	PM				PR,UR,MMC MPC,XR	MF	F2,M3 M5	RP4,RM4	19	MT,PMR
M Stainless Steel	Finishing	**FC**	FM,FV	PSF,PF SS,JSS			AZ7	MF,XF	11,UF	FF1	FM4	PF	FA,FX
	Finishing to Light Cutting	**SI**	SMG				YL,1L,CL	UF	LF,FP				FG
		LB	LM		MQ					F1			
	Light to Medium Cutting	**SU,GU**	SV		HQ		AM5	MM	MP	MF2	MM4,PS5	SM	PC
	Medium Cutting	**MU**	MM, MV, Blank	PM				UM,MR XR,UR	MF	F2,M3 M5	PM5,RM4		MT,PMR
K Cast Iron	Finishing	**FC**		CF				KF,XF	11,UF		FK6		
	Light to Medium Cutting	**MU**	MK				AF1,FM	KM,UM,XR	FP,LF MF,MP	M5	MK4,RK4		MT
N Non-Ferrous Metal	Finishing	**AG,AW,AY**	AZ	AL,PP	AH,AP			AL	HP	AL	PM2	AS,AF	FL
	Finishing to Light Cutting	**LD*,GD***											SA
S Exotic Alloy	Finishing	**FC,SI**	FS	PSS	PP,MQ			WF,MF					
	Light to Medium Cutting	**SU,GU**	LS,MS	PS,PM	HQ,GK			UM,PM		MF2,R2 R3	FV4,MV4		
H Hardened Steel	Finishing	**FV***		HP*									
	Light Cutting	**LV***	BF*										

( ) indicates a discontinued item. * mark indicates CBN/PCD tool breaker

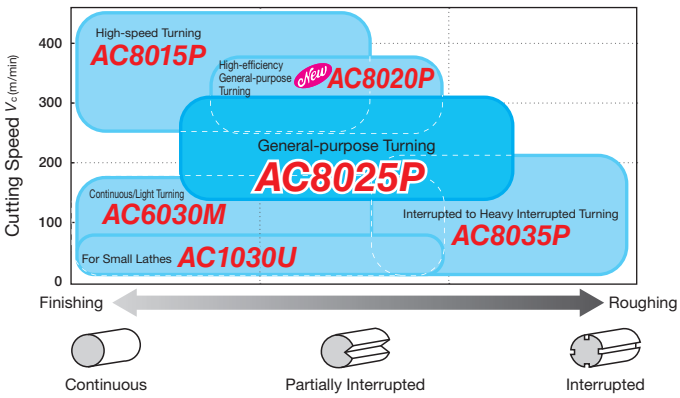
Note: The above data was collected from various published catalogues. The information may therefore not be up to date.

Grades

● Fine Cutting to Finishing (Cermet)

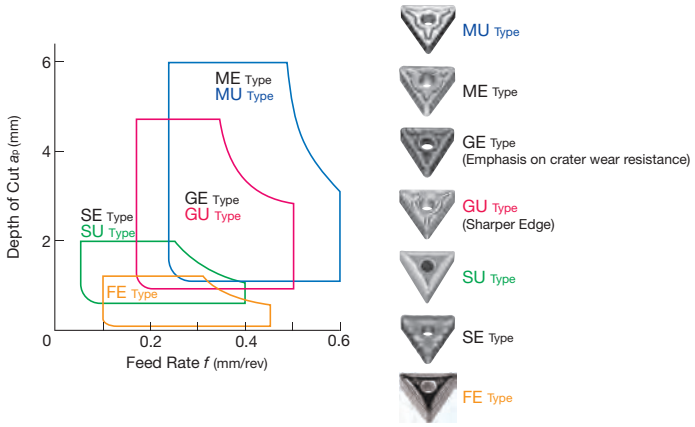


● Finishing to Roughing (Coated Carbide)

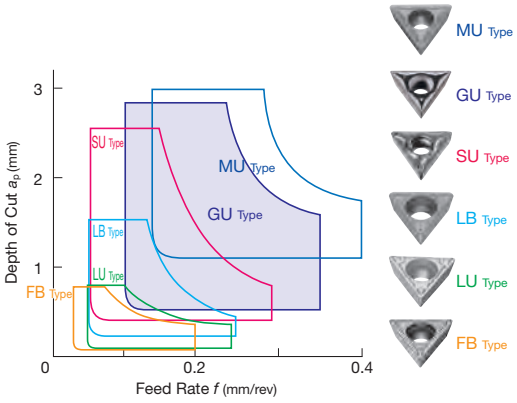


Main Chipbreakers

Negative Type



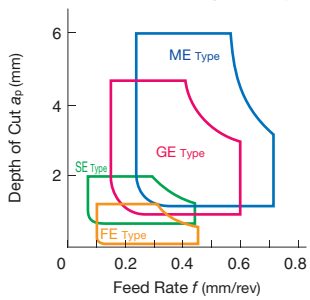
Positive Type



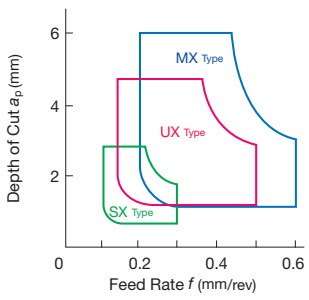
Sub-Chipbreakers

Negative Type

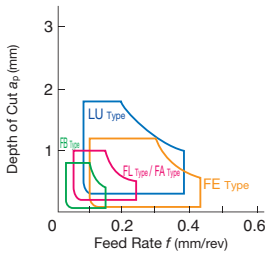
Chipbreakers for High-efficiency Machining



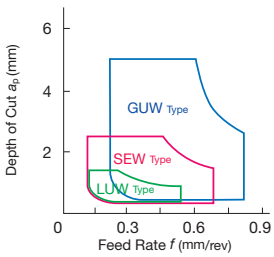
Strong Cutting Edge Chipbreakers



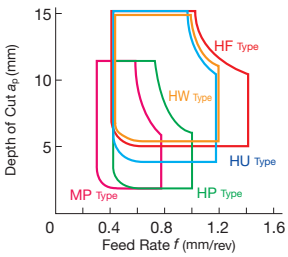
Chipbreakers for Small Depth of Cut



Wiper Insert



Chipbreakers for Heavy Cutting



Grades

Uncoated Cermet / Coated Cermet

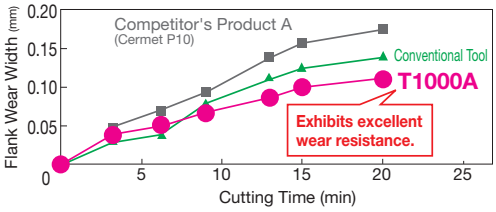
T1000A / T1500A / T1500Z / New T2500Z

T1000A: High-hardness cermet with outstanding wear resistance and toughness. Realises high dimensional accuracy for continuous steel machining or finishing of Sintered Alloy or cast iron.
T1500A: General-purpose cermet made from hard grains with different grain sizes, delivering functionality that provides an excellent balance of wear resistance and toughness. Also achieves good surface finish quality.
T1500Z: Employs Brilliant Coat PVD coating with excellent lubricity to provide better wear resistance and consistent surface finishes in low-speed cutting applications such as machining of small products or low carbon steel.
T2500Z: A new cermet substrate with excellent thermal conductivity is used to achieve outstanding thermal crack resistance. Also uses Brilliant Coat, which has excellent lubricity.

Cutting Performance

T1000A

● Wear Resistance



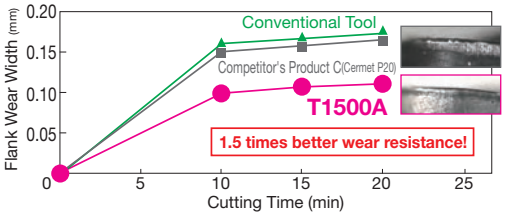
Work Material: SCM435
Insert: CNMG120408N-SU
Cutting Conditions: v_c= 320m/min, f= 0.20mm/rev, a_p= 1.5mm Dry

● Fracture Resistance

Work Material: SCM435 (Interrupted Cutting)
Insert: CNMG120408N-SU
Cutting Conditions: v_c= 230m/min, f= 0.20mm/rev, a_p=1.0mm Wet

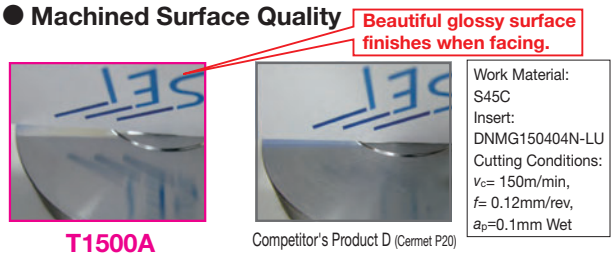
T1500A

● Wear Resistance



Work Material: SCM435
Insert: CNMG120408N-SU
Cutting Conditions: v_c= 230m/min, f= 0.20mm/rev, a_p=1.0mm Wet

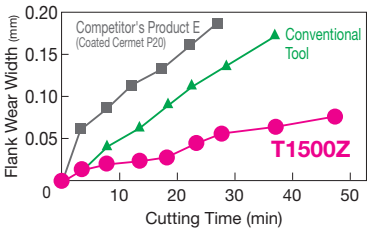
● Machined Surface Quality



Work Material: S45C
Insert: DNMG150404N-LU
Cutting Conditions: v_c= 150m/min, f= 0.12mm/rev, a_p=0.1mm Wet

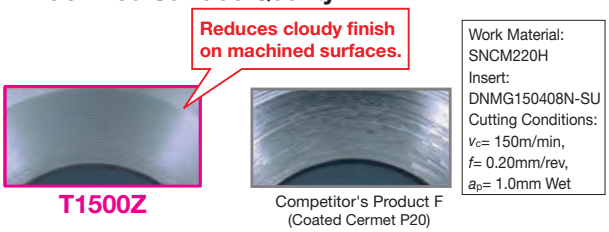
T1500Z

● Wear Resistance



Work Material: SCM435
Insert: CNMG120408N-SU
Cutting Conditions: v_c= 230m/min, f= 0.20mm/rev, a_p= 1.0mm Wet

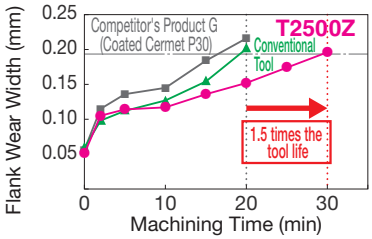
● Machined Surface Quality



Work Material: SNCM220H
Insert: DNMG150408N-SU
Cutting Conditions: v_c= 150m/min, f= 0.20mm/rev, a_p= 1.0mm Wet

T2500Z

● Wear Resistance



Work Material: SCM435
Insert: CNMG120408N-SU
Cutting Conditions: v_c= 260m/min f= 0.23mm/rev a_p= 1.5mm Wet

● Fracture Resistance

Work Material: SCM435 (Interrupted Cutting)
Insert: CNMG120408N-SU
Cutting Conditions: v_c= 260m/min f= 0.23mm/rev a_p= 1.50mm Wet

Recommended Cutting Conditions

Work Material	Application	Chipbreaker	Grade	Cutting Conditions (Min. - **Optimum** - Max.)		
				Depth of Cut a_p(mm)	Feed Rate f (mm/rev)	Cutting Speed V_c (m/min)
Mild Steel (SS400, etc.)	Fine Finishing	FB/FL	T1500Z	0.2-**0.5**-1.0	0.05-**0.15**-0.25	150-**280**-400
	Finishing	FE/LU	T2500Z	0.3-**1.0**-1.8	0.08-**0.20**-0.35	150-**280**-400
Carbon Steel Alloy Steel (S45C, SCM435, etc.)	Fine Finishing	FB/FA	T1500A	0.2-**0.5**-1.0	0.05-**0.15**-0.25	100-**200**-300
	Finishing	FE/SU	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
Hard Steel Alloy Steel (SCM440H, etc.)	Fine Finishing	FB/FA	T1000A	0.2-**0.5**-1.0	0.05-**0.15**-0.25	50-**150**-250
	Finishing	FE/SU	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

Grades

ABSOTECH AC8015P / New ABSOTECH AC8020P / ABSOTECH AC8025P / ABSOTECH AC8035P / ABSOTECH AC1030U

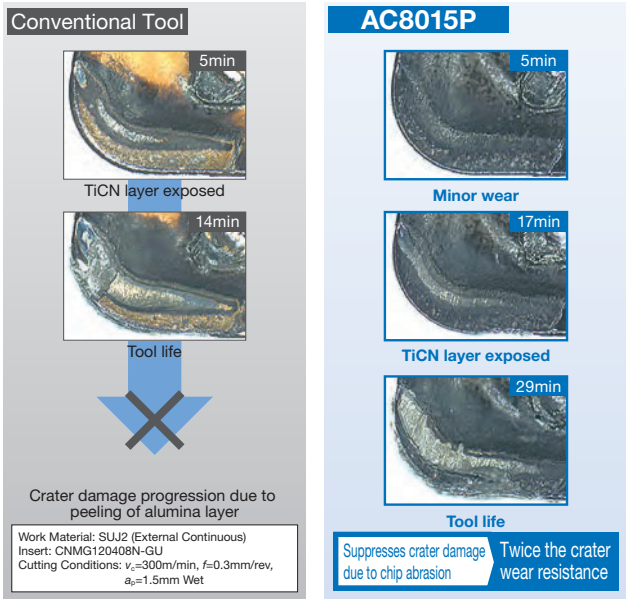
Covers a wide range of machining applications from high-speed to interrupted cutting and small lathes

AC8015P: Development of crater damage is suppressed by controlling the orientation of the alumina crystal grains. Achieves long, stable tool life during high-speed and high feed cutting.
AC8020P: Alumina coating with even higher strength balances outstanding stability and wear resistance in mill-scale work on forged material. Gold-colored coating makes used corners easily identifiable.
AC8025P: Our 1st recommended grade for turning steel. Surface smoothing technology significantly suppresses adhesion of work material components. Achieves long, stable tool life with various cutting speeds and work materials.
AC8035P: Tensile stress removal of the coating layer greatly improves fracture resistance. Achieves long, stable tool life during heavy interrupted cutting.
AC1030U: Employs a new PVD coating, and a dedicated tough carbide substrate. High-quality cutting edge grade suppresses adhesion and micro-chipping, realizing excellent machined surface quality.

Cutting Performance

AC8015P

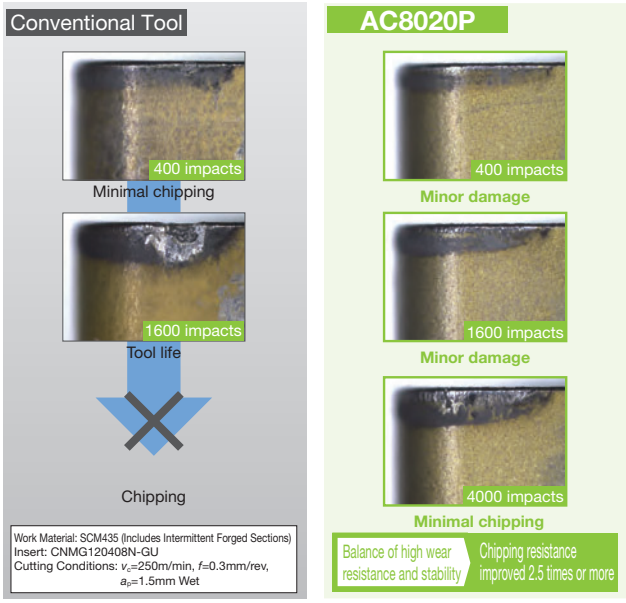
● Alumina crystal grain orientation control technology suppresses crater damage due to chip abrasion



Work Material: SUJ2 (External Continuous)
Insert: CNMG120408N-GU
Cutting Conditions: v_c=300m/min, f=0.3mm/rev, a_p=1.5mm Wet

AC8020P

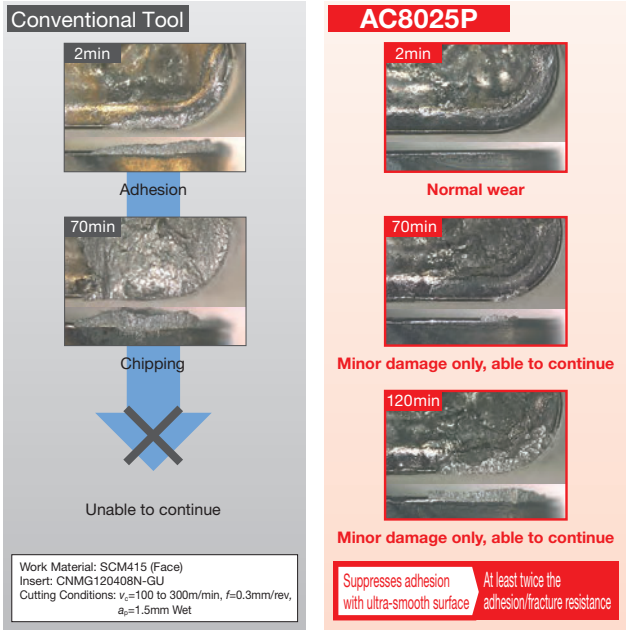
● Alumina coating with even higher strength suppresses chipping



Work Material: SCM435 (Includes Intermittent Forged Sections)
Insert: CNMG120408N-GU
Cutting Conditions: v_c=250m/min, f=0.3mm/rev, a_p=1.5mm Wet

AC8025P

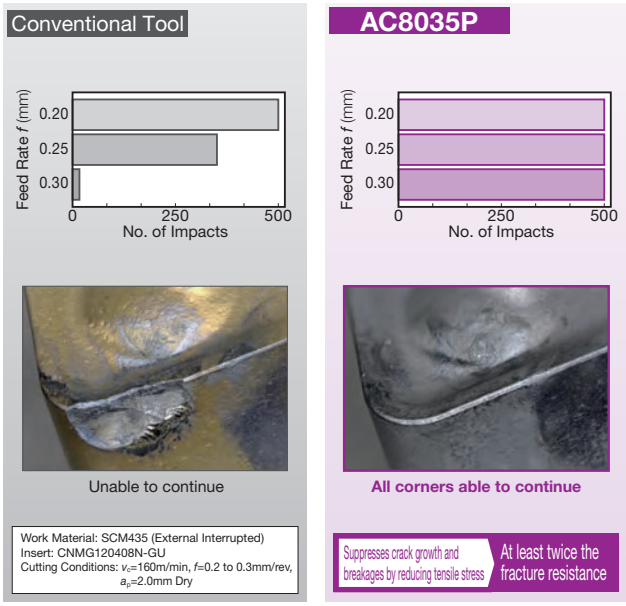
● Surface smoothing treatment significantly suppresses adhesion and chipping



Work Material: SCM415 (Face)
Insert: CNMG120408N-GU
Cutting Conditions: v_c=100 to 300m/min, f=0.3mm/rev, a_p=1.5mm Wet

AC8035P

● Special surface treatment reduces tensile stress in the coating layer, significantly suppressing breakages



Work Material: SCM435 (External Interrupted)
Insert: CNMG120408N-GU
Cutting Conditions: v_c=160m/min, f=0.2 to 0.3mm/rev, a_p=2.0mm Dry

■ Application Guide

1st Recommended Grade

AC8025P + **GU** Type Chipbreaker (1st Recommendation)

	Chipbreakers for High-efficiency Machining		Main Chipbreakers	Strong Cutting Edge Chipbreakers
Finishing to Small depth of Cut	FE Type	SE Type	SU Type	SX Type
General-purpose	GE Type		GU Type (1st Recommendation)	UX Type
Roughing to Large Depth of Cut	ME Type		MU Type	MX Type

For high-speed continuous machining of mild steel

High-speed Machining AC8015P

To improve tool life at small depths of cut	FE Type
To improve finishing efficiency	SE Type

For heavy interrupted cutting emphasizing stability

Interrupted Machining AC8035P

To improve tool life	GU Type
To improve machining stability	UX Type

For high-efficiency machining of hardened steel and forged material

High Efficiency AC8020P

To increase feed rate	GE Type	To increase cutting speed	GU Type

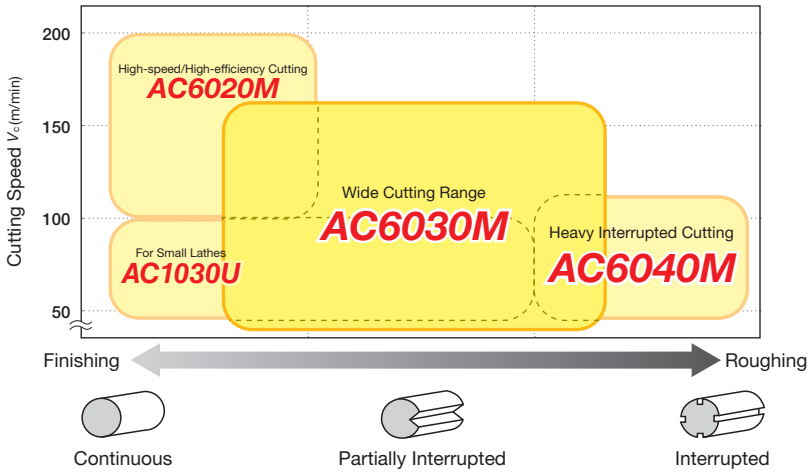
P Steel Recommended Cutting Conditions

(Red text indicates 1st recommendation.)

Work Material	Application	Chipbreaker	Grade	Cutting Conditions Min. - **Optimum** - Max.		
				Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Cutting Speed V_c (m/min)
Mild Steel Low Carbon Steel (SS400, S15C, etc.)	Fine Finishing	FB, FE	T1500Z	0.2-**0.6**-1.0	0.05-**0.15**-0.25	100-**250**-400
	Continuous	GU, GE	AC8015P	1.0-**2.5**-4.0	0.1-**0.25**-0.4	260-**350**-440
	General to Interrupted	**GU, GE**	**AC8025P**	1.0-**2.5**-4.0	0.2-**0.35**-0.5	200-**260**-320
	Heavy Interrupted	MU, ME	AC8035P	1.5-**4.0**-6.0	0.3-**0.45**-0.6	140-**150**-220
Medium to High Carbon Steel Alloy Steel Hard Steel (S45C, SCM435, SCM440H, etc.)	Fine Finishing	FB, FE	T1500Z	0.2-**0.6**-1.0	0.05-**0.15**-0.25	50-**200**-300
	Continuous to General	**GU, GE**	**AC8020P**	1.0-**2.5**-4.0	0.2-**0.35**-0.5	150-**235**-290
	Interrupted	GU, GE	AC8025P	1.0-**2.5**-4.0	0.2-**0.35**-0.5	130-**165**-230
	Heavy Interrupted	MU, ME	AC8035P	1.5-**4.0**-6.0	0.3-**0.45**-0.6	90-**135**-160

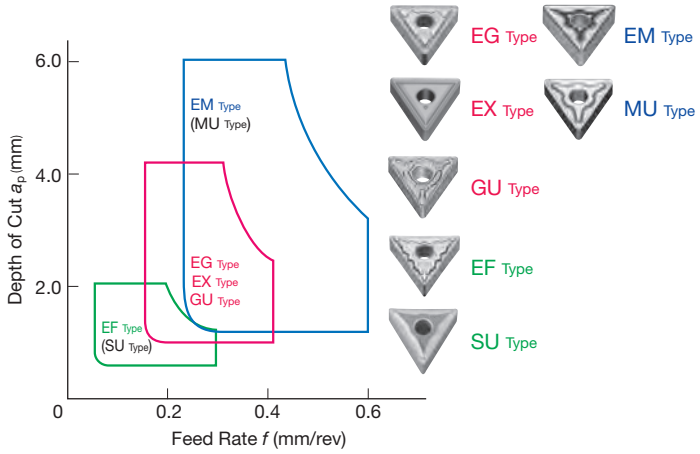
Stainless Steel M Stainless Steel

Grades

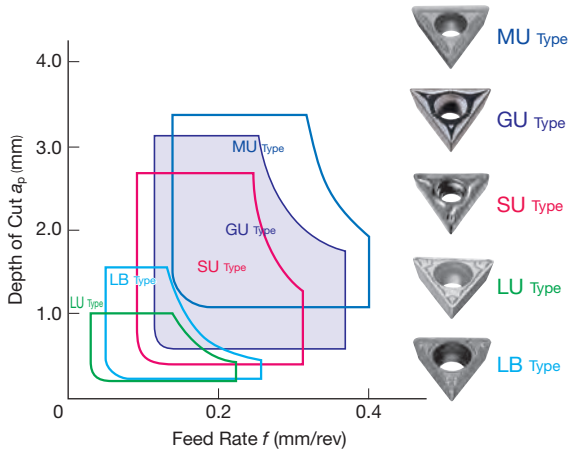


Chipbreakers

Negative Type



Positive Type



Refer to the Tools for Small Lathes chapter D7 for the Chipbreaker Selection Guide for ground (G Class) inserts.

M Stainless Steel Recommended Cutting Conditions

(Red text indicates 1st recommendation.)

Work Material			Cutting Range	Chipbreaker	Grade	Cutting Conditions Min. - **Optimum** - Max.		
						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
			Roughing	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
			Roughing	EM	**AC6040M**	1.5-**3.5**-6.0	0.20-**0.35**-0.60	80-**130**-180
Cr/Ni-based	Austenitic	SUS304, 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
			Roughing	EM	**AC6040M**	1.5-**3.5**-6.0	0.20-**0.35**-0.60	80-**130**-180
	Duplex (Austenitic/ Ferritic)	SUS329J1, SUS329J3L, SUS329J4L	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
			Roughing	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
			Roughing	EM	**AC6040M**	1.5-**3.5**-6.0	0.20-**0.35**-0.60	50- **80**-120

Stainless Steel M Stainless Steel

Grades

ABSOTECH AC6020M / ABSOTECH AC6030M / ABSOTECH AC6040M / ABSOTECH AC1030U

AC6020M: Combines a high-hardness carbide substrate with excellent wear resistance and a new CVD coating with improved coating strength to achieve both excellent wear resistance and fracture resistance. Achieves long, stable tool life during high-speed cutting.

AC6030M: Our 1st recommended grade for turning of stainless steel, achieving long and stable machining.
Drastically reduces the abnormal damage common in stainless steel machining, thanks to the improved coating strength and excellent adhesion.

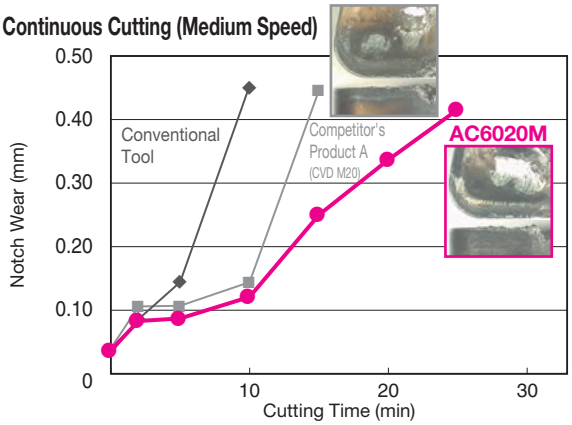
AC6040M: Drastically improves the reliability in the unstable cutting range, thanks to the excellent adhesion and peel-off resistance of the new PVD coating, as well as the improved fracture resistance of the dedicated carbide substrate.

AC1030U: High-quality cutting edge grade suppresses adhesion and micro-chipping, realizing excellent machined surface quality.

Cutting Performance

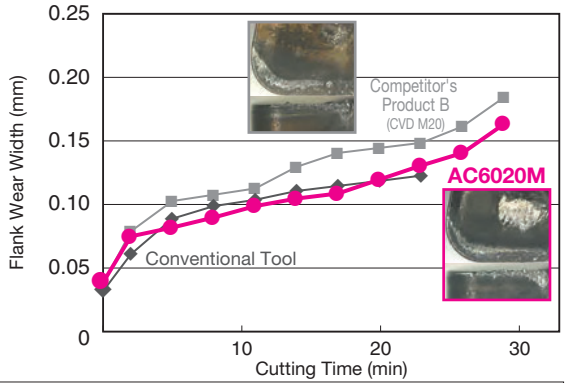
AC6020M

● Continuous Cutting (Medium Speed)



Work Material: SUS316L Insert: CNMG120408N-GU
Cutting Conditions: v_c= 150m/min, f= 0.3mm/rev, a_p= 2.0mm Wet

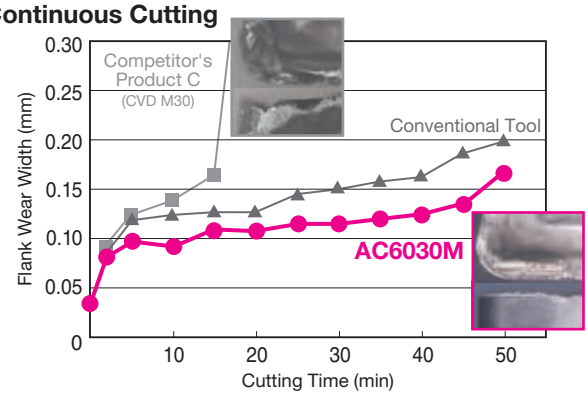
● Continuous Cutting (High Speed)



Work Material: SUS316L Insert: CNMG120408N-GU
Cutting Conditions: v_c= 200m/min, f= 0.3mm/rev, a_p= 2.0mm Wet

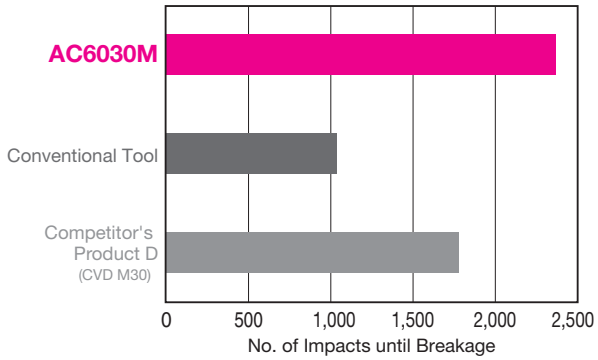
AC6030M

● Continuous Cutting



Work Material: SUS316 Insert: CNMG120408N-EX
Cutting Conditions: v_c=200m/min, f=0.2mm/rev, a_p=2.0mm Wet

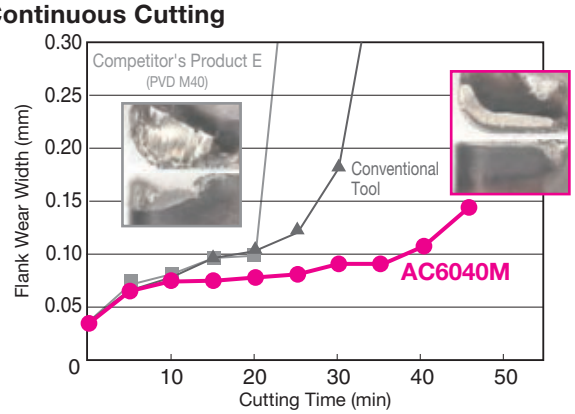
● Interrupted Cutting



Work Material: SUS316 Insert: CNMG120408N-GU
Cutting Conditions: v_c=100m/min, f=0.1mm/rev, a_p=1.0mm Wet

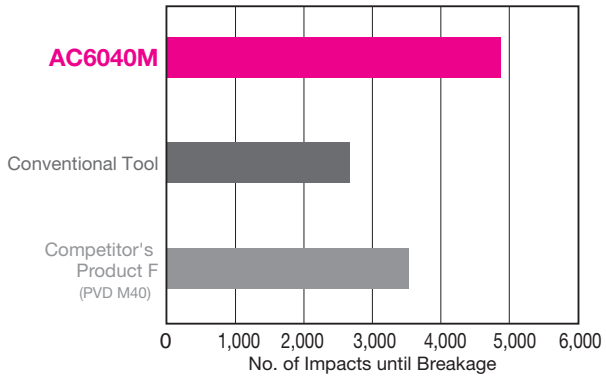
AC6040M

● Continuous Cutting



Work Material: SUS316 Insert: CNMG120408N-GU
Cutting Conditions: v_c=150m/min, f=0.2mm/rev, a_p=2.0mm Wet

● Interrupted Cutting

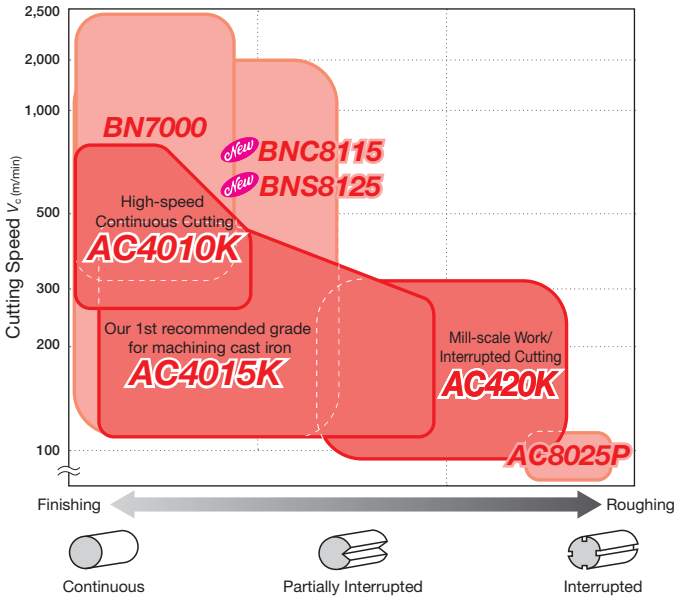


Work Material: SUS316 Insert: CNMG120408N-GU
Cutting Conditions: v_c=230m/min, f=0.23mm/rev, a_p=0.8mm Dry

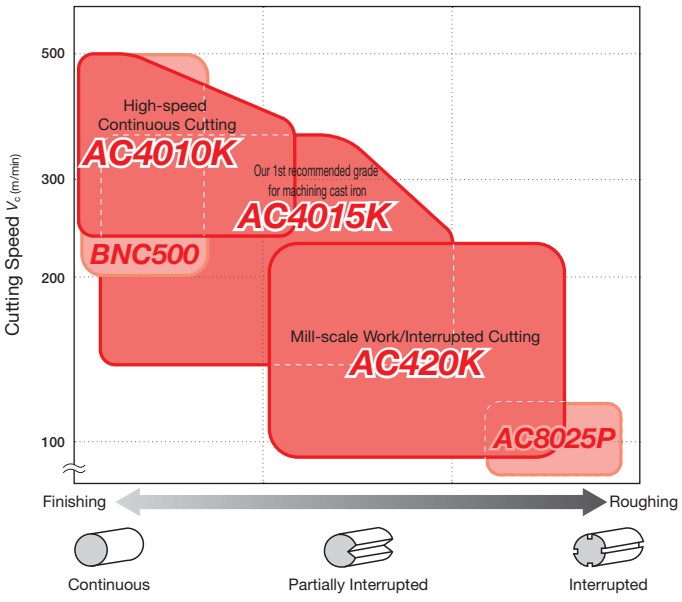
Grades

CBN Coated SUMIBORON / SUMIBORON / Solid SUMIBORON / Solid SUMIBORON
BNC500 / BN7000 / BNC8115 / BNS8125 ··· L7

● FC (Gray Cast Iron)

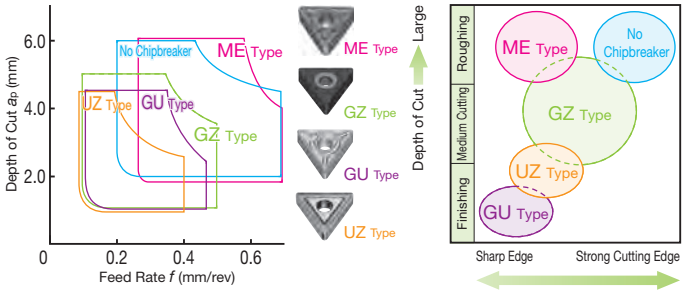


● FCD (Ductile Cast Iron)

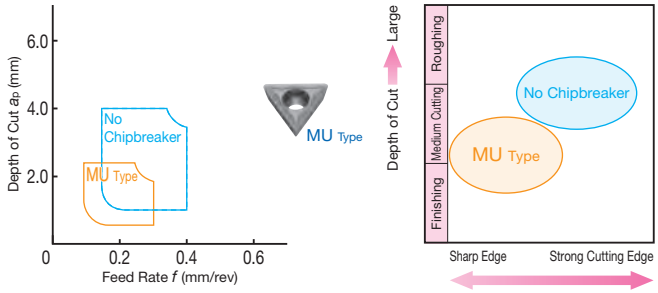


Chipbreakers

Negative Type



Positive Type



Recommended Cutting Conditions

(Red text indicates 1st recommendation.)

Work Material	Application	Grade	Cutting Conditions (Min. -**Optimum**- Max.)		
			Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Cutting Speed V_c (m/min)
Gray Cast Iron (FC250, etc.)	High-speed	BN7000	0.1 - **0.3** - 1.0	0.10 - **0.20** - 0.50	500 - **1,500** - 2,000
	Continuous to General	**AC4010K**	0.5 - **2.0** - 6.0	0.10 - **0.25** - 0.40	200 - **400** - 700
	Interrupted	AC4015K	0.5 - **2.0** - 6.0	0.10 - **0.30** - 0.50	180 - **300** - 450
	Heavy Interrupted	AC420K	0.5 - **2.0** - 6.0	0.10 - **0.30** - 0.60	150 - **200** - 300
Ductile Cast Iron (FCD450, etc.)	High-speed	BNC500	0.1 - **0.2** - 0.5	0.10 - **0.20** - 0.40	150 - **350** - 500
	Continuous to General	AC4010K	0.5 - **2.0** - 6.0	0.10 - **0.25** - 0.40	180 - **300** - 450
	Interrupted	**AC4015K**	0.5 - **2.0** - 6.0	0.10 - **0.30** - 0.50	160 - **250** - 400
	Heavy Interrupted	AC420K	0.5 - **2.0** - 6.0	0.10 - **0.30** - 0.60	120 - **170** - 250
High-strength Ductile Cast Iron (FCD700, etc.)	High-speed	BNC500	0.1 - **0.2** - 0.5	0.10 - **0.20** - 0.40	200 - **350** - 500
	Continuous to General	AC4010K	0.5 - **2.0** - 6.0	0.10 - **0.25** - 0.40	160 - **250** - 400
	Interrupted	**AC4015K**	0.5 - **2.0** - 6.0	0.10 - **0.30** - 0.50	140 - **200** - 350
	Heavy Interrupted	AC420K	0.5 - **2.0** - 6.0	0.10 - **0.30** - 0.60	80 - **150** - 220

Grades

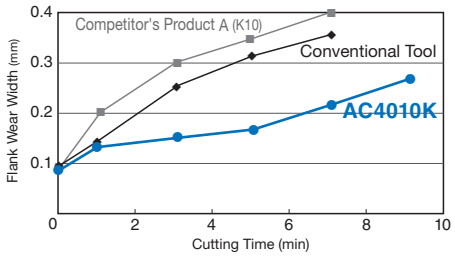
ABSOTECH AC4010K / ABSOTECH AC4015K / AC420K

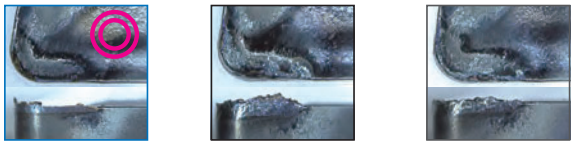
AC4010K: Our 1st recommended grade for machining gray cast iron.
New ultra-thick CVD coating enables V_C= 700m/min ultra-high-speed machining.
AC4015K: Our 1st recommended grade for ductile cast iron.
New high-adhesion, high-strength CVD coating realises both wear resistance and chipping resistance.
AC420K: Superior fracture resistance, providing excellent stability in interrupted unstable cutting and when cutting mill-scale work.

Cutting Performance

AC4010K/AC4015K Wear Resistance

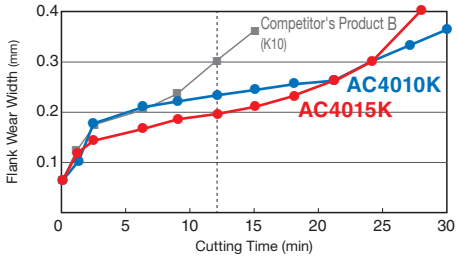
● Gray Cast Iron

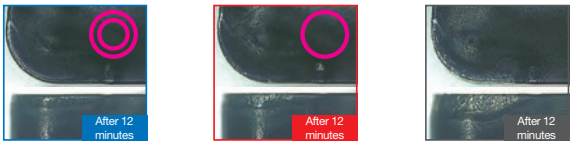




Work Material: FC250 Continuous Insert: CNMG120408N-GZ
Cutting Conditions: v_c= 600m/min, f= 0.4mm/rev, a_p= 2.0mm Dry

● Ductile Cast Iron

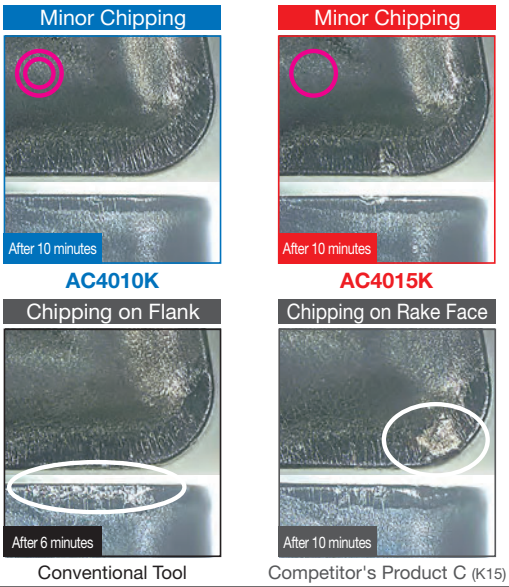




Work Material: FCD700 Continuous Insert: CNMG120408N-GZ
Cutting Conditions: v_c= 140m/min, f= 0.3mm/rev, a_p= 1.5mm Wet

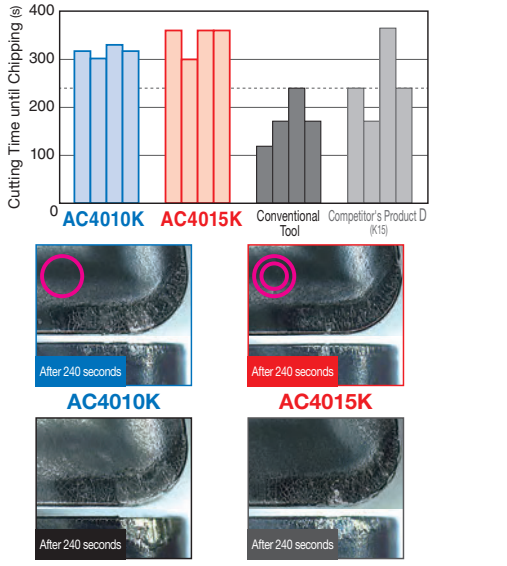
AC4010K/AC4015K Chipping Resistance

● Gray Cast Iron



Work Material: FC250 Interrupted Insert: CNMG120408N-GZ
Cutting Conditions: v_c= 400m/min, f= 0.3mm/rev, a_p= 2.0mm Wet

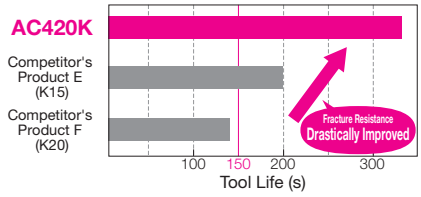
● Ductile Cast Iron



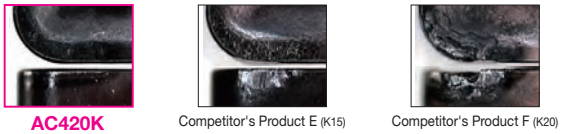
Work Material: FCD450 Interrupted Insert: CNMG120408N-GZ
Cutting Conditions: v_c= 450m/min, f= 0.3mm/rev, a_p= 1.5mm Wet

AC420K Fracture Resistance

FCD450 Grooved (Heavy Interrupted Acceleration Test)



Edge Wear Comparison (After 150s)

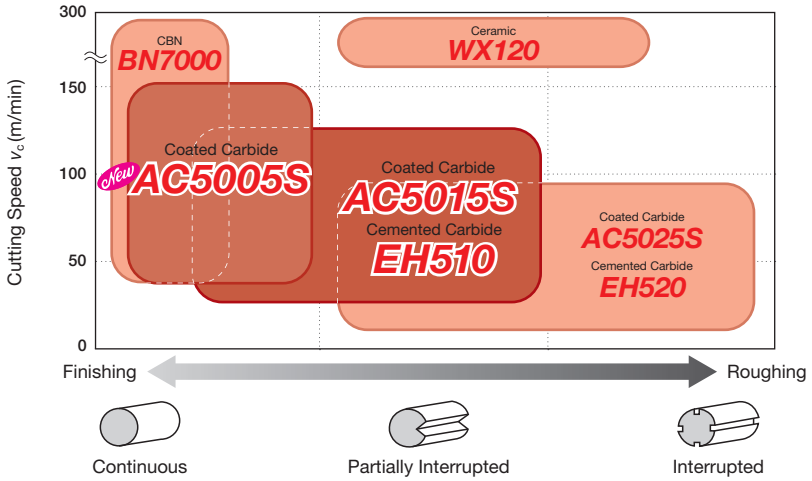


Work Material: FCD450 Interrupted Insert: CNMG120408N-GZ
Cutting Conditions: v_c=350m/min, f=0.25mm/rev, a_p=1.5mm Wet

Exotic Alloy S Exotic Alloy

Grades

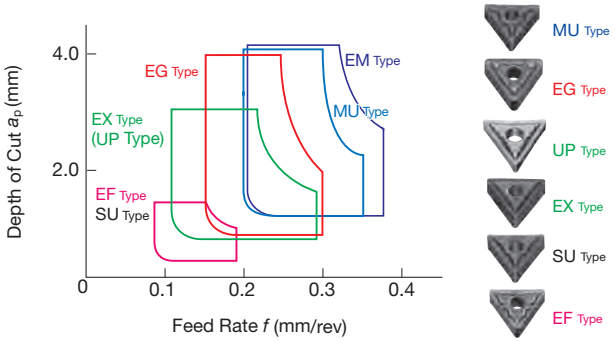
CBN SUMIBORON BN7000 ••• L10



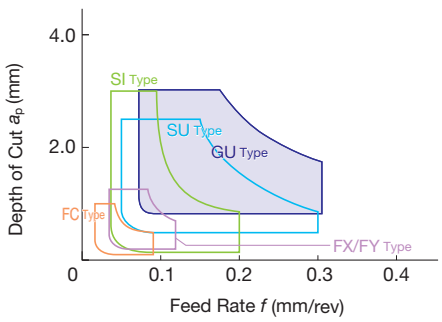
★WX120 is only sold in Japan.

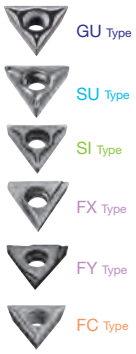
Chipbreakers

Negative Type



Positive Type





S Exotic Alloy Recommended Cutting Conditions

(Red text indicates 1st recommendation.)

Work Material	Application	Chipbreaker	Grade	Cutting Conditions (Min. - **Optimum** - Max.)		
				Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Cutting Speed v_c (m/min)
Heat-Resistant Alloy (Ni-based Material, Fe-based Material, Co-based Material)	Finishing	EF	AC5005S, AC5015S, AC5025S	0.2-**0.5**-1.5	0.10-**0.12**-0.20	50-**70**-110
	Light	EX	AC5005S, AC5015S, AC5025S	0.5-**1.0**-3.0	0.10-**0.20**-0.30	40-**60**-90
	Medium	EG	AC5005S, AC5015S, AC5025S	0.5-**2.0**-4.0	0.15-**0.25**-0.30	40-**60**-90
	Roughing	MU/EM	AC5015S, AC5025S	1.0-**2.0**-4.0	0.20-**0.25**-0.40	30-**55**-80
Titanium Alloy (Pure Titanium (99.5%), α + β Alloy)	Finishing	EF(SU)	EH510 (AC5005S, AC5015S)	0.2-**0.5**-1.5	0.1-**0.15**-0.2	50-**65**-80
	Light	EX	AC5005S, AC5015S	0.5-**1.0**-2.5	0.1-**0.20**-0.25	40-**55**-70
	Medium	EG	EH510 (AC5005S, AC5015S)	0.5-**2.0**-3.5	0.15-**0.25**-0.3	40-**55**-70
	Roughing	MU/EM	AC5025S	1.0-**2.0**-3.5	0.2-**0.25**-0.3	30-**40**-50

Exotic Alloy S

Grades

ABSOTECH ABSOTECH ABSOTECH

New **AC5005S / AC5015S / AC5025S / EH510 / EH520**

- Excellent Wear and Thermal Resistance PVD New Coating Grade

AC5005S: High-speed, high-efficiency grade with great high-temperature strength, which realises excellent wear resistance in high-efficiency machining.

AC5015S: Our 1st recommended grade for turning exotic alloys as it realises stable tool life in high-speed, high-efficiency machining.

AC5025S: High-toughness grade for realising stable tool life for interrupted cutting machining or mill-scaled work.

- Dedicated Cemented Carbide grades with excellent thermal, wear and fracture resistance for machining titanium alloys

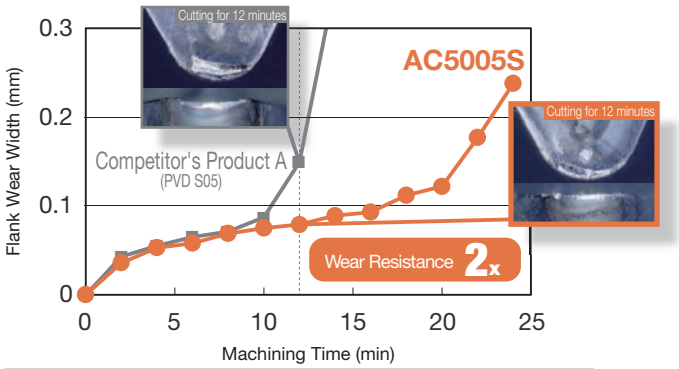
EH510: General-purpose grade for titanium machining that features excellent wear and thermal resistance. For applications from roughing to finishing.

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

Cutting Performance

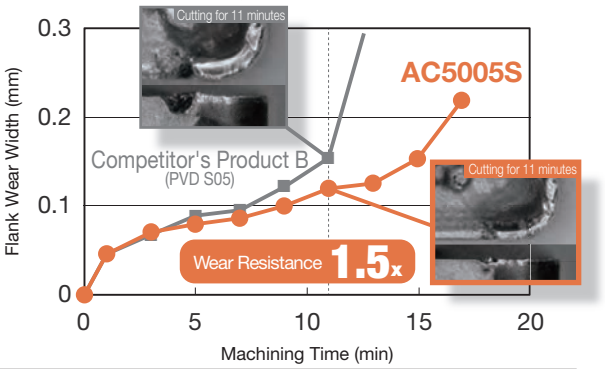
AC5005S

● Wear Resistance (High-speed)



Work Material: Inconel 718 (44HRC) Insert: DNMG150408N-EF
Cutting Conditions: v_c= 100m/min, f= 0.15mm/rev, a_p= 0.5mm, Wet

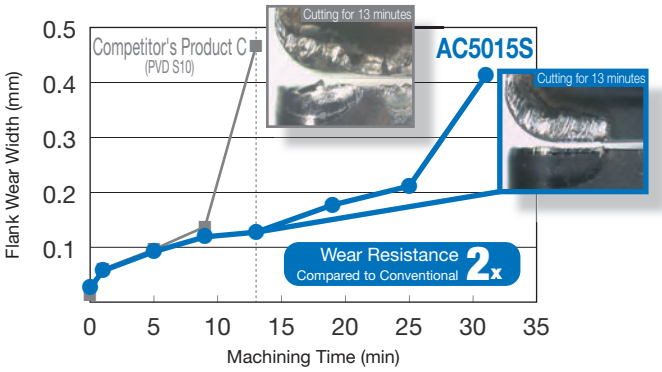
● Wear Resistance (High-feed)



Work Material: Inconel 718 (44HRC) Insert: CNMG120408N-EG
Cutting Conditions: v_c= 50m/min, f= 0.25mm/rev, a_p= 1.2mm, Wet

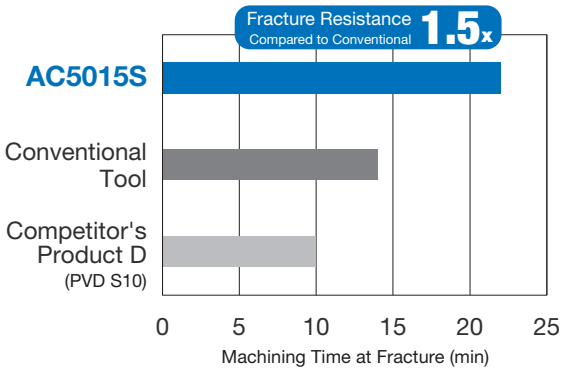
AC5015S

● Wear Resistance



Work Material: Inconel 718 (44HRC) Insert: CNMG120408N-EX
Cutting Conditions: v_c= 40m/min, f= 0.1mm/rev, a_p= 1.5mm Wet

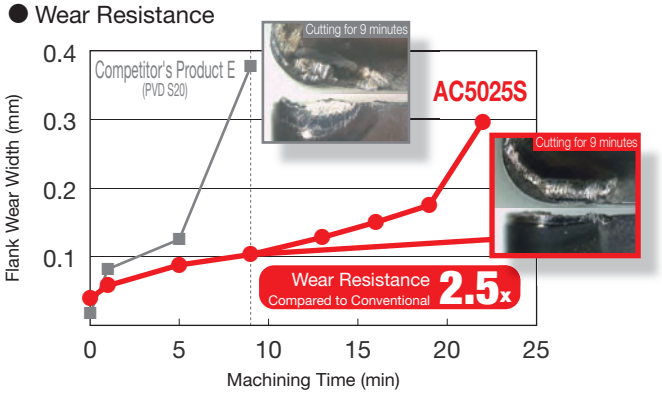
● Fracture Resistance



Work Material: Hastelloy (22HRC) Insert: CNMG120408N-EX
Cutting Conditions: v_c= 50m/min, f= 0.1mm/rev, a_p= 1.5mm Wet

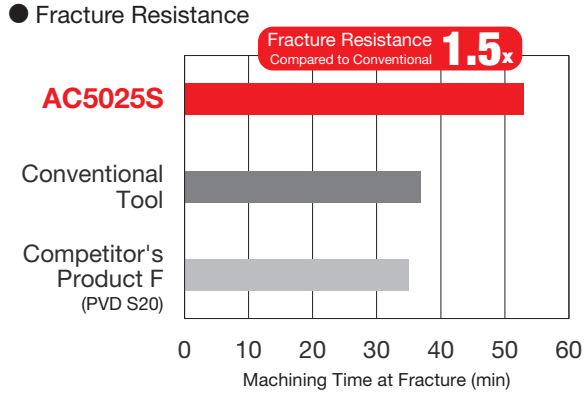
AC5025S

● Wear Resistance



Work Material: Inconel 718 (44HRC) Insert: CNMG120408N-EX
Cutting Conditions: v_c= 40m/min, f= 0.1mm/rev, a_p= 1.5mm Wet

● Fracture Resistance

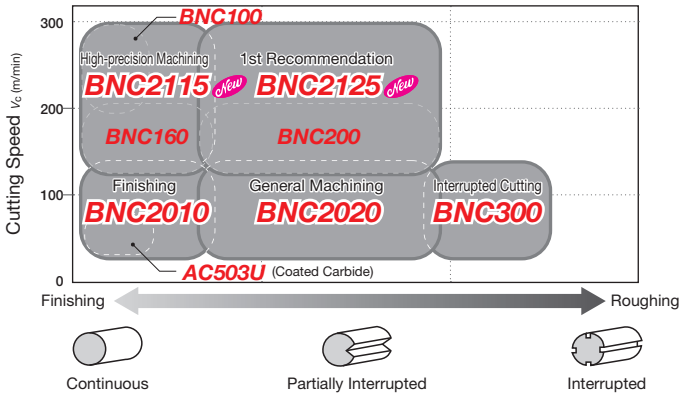


Work Material: Hastelloy (22HRC) Insert: CNMG120408N-EX
Cutting Conditions: v_c= 50m/min, f= 0.1mm/rev, a_p= 1.5mm Wet

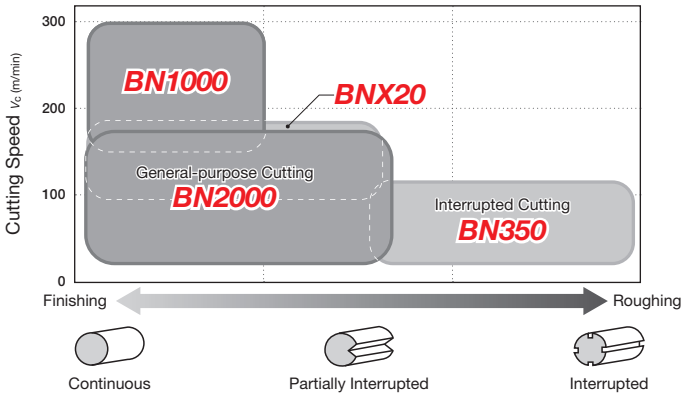
Hardened Steel H

Grades

● Coated SUMIBORON, Coated Carbide



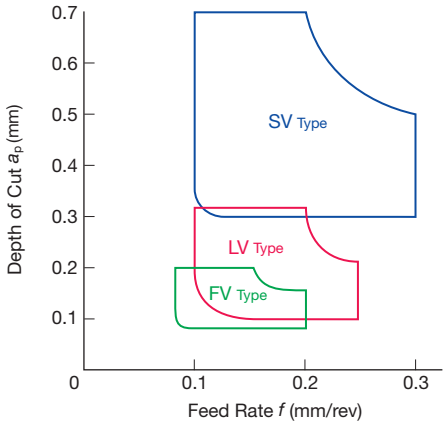
● Uncoated SUMIBORON

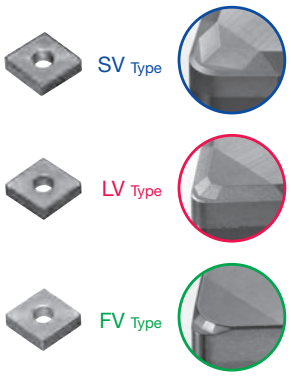


CBN SUMIBORON ••• L2

Chipbreakers

LV Type/FV Type Chipbreaker: For chip evacuation during hardened steel finishing
SV Type Chipbreaker: For chip evacuation during carburised layer removal





CBN SUMIBORON BREAK MASTER ••• L28

Recommended Cutting Conditions

(Red text indicates 1st recommendation.)

Process	Grade	Cutting Conditions (Min. - **Optimum** - Max.)		
		Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Cutting Speed V_c (m/min)
Continuous Cutting	**BNC2115**	0.03-**0.20**-0.35	0.03-**0.10**-0.20	110-**180**-300
	BNC2010	0.03-**0.20**-0.35	0.03-**0.10**-0.20	50-**140**-180
	BNC100	0.03-**0.15**-0.20	0.03-**0.10**-0.20	80-**200**-300
	BN1000	0.03-**0.15**-0.20	0.03-**0.10**-0.15	120-**180**-300
	AC503U (Coated Carbide)	0.03-**0.50**-1.00	0.02-**0.05**-0.10	40- **70**-100
General Cutting	**BNC2125**	0.05-**0.30**-0.50	0.05-**0.20**-0.40	110-**160**-300
	BNC2020	0.05-**0.30**-0.50	0.03-**0.20**-0.40	50-**120**-180
	BNC160	0.03-**0.20**-0.35	0.03-**0.10**-0.20	80-**160**-270
	BNC200	0.05-**0.30**-0.50	0.05-**0.10**-0.35	80-**140**-270
	BN2000	0.03-**0.20**-0.30	0.03-**0.10**-0.20	30-**100**-200
	BNX20	0.03-**0.30**-0.50	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

Grades

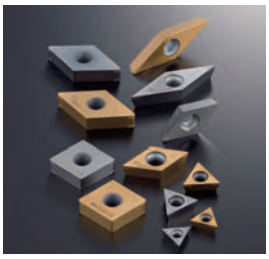
NEW BNC2115 / NEW BNC2125 / BN1000 / BN2000

BNC2115: High-precision grade realizing long tool life with excellent surface roughness and stable machining. Maintains excellent surface roughness thanks to a high notch-wear resistant coating and tough CBN substrate.

BNC2125: 1st recommended grade, balancing excellent wear resistance and fracture resistance in hardened steel machining. Along with a tough CBN substrate, the coating combines wear resistance and toughness to achieve long, stable tool life even in high-efficiency and interrupted machining.

BN1000: For high-speed machining, BN1000 provides the highest wear resistance of all uncoated SUMIBORON grades, improving fracture resistance while maintaining an emphasis on wear resistance.

BN2000: General-purpose grade for general hardened steel machining with a high degree of fracture and wear resistance.

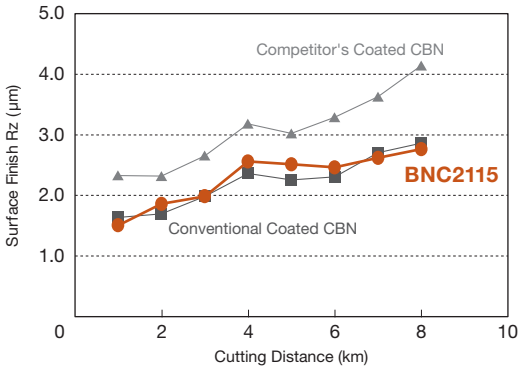


BNC2115 / BNC2125

Cutting Performance

BNC2115

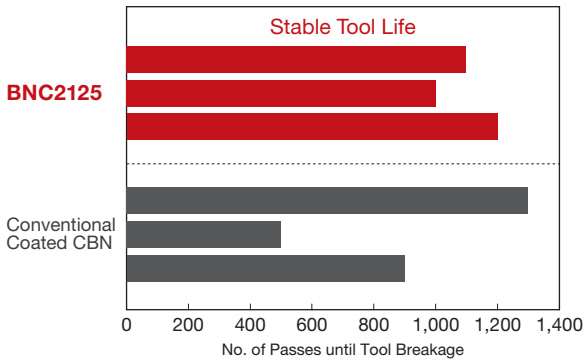
● Continuous Cutting of Hardened Steel



Work Material: SCM415H (58 to 62HRC)
Tool Cat. No.: 4NC-DNGA150408
Cutting Conditions: V_c= 200m/min, f= 0.1mm/rev, a_p= 0.15mm Wet

BNC2125

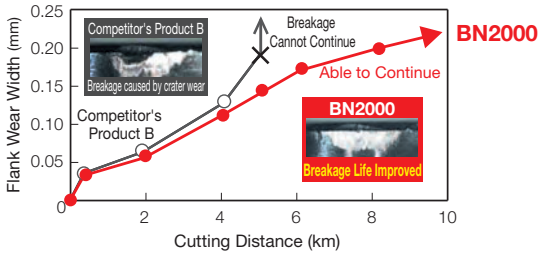
● Interrupted Cutting of Hardened Steel



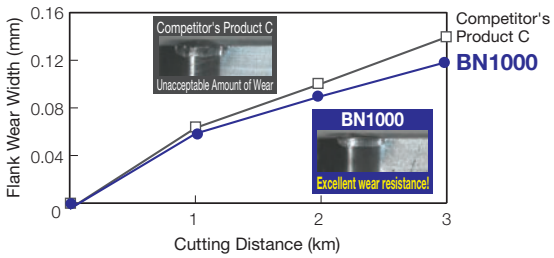
Work Material: SUJ2 (58 to 62HRC)
Tool Cat. No.: 4NC-DNGA150408
Cutting Conditions: V_c= 150m/min, f= 0.15mm/rev, a_p= 0.5mm, 63m/times Wet

BN1000 / BN2000

● Wear Resistance (Continuous Cutting)

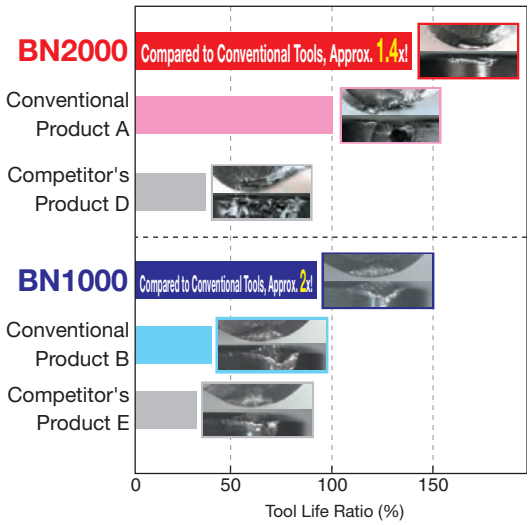


Work Material: SCM415H Round Bar (58 to 62HRC)
Insert: 2NU-CNGA120408
Cutting Conditions: v_c=100m/min, f=0.1mm/rev, a_p=0.2mm Dry



Work Material: SUJ2 Round Bar (62HRC)
Insert: 2NU-CNGA120408
Cutting Conditions: v_c=150m/min, f=0.1mm/rev, a_p=0.2mm Dry

● Chipping Resistance (Interrupted Cutting)
(Conventional Tool A as 100%)

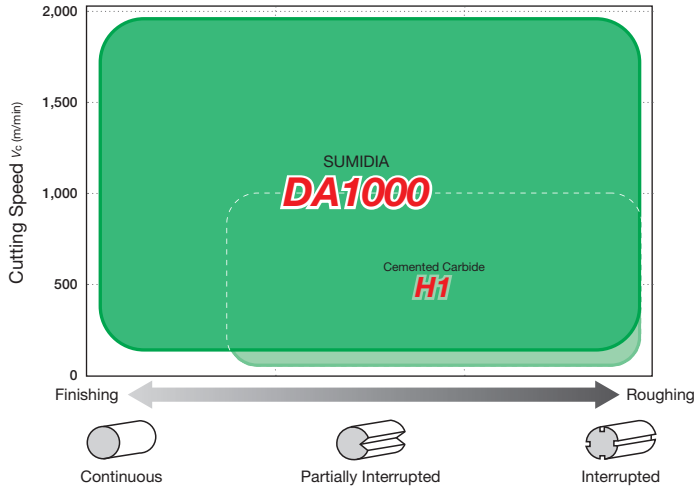


Work Material: SCM415H 8V Grooved (58-62HRC)
Insert: 2NU-CNGA120408
Cutting Conditions: v_c=150m/min, f=0.1mm/rev, a_p=0.2mm Dry

Non-ferrous Metal

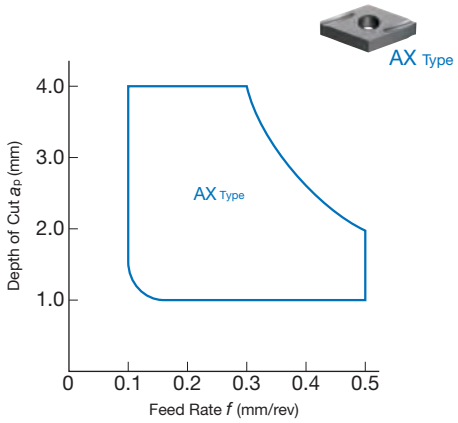
Grades

PCD SUMIDIA DA1000 ••• M6

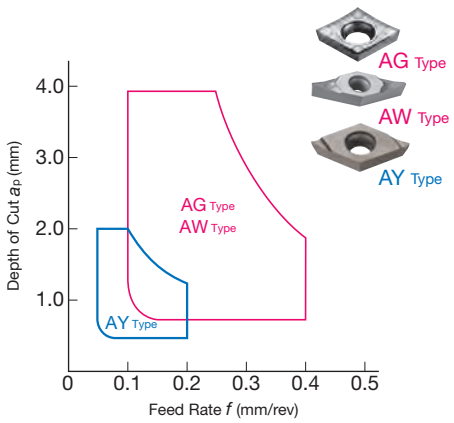


Main Chipbreakers

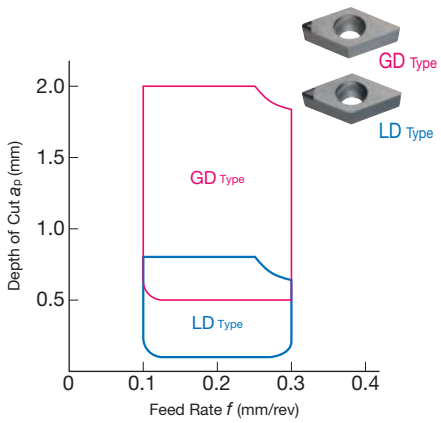
Negative Type



Positive Type



Positive Type (PCD)



Recommended Cutting Conditions

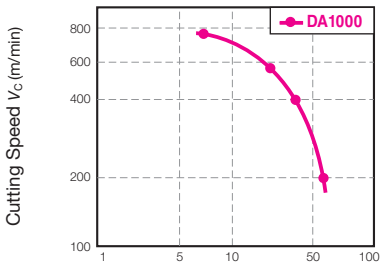
Process	Series	Grade	Cutting Conditions (Min. - **Optimum** - Max.)		
			Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Cutting Speed V_c (m/min)
Continuous Cutting General Cutting Interrupted Cutting	SUMIDIA	**DA1000**	0.1-**0.5**-3.0	0.05-**0.10**-0.20	up to 2,000
	Cemented Carbide	**H1**	0.3-**1.0**-5.0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

Grades DA1000

- Ultra-high-density sintered ultra-fine grained diamond
- Significantly improved surface roughness on machined surfaces
- World's highest wear resistance and strength
- Suitable for use on a wide variety of aluminum and non-ferrous alloys

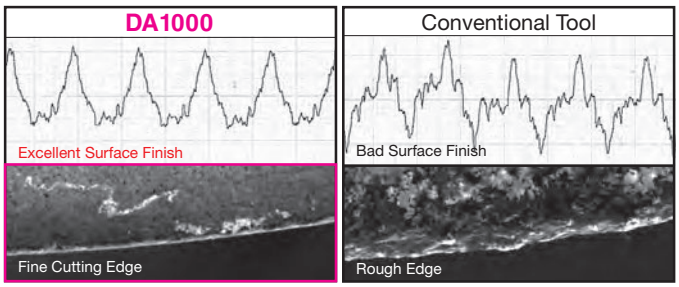
Cutting Performance

● Wear Resistance



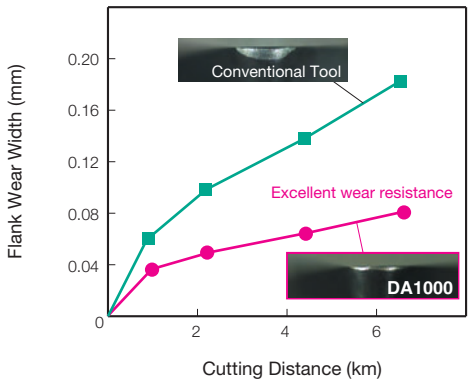
Work Material: 17% Si-Al Alloy
Insert: TPGN160304
Cutting Conditions: v_c= 200 to 800m/min, f= 0.12mm/rev, a_p= 0.5mm Wet

● Cutting Edge Surface Roughness Comparison



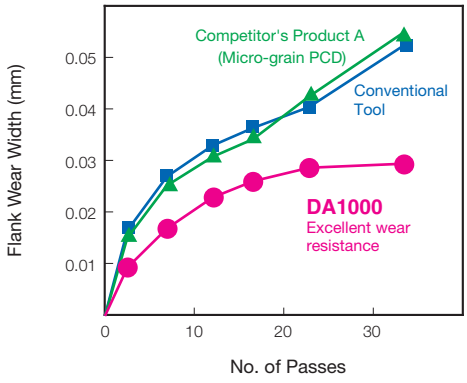
Work Material: 17% Si-Al Alloy
Insert: TPGW160308
Cutting Conditions: v_c=1,000m/min, f=0.15mm/rev, a_p=0.2mm Wet

● Wear Resistance in Turning Applications



Work Material: 17% Si-Al Alloy
Insert: TPGN160304
Cutting Conditions: v_c=800m/min, f=0.12mm/rev, a_p=0.5mm Wet

● Wear Resistance in Milling Applications



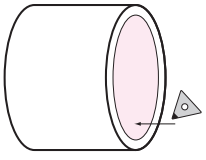
Work Material: ADC12 (12% Si-Al Alloy)
Insert: NF-SNEW1204ADFR
Cutting Conditions: v_c=2,000m/min, f=0.15mm/rev, a_p=3.0mm Wet

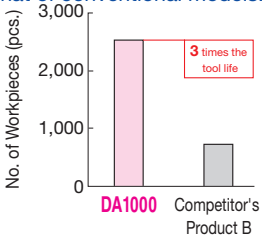
Application Examples

DA1000

[Copper Alloy Bushing]

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



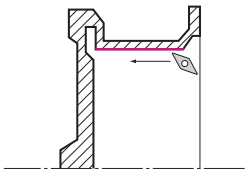


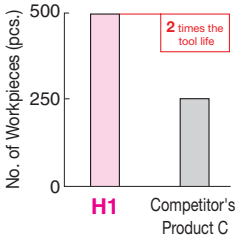
Insert: NF-TPGN160308
Cutting Conditions: v_c=300m/min, f=0.07mm/rev, a_p=0.08mm Wet

H1

[ADC12 Aluminum Wheel]

Excellent adhesion resistance.
Longer tool life.





Insert: VCGT160408N-AG
Cutting Conditions: v_c=2,200m/min, f=0.25mm/rev. a_p=2.0mm Wet

For Small Lathes

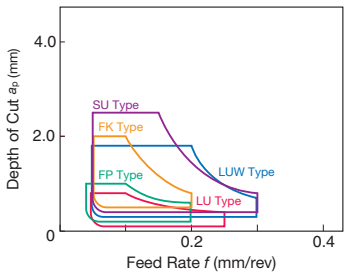
Grades

Insert Grade	Application Range	Applicable Work Material P: General Steel	M: Stainless Steel	K: Cast Iron	S: Heat-Resistant Alloy	H: Hardened Steel	N: Non-ferrous Metal
Coated Carbide (PVD)	ACZ150 (High-precision, Finishing to Light Cutting)	◎	◎				○
	AC5015S (Finishing to Light Cutting, Medium Cutting)	○	◎	○	◎		
	AC5025S (Finishing to Light Cutting, Medium Cutting)	○	◎	○	◎		
	AC530U (Finishing to Light Cutting, Medium Cutting)	◎	◎	○	○		○
	AC1030U (Finishing to Light Cutting, Medium Cutting)	◎	◎	○	○		○
Uncoated Cermet Coated Cermet	T1000A (Finishing to Light Cutting)	◎	○	◎			○
	T1500A/T1500Z (Finishing to Light Cutting, Medium Cutting)	◎	○	○			○
Cemented Carbide	BL130 (High-precision)	○	○	○			○
	H1 (Finishing to Light Cutting, Medium Cutting)	○	○	○			◎
	EH510 (Finishing to Light Cutting, Medium Cutting)	○	○	○	◎		○
CBN (SUMIBORON)	BN1000/BN2000 (Finishing to Light Cutting)					◎	
	BN7000 (Finishing to Light Cutting, Medium Cutting)			◎	○		
PCD (SUMIDIA)	DA1000 (High-precision, Finishing to Light Cutting)						◎

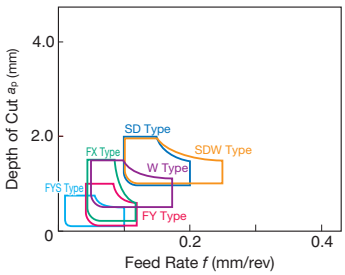
◎ 1st Recommendation ○ 2nd Recommendation

Chipbreakers

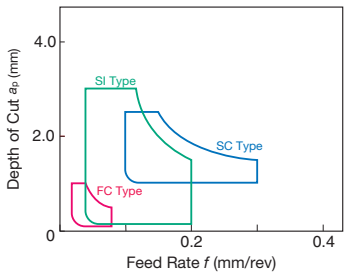
● M Class Finishing to Light Cutting



● G Class Ground Type



● G Class Chipbreaker



Recommended Cutting Conditions

(Red text: 1st Recommendation Blue text: 2nd Recommendation)

Work Material / Tool Grade	P Free-Cutting Steel		P Carbon Steel		M Stainless Steel		S Heat-Resistant Alloy		H Hardened Steel		N Aluminum Alloy		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)	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
AC5015S	50 to 200	0.02 to 0.15	50 to 200	0.02 to 0.10	50 to 200	0.02 to 0.10	30 to 100	0.02 to 0.10					70 to 300	0.05 to 0.20
AC5025S	50 to 200	0.02 to 0.15	50 to 200	0.02 to 0.10	50 to 200	0.02 to 0.10	30 to 100	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 150	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									120 to 300	0.03 to 0.15				
BN2000									50 to 200	0.03 to 0.20				
BN7000							50 to 200	0.05 to 0.20						
DA1000											70 to 300	0.02 to 0.10	70 to 300	0.02 to 0.10

For Small Lathes

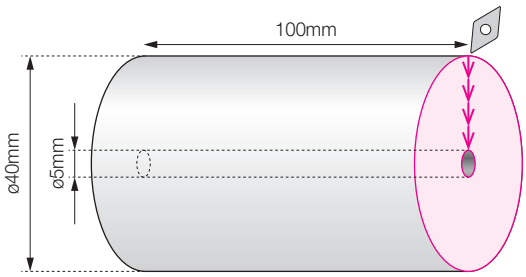
Grades

ABSOTECH **AC1030U**

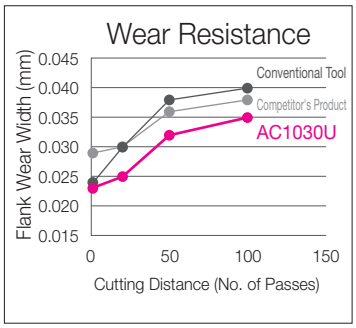
Employs a new PVD coating, and a dedicated tough carbide substrate.
High-quality cutting edge suppresses adhesion and micro-chipping, realizing excellent machined surface quality.

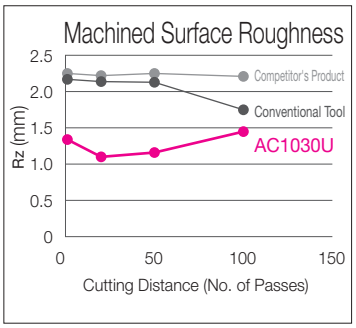
Cutting Performance

AC1030U



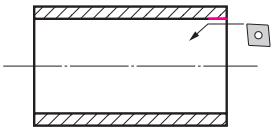
Work Material: SUS304 Insert: DCGT11T302R-FY
Cutting Conditions: v_c= 100m/min, f= 0.05mm/rev, a_p=0.1mm Wet (oil-based)

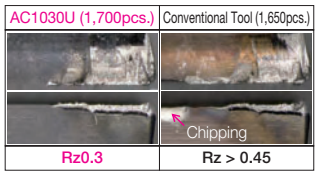




Application Examples

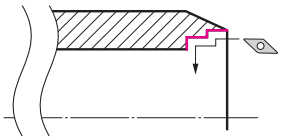
[STKM12C-EC Pipe]

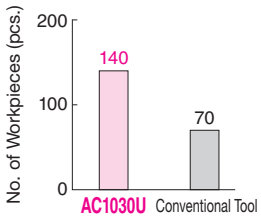




Insert: CCGT060201L-FX
Cutting Conditions: v_c=196m/min, f=0.04mm/rev, a_p=0.4mm

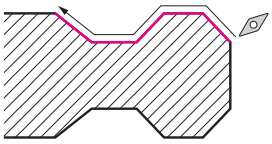
[S45C Shaft Stator]

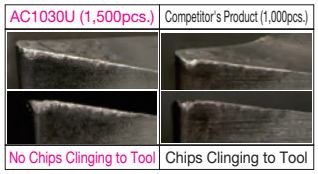




Insert: VCGT110302R-FX
Cutting Conditions: v_c=195m/min, f=0.12mm/rev, a_p=0.175 to 0.25mm Wet

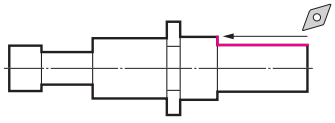
[SUS304 Body Valve]

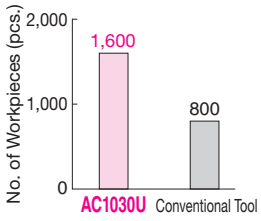




Insert: VCGT110301R-FY
Cutting Conditions: v_c=31.5m/min, f=0.025mm/rev, a_p=0.2mm Wet

[SUS430 Sensor Housing]



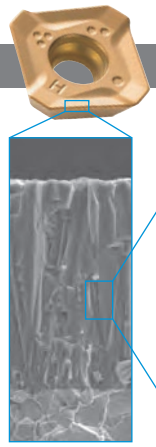


Insert: DCGT11T304MN-FC
Cutting Conditions: v_c=50m/min, f=0.06mm/rev, a_p=0.2mm

Coated Carbide

Features

ABSOTECH X : Revolutionary coating technology that realises superb tool life



CVD

Pure cubic crystal AlTiN with high Al content:
With proprietary structural control technology, differently composed layers of AlTiN are stacked at the nanometre level.
With a high-Al composition containing over 80% Al on average, it also maintains a cubic crystalline structure to achieve excellent thermal resistance and high hardness. Vastly improved wear resistance.

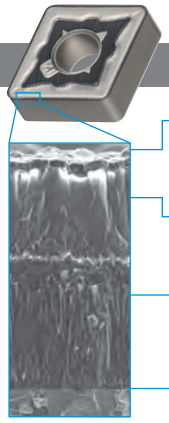
Special Surface Treatment:
Proprietary surface treatment introduces high compression stress to the coating, suppressing the development of cracks. Greatly improved fracture and thermal crack resistance.

- Realises extremely long tool life for general machining through high-efficiency machining, using revolutionary technology combining wear resistance and fracture resistance

[ABSOTECH X] For CVD Milling

■ Applicable Grades (for Milling): XCU2500, XCK2000

ABSOTECH : New coating technology that realises absolute stability



CVD

Special Surface Treatment:
Chipping resistance and adhesion resistance are significantly improved by special surface treatments applied to suit the application

High Strength Alumina Layer:
Significantly improves the coating strength by controlling crystal growth direction

High Hardness Micro-Grain TiCN Layer:
Significantly improves the coating hardness by using a fine and uniform crystal structure

High Adhesion Technology:
Significantly improves adhesion strength through a smooth interface between the coating and carbide substrate

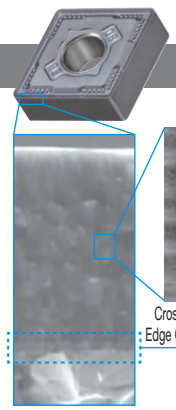
- Suppresses abnormal damage such as chipping and adhesion. Stable machining is achieved in various situations.
- Next-level high strength and high hardness coating is achieved. Achieves long, stable tool life even in high-efficiency machining.

[ABSOTECH] For CVD Turning

■ Applicable Grades (for Turning)

Steel	: AC8015P, AC8020P, AC8025P, AC8035P
Stainless Steel	: AC6020M, AC6030M
Cast Iron	: AC4010K, AC4015K

■ Applicable Grades (For Milling) : ACP2000, ACK2000



PVD

Our proprietary super multi-layered coating structure: Advanced nanotechnology enables nanometre-level thickness (1 nanometre is one billionth of a metre). Hardness, thermal resistance and toughness are significantly improved by alternately layering one thousand layers of super thin film

High Adhesion Technology:
Significantly improves adhesion strength through advanced control technology at the interface of the coating and carbide substrate

- Optimised coating composition according to application. Achieves stable machining regardless of the work material.
- Significantly improves chipping resistance by improving coating adhesion strength. Stable machining is realised even under high load conditions.

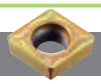
[ABSOTECH] For PVD Turning/Milling

■ Applicable Grades (for Turning)

Stainless Steel	: AC6040M
Exotic Alloy	: AC5005S, AC5015S, AC5025S
For Small Lathes	: AC1030U

■ Applicable Grades (For Milling) : ACU2500, ACP3000, ACK3000

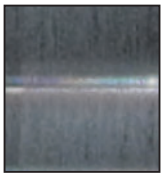
Brilliant Coat — PVD



Brilliant Coat provides excellent lubricity for higher quality machining

- PVD coating with excellent wear resistance and lubricity
- Suppresses reactions with work material and realises beautiful machined surfaces

Brilliant Coat

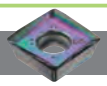


Conventional coating

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

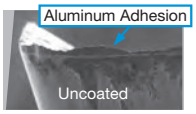
■ Applicable Grades: (For Steel Turning) T1500Z, T2500Z

AURORA Coat (DLC:DiamondLikeCarbon) — PVD



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

- Comparison of Cutting Edge Adhesion after Cutting ADC12



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 flat and 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

■ Applicable Grades: (For Milling) DL1000, DL2000 (For Endmilling) DL1000, DL1200 (For Drilling) DL1300, DL1500

Coated Carbide

Characteristic Values

For Turning (CVD)

Work Material	Grades	Hardness (HRA)	TRS (GPa)	Coating Type	Coating Thickness (μm)	Features	Old Grades
P Steel	**AC810P**	91.0	2.2	Super FF Coat	18	· For high-speed and high-efficiency machining of steel · Grade emphasising wear resistance for high- to medium-speed cutting	AC700G
	AC8015P	91.0	2.3	ABSOTECH	14	· For high-speed and high-efficiency machining of steel · Crystal orientation control technology is used to drastically suppress the advancement of crater wear, achieving long, stable tool life during high-speed and high feed cutting	AC810P
	AC820P	90.1	2.2	Super FF Coat	14	· General-purpose grade with a superior balance of fracture and wear resistance	AC2000
	New **AC8020P**	90.5	2.2	ABSOTECH	18	· Our 1st recommended grade for mill-scale work on forged material · Alumina coating with even higher strength balances outstanding stability and wear resistance in mill-scale work	AC820P
	AC8025P	90.1	2.3	ABSOTECH	12	· Our 1st recommended grade for turning steel · Smooth surface treatment suppresses abnormal damage from adhesion/chipping while realizing stable tool life over a wide range of work materials and cutting speeds	AC820P
	AC830P	89.4	2.6	Super FF Coat	8	· For interrupted machining of steel · Tough grade with an emphasis on fracture resistance	AC3000
	AC8035P	89.4	2.6	ABSOTECH	9	· For interrupted machining of steel · Coating layer tensile stress removal technology greatly improves fracture resistance and achieves long, stable tool life during heavy interrupted cutting	AC830P
M Stainless Steel	**AC610M**	91.0	2.2	Super FF Coat	5	· For high-speed machining of stainless steel · Grade emphasising wear resistance for high-efficiency machining	—
	AC6020M	90.1	2.3	ABSOTECH	5	· For high-speed machining of stainless steel · Adopts a high-hardness carbide substrate and new coating to realise excellent wear resistance and fracture resistance, resulting in stable long tool life in high-speed machining	AC610M
	AC6030M	89.5	2.7	ABSOTECH	5	· Our 1st recommended grade for turning stainless steel · Drastically reduces the occurrence of abnormal damage in stainless steel machining and achieves long and stable tool life thanks to the new coating	AC630M
	AC630M	89.5	2.7	Super FF Coat	5	· General-purpose grade with a superior balance of fracture and wear resistance for stainless steel machining · Supports continuous and light cutting of steel with low cutting speeds	AC304
K Cast Iron	**AC405K**	92.0	2.4	Super FF Coat	18	· For high-speed cast iron milling · Grade emphasising wear resistance for high- to medium-speed cutting	AC410K
	AC4010K	91.1	2.5	ABSOTECH	20	· Our 1st recommended grade for turning gray cast iron · For high-speed cast iron milling · New thick coating realises stable long tool life even with ultra-high-speed machining of gray cast iron at V_c= 700 m/min	AC405K
	AC4015K	91.1	2.5	ABSOTECH	16	· Our 1st recommended grade for turning ductile cast iron · New high-adhesion, high-strength coating realises high wear resistance and chipping resistance for stable long tool life over a wide range of cutting conditions	AC415K
	AC415K	91.1	2.5	Super FF Coat	18	· General-purpose grade with a superior balance of fracture and wear resistance	AC410K
	AC420K	91.1	2.5	Super FF Coat	12	· For interrupted machining of cast iron · Designed as a grade with emphasis on fracture resistance and chipping resistance, outstanding stability is realised in heavy interrupted cutting and unstable cutting of cast iron	AC700G

For Milling (CVD)

Work Material	Grades	Hardness (HRA)	TRS (GPa)	Coating Type	Coating Thickness (μm)	Features	Old Grades
P Steel	**ACP100**	89.3	3.1	Super FF Coat	6	· For high-speed machining of steel · Grade emphasising wear resistance for high-speed cutting	AC230
	ACP2000	89.5	3.2	ABSOTECH	10	· For high-speed machining of steel · Stable long tool life in high-speed machining is realised by adopting a tough carbide substrate and a new coating with excellent thermal crack resistance	ACP100
	New **XCU2500**	89.5	3.2	ABSOTECH X	6	· General-purpose grade for a wide variety of materials such as steel, cast iron and stainless steel · New coating combining wear and fracture resistance realises long tool life in medium-speed to high-speed machining	—
M Stainless Steel	**ACM200**	89.8	3.4	Super FF Coat	6	· For machining high-hardness stainless steel · Adopts newly developed high-strength Cemented Carbide substrate with excellent wear resistance and thermal resistance, realizing outstanding stability when machining hardened stainless steel	AC230
K Cast Iron	**ACK100**	92.0	2.4	Super FF Coat	6	· For high-speed cast iron milling · Adopts a high-hardness substrate with high wear resistance	—
	ACK200	91.7	2.5	Super FF Coat	6	· For high-speed cast iron milling · Adopts a tough carbide substrate with excellent wear resistance and thermal crack resistance	AC211
	ACK2000	91.7	3.1	ABSOTECH	10	· For high-speed cast iron milling · Stable long tool life in high-speed machining is realised by adopting a tough carbide substrate and a new coating with excellent thermal resistance	ACK100 ACK200
	New **XCK2000**	91.7	2.5	ABSOTECH X	6	· For high-speed cast iron milling · Along with a high-hardness carbide substrate, the new coating combining wear and fracture resistance realises superb long tool life in medium-speed to high-speed machining	—

Coated Carbide

Characteristic Values

For Turning (PVD)

Work Material	Grades	Hardness (HRA)	TRS (GPa)	Coating Type	Coating Thickness (μm)	Features	Old Grades
P Steel	**T1500Z** (Cermet)	92.0	2.2	Brilliant Coat*	3	· For finishing of steel · Adopts Brilliant Coat for excellent lubricity and higher machined surface quality	T2000Z
P Steel	New **T2500Z** (Cermet)	91.8	2.4	Brilliant Coat*	3	· For finishing of steel · The use of Brilliant Coat with excellent lubricity and a tough cermet substrate realises excellent machined surface quality and superb stability	T3000Z
P Steel	**AC530U**	91.4	3.3	Super ZX Coat	3	· For interrupted machining of steel and stainless steel · Adopts a micro-grained tough carbide substrate and super multi-layered coating to realise outstanding fracture resistance	ACZ310
M Stainless Steel	**AC6040M**	91.6	3.8	ABSOTECH	3	· Our 1st recommended grade for interrupted machining of stainless steel · New coating with excellent adhesion resistance and peel-off resistance, together with the tough carbide substrate, realise stable tool life in heavy interrupted machining	AC530U
S Exotic Alloy	New **AC5005S**	93.1	2.8	ABSOTECH	5	· Grade for high-speed and high-efficiency machining of exotic alloys · The use of a dedicated carbide substrate with great high-temperature strength realises excellent wear resistance in high-speed, high-efficiency machining	—
S Exotic Alloy	**AC510U**	92.6	2.6	Super ZX Coat	3	· For continuous to partially interrupted machining of exotic alloy · Grade with an emphasis on wear resistance and thermal resistance for continuous machining of exotic alloy · Can also be used for interrupted machining of cast iron	EH510Z EH10Z
S Exotic Alloy	**AC5015S**	92.7	3.2	ABSOTECH	5	· Our 1st recommended grade for turning exotic alloy · Adopts a carbide substrate with excellent thermal resistance and a new coating with excellent wear resistance and chipping resistance, realizing stable long tool life over a wide range of cutting conditions	AC510U
S Exotic Alloy	**AC520U**	91.7	3.0	Super ZX Coat	3	· For interrupted machining of exotic alloy · Grade with an emphasis on fracture resistance for interrupted machining of exotic alloy · Also suitable for interrupted machining of stainless steel	EH520Z EH20Z
S Exotic Alloy	**AC5025S**	91.8	3.6	ABSOTECH	5	· For partially interrupted to interrupted machining of exotic alloy · Adopts a carbide substrate with excellent fracture resistance and a new coating with excellent wear resistance and chipping resistance, realizing stable long tool life under unstable cutting conditions	AC520U
H Hardened Steel	**AC503U**	93.2	1.7	Super ZX Coat	3	· For roughing of hardened steel · Adopts a high-hardness carbide substrate and super multi-layered coating to realise outstanding wear resistance	—
For Small Lathes	**AC1030U**	91.6	3.8	ABSOTECH	2	· Our 1st recommended grade for high-precision machining · Adopts a new coating with excellent adhesion resistance and peel-off resistance which realises outstanding stability and machined surface quality due to the improved cutting edge quality	—
For Small Lathes	**ACZ150**	91.4	3.3	ZX Coat	1	· For high-precision machining · Adopts an ultra-thin coating and micro-grain tough carbide substrate to realise excellent machined surface quality	—

For Milling (PVD)

Work Material	Grades	Hardness (HRA)	TRS (GPa)	Coating Type	Coating Thickness (μm)	Features	Old Grades
P Steel	Expansion **ACU2500**	91.6	3.8	ABSOTECH	3	· General-purpose grade supporting steel, stainless steel, and cast iron machining · Adopts a carbide substrate with excellent fracture resistance and wear resistance, plus a new coating with excellent wear resistance and chipping resistance, realising stable long tool life on various work materials	—
P Steel	**ACP200**	89.5	3.2	(New) Super ZX Coat	3	· Our 1st recommended grade for steel applications · General-purpose grade with an excellent balance of wear and fracture resistance · Also suitable for machining stainless steel	ACZ330
P Steel	**ACP300**	89.3	3.1	(New) Super ZX Coat	3	· For interrupted machining of steel · Tough grade with an emphasis on fracture resistance · Also suitable for interrupted machining of stainless steel	ACZ350
P Steel	**ACP3000**	89.5	3.2	ABSOTECH	3	· Our 1st recommended grade for milling steel · Carbide substrate with excellent thermal crack resistance, plus a new coating with excellent wear resistance and chipping resistance, realises stable long tool life over a wide range of cutting conditions	ACP200 ACP300
M Stainless Steel	**ACM100**	91.4	3.3	(New) Super ZX Coat	3	· For high-speed machining of stainless steel · Adopts high-hardness micro-grain Cemented Carbide substrate and super multi-layered coating to realise outstanding wear resistance	ACZ310
M Stainless Steel	**ACM300**	89.8	3.4	(New) Super ZX Coat	3	· Our 1st recommended grade for milling stainless steel · Adopts high-strength Cemented Carbide substrate and super multi-layered coating for next-level wear resistance and fracture resistance	—
K Cast Iron	**ACK300**	91.4	3.3	(New) Super ZX Coat	3	· General-purpose grade with an excellent balance of wear and fracture resistance	ACZ310
K Cast Iron	**ACK3000**	91.7	3.1	ABSOTECH	3	· Our 1st recommended grade for milling cast iron · Adopts a high thermal conductivity carbide substrate and a new coating with excellent wear resistance and chipping resistance, realizing stable long tool life over a wide range of cast iron machining operations	ACK300
N Non-Ferrous Metal	**DL1000**	92.9	2.1	AURORA Coat (DLC)	0.5	· Grade for milling non-ferrous metal, utilising DLC coat with a low coefficient of friction and excellent adhesion resistance	—
N Non-Ferrous Metal	**DL2000**	91.6	3.8	AURORA Coat (DLC)	0.5	· Grade for milling non-ferrous metal, utilising DLC coat with a low coefficient of friction and excellent adhesion resistance	—

*Brilliant Coat may appear a slightly different colour or lustre due to light interference, but these variations do not affect the performance.

Cermet

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

Grades with Better Wear Resistance T1000A, General-purpose Grades T1500A, General-purpose Coated Grades T1500Z, Grades with Better Toughness T2500Z in the Lineup. Expanded lineup of catalogue items for a wide variety of finishing applications.

Features

Uncoated

T1000A

High-hardness grade with superior 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 Sintered Alloy.

Coated

T1500Z

General-purpose coated grade that employs our proprietary Brilliant Coat* PVD coating with excellent lubricity

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

Uncoated

T1500A

A general-purpose grade that provides both wear and fracture resistance with higher-quality surface finishes

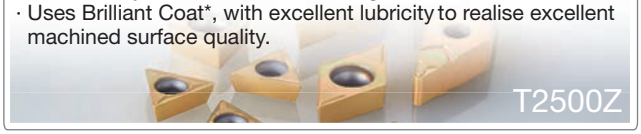
- Mixing hard phases of different functionality, grain size and composition improves balance of wear and fracture resistance.
- Improved cutting edge treatment technology provides beautiful finished machined surfaces.

Coated

T2500Z

Tough grade with excellent fracture resistance and thermal crack resistance

- Fine, uniform grain structure greatly improves toughness.
- Improves thermal crack resistance due to the high thermal conductivity and realises stable, long tool life.
- Uses Brilliant Coat*, with excellent lubricity to realise excellent machined surface quality.



Characteristic Values

For Turning

Work Material	Grades	Hardness (HRA)	TRS (GPa)	Coating Type	Coating Thickness (μm)	Features	Old Grades
P Steel K Cast Iron	**T1000A**	93.3	1.8	—	—	· For continuous machining of steel · High-hardness grade with superior wear resistance · Supports finishing of cast iron and sintered metals	T110A
	T1500A	92.0	2.2	—	—	· Our 1st recommended cermet grade for turning steel · General-purpose grade with an excellent balance of wear and fracture resistance, achieving an excellent machined surface over a wide range of cutting conditions	T1200A
	T2500A	91.8	2.4	—	—	· For interrupted machining of steel · Fine, uniform grain structure greatly improves toughness, realising long tool life and excellent surface finishes even with interrupted cutting	—
	T1500Z	92.0	2.2	Brilliant Coat*	3	· Adopts Brilliant Coat for excellent lubricity and higher machined surface quality	T2000Z
	New **T2500Z**	91.8	2.4	Brilliant Coat*	3	· For finishing of steel · The use of Brilliant Coat with excellent lubricity and a tough cermet substrate realises excellent machined surface quality and superb stability	T3000Z

For Milling

Work Material	Grades	Hardness (HRA)	TRS (GPa)	Coating Type	Coating Thickness (μm)	Features	Old Grades
P Steel M Stainless Steel	**T1500A**	92.0	2.2	—	—	· For finishing of steel and stainless steel · Excellent balance of wear and fracture resistance, achieving excellent machined surface quality over a wide range of cutting conditions	T1200A
	T250A	91.4	2.1	—	—	· For finishing of steel and stainless steel · Tough grade with enhanced crack development resistance	—
	T2500A	91.8	2.4	—	—	· For finishing of steel and stainless steel · Fine, uniform grain structure greatly improves toughness, realising long tool life and excellent surface finishes	T250A
	T4500A	91.0	2.3	—	—	· For finishing of steel and stainless steel · Tough grade with excellent fracture resistance and reduced thermal cracking	—

*Brilliant Coat may appear a slightly different colour or lustre due to light interference, but these variations do not affect the performance.

Cemented Carbide

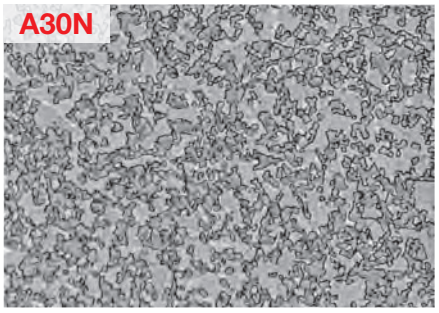
IGETALLOY cemented carbides have a solid history and a wide variety of grades to suit many different applications. They are widely used and appreciated for their superior performance.

The IGETALLOY range consists of cemented carbide grades with various characteristics that correspond to the cutting tool application. This is achieved by varying the carbide components: the WC structure (main component) and additives such as TiC, TaC, and Co (binder).

The wide selection of IGETALLOY grades provides excellent wear resistance and toughness in various cutting conditions.

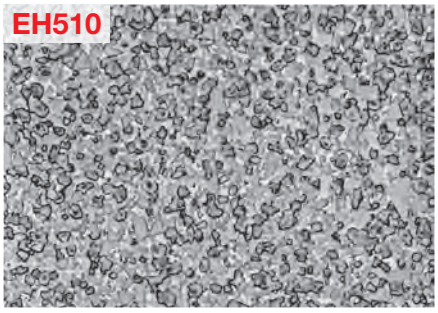
● For Steel

A30N



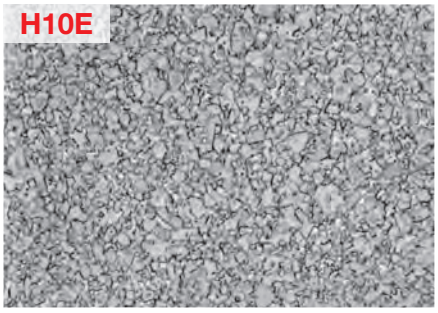
● For Stainless Steel

EH510



● For Cast Iron

H10E



Characteristic Values

Work Material	Grades	Hardness (HRA)	TRS (GPa)	Thermal Conductivity (W/m/°C)	Young Modulus (GPa)	Compressive Strength (GPa)	Coefficient of Linear Expansion ($\times 10^{-6}$/°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	**EH510**	92.6	2.6	76	—	—	—
	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
	EH510	92.6	2.6	76	—	—	—
	H10E	92.3	2.0	67	—	—	—
	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
	H20	91.6	3.8	—	—	—	—
S Exotic Alloy	**EH510**	92.6	2.6	76	—	—	—
	EH520	91.7	3.0	78	—	—	—

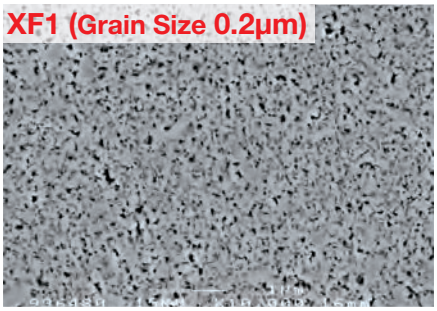
Cemented Carbide

The IGETALLOY micro-fine grained carbide series performs at a world-class level to deliver superior performance in small drills and other tools.

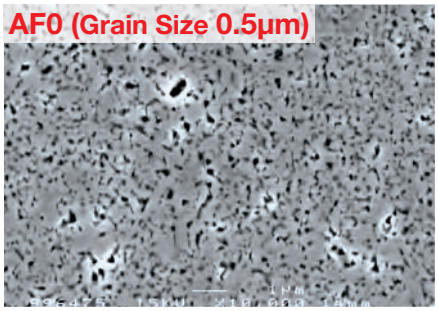
IGETALLOY micro-fine grained cemented carbides feature a WC structure between 0.2 and 1μm and are extremely strong and hard. They also provide excellent sharpness and superb surface quality on machined surfaces.
These features provide excellent performance in a variety of applications from ø0.1mm PCB drills and endmill materials to thin-bladed slitters and precision molds.

● Ultra-fine Grained Carbide

XF1 (Grain Size 0.2μm)

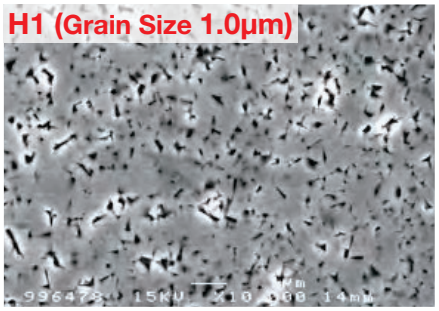


AF0 (Grain Size 0.5μm)



● Micro-grained Carbide

H1 (Grain Size 1.0μm)



Characteristic Values

Classification	Grades	Properties					Features	Applications
		Grain Size (μm)	Co Content (wt%)	TRS (GPa)	Hardness (HRA)	Hardness HV (GPa)		
Ultra-fine Grained Carbide	**XF1**	0.2	9.0	4.0	93.5	19.2	World's smallest grain size ultra-fine grained carbide	Microdrills, Very Small Diameter Drills
	AF1	0.5	12.0	4.4	92.5	17.3	World's toughest ultra-fine grained carbide	Microdrills, Mini-tools, Punches
	AF0	0.5	10.0	4.1	93.0	18.0	Tough, wear-resistant ultra-fine grained carbide	Microdrills, Routers
	AFU	0.5	8.0	3.8	93.6	19.4	Wear-resistant ultra-fine grained carbide	PCB Drills, Endmills for High-Hardness Materials
Micro-fine Grained Carbide	**A1**	0.7	13.0	3.2	91.4	15.6	Tough micro-fine 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 excellent wear resistance and toughness	Endmills, Drills for Steel
	F0	0.7	5.0	2.0	93.6	20.1	Micro-fine grained carbide with superior wear resistance	PCB Drills, Routers
Micro-grained Carbide	**KH03**	1.0	10.0	3.3	91.4	15.2	Micro-grained carbide with excellent strength and toughness	Molds/Dies, Drills, Endmills
	KH05	1.0	13.0	3.5	90.4	13.6	Tough, micro-grained carbide	Molds/Dies
	H1	1.0	5.0	2.1	92.9	17.7	Micro-grained carbide with superior wear resistance	Drills for Cast Iron and High-Hardness, Reamers
	ZF16	1.0	6.0	3.5	93.0	18.6	Wear- and chipping-resistant micro-grained carbide for high-speed machining	PCB Drills

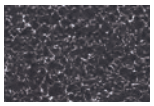
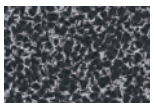
Carbide Materials ••• ☞K2

CBN

High hardness and thermal resistance for machining hardened steel and hard cast iron.
High-speed finishing of gray cast iron with long tool life is also possible.

"SUMIBORON" was first successfully developed in Japan by our company in 1977. "Coated SUMIBORON" with a special ceramic coating and "SUMIBORON BINDERLESS" made by directly bonding CBN particles without a binder are new additions to our product lineup.

Features

Structure Features	Structure	CBN Content	Hardness (GPa)	Grades	Work Materials/Applications	Features
Purely CBN particles, firmly bonded		High	54	NCB100	Cast Iron, Titanium Alloy, Pure Titanium, Cobalt-chrome Alloy, Cemented Carbide, Cermet	· Containing no binder, its structure of directly bonded nano- to sub-micron CBN particles provides high hardness and thermal conductivity, making it highly efficient with a longer tool life when machining exotic alloys such as titanium alloys and cobalt-chrome alloys
Mainly CBN grains fused together				BN7000 BN7500 BN7115 New BNC8115 New BNS8125 New BNS800	Cemented Carbide, Chilled Cast Iron, Ni-Hard Cast Iron, Sintered Ferrous Alloy, Heat-Resistant Alloy, Cast Iron	· High CBN content. Structure consists of strongly fused CBN grains · Suited to cutting cast iron, heat-resistant alloy, cemented carbide and other high-hardness materials
Mainly CBN grains held together with a binder		Low	27	BN1000/BN2000/BN350 BNX10/BNX20/BN500 BNC2115 New /BNC2125 New BNC2010/BNC2020/BNC300 BNC100/BNC160/BNC200/BNC500	Alloy Steel, Case Hardened Steel, Carbon Tool Steel, Bearing Steel, Die Steel, Ductile Cast Iron	· CBN grains are fused together strongly with a special ceramic binder · Strong CBN binding provides superior wear resistance and toughness when cutting hardened steel and cast iron

Grade Range Map

Work Material	Series	High-speed Cutting	Finishing to Light Cutting	Medium Cutting		Rough to Heavy Cutting
H Hardened Steel	Classification	—	H01	H10	H20	H30
	Coated SUMIBORON		New BNC2115			
				New BNC2125		
		BNC2010				
			BNC2020			BNC300
		BNC100		BNC160		
				BNC200		
	Uncoated SUMIBORON	BN1000				
			BN2000			
		BNX10			BNX20	BN350
Sintered Alloy	Classification	—	01	10	20	30
	Uncoated SUMIBORON	New BN7115				
				BN7000		
K Cast Iron	Classification	—	K01	K10	K20	K30
	Coated SUMIBORON	BNC500*			New BNC8115	
	Uncoated SUMIBORON	NCB100				
			BN500			
		BN7000				
					New BNS8125	
					BNS800	
S Exotic Alloy	Classification	—	S01	S10	S20	S30
	Uncoated SUMIBORON	NCB100				
			BN7000			
				New BNS8125		

*Dedicated for Ductile Cast Iron

CBN

Characteristic Values

Work Material	Grades	Binder	CBN Content (%)	Grain Size (μm)	Hardness HV (GPa)	TRS (GPa)	Main Coating Components	Coating Thickness (μm)	Features
H Hardened Steel	New BNC2115	TiN	60 to 65	3	31 to 33	1.3 to 1.4	TiAlSiN Super Multi-layered Coating	3	Maintains excellent surface roughness thanks to coating with high notch wear resistance and tough CBN substrate
	New BNC2125	TiN	65 to 70	4	33 to 35	1.5 to 1.6	TiAlBN Super Multi-layered Coating	3	Along with a tough CBN substrate, the coating combines wear resistance and toughness to achieve even more stable machining
	BNC2010	TiCN	50 to 55	2	30 to 32	1.1 to 1.2	TiCN Multiple Layers	2	Improved wear resistance from coating and substrate, achieves excellent and consistent surface finish.
	BNC2020	TiN	70 to 75	5	34 to 36	1.4 to 1.5	TiAlN Multiple Layers	2	Utilising a tough substrate along with a highly wear-resistant and adhesive coating layer, to achieve long tool life in general-purpose to high-efficiency machining.
	BNC300	TiN	60 to 65	1	33 to 35	1.5 to 1.6	TiAlN	1	Suitable for finishing of workpieces with a mixture of continuous and interrupted cutting portions.
	BNC100	TiN	40 to 45	1	29 to 32	1.0 to 1.1	TiAlN/TiCN	3	Grade suitable for high-speed finishing thanks to highly wear-resistant coating.
	BNC160	TiN	60 to 65	3	31 to 33	1.2 to 1.3	TiAlN/TiCN	3	Achieves stable, high-precision finishing of hardened steel.
	BNC200	TiN	65 to 70	4	33 to 35	1.4 to 1.5	TiAlN	3	Provides long tool life thanks to tough substrate and highly wear-resistant coating.
	BN1000	TiCN	40 to 45	1	27 to 31	0.9 to 1.0	—	—	Grade with ultimate wear and fracture resistance, suitable for high-speed cutting.
	BN2000	TiN	50 to 55	2	31 to 34	1.1 to 1.2	—	—	General-purpose grade for hardened steel machining with a high degree of fracture and wear resistance.
	BNX20	TiN	55 to 60	3	31 to 33	1.0 to 1.1	—	—	Grade with excellent crater wear resistance, suitable for high-efficiency cutting under high-temperature conditions.
	BN350	TiN	60 to 65	1	33 to 35	1.5 to 1.6	—	—	Grade with ultimate cutting edge strength, suitable for heavy interrupted cutting.
	BNX10	TiCN	40 to 45	3	27 to 31	0.9 to 1.0	—	—	Highly wear-resistant grade, suitable for high-speed continuous cutting.
Sintered Alloy	New BN7115	Co Compound	90 to 95	1	41 to 44	2.2 to 2.3	—	—	Grade balancing ultimate cutting edge sharpness with fracture resistance, suitable for finishing of sintered alloy
	BN7500	Co Compound	90 to 95	1	41 to 44	2.0 to 2.1	—	—	Grade maintaining good cutting edge sharpness, suitable for finishing of sintered alloy
	BN7000	Co Compound	90 to 95	2	41 to 44	1.8 to 1.9	—	—	Grade exhibiting improved wear and fracture resistance in roughing of sintered materials.
K Cast Iron	New BNC8115	Al Alloy	85 to 90	8	39 to 42	0.95 to 1.15	TiAlN	2	Grade with 100% solid CBN structure, using PVD coating with excellent wear resistance to enable roughing operations.
	New BNS8125	Al Alloy	85 to 90	8	39 to 42	0.95 to 1.15	—	—	Grade with 100% solid CBN structure that exhibits excellent wear and fracture resistance
	BNS800	Al Alloy	85 to 90	8	39 to 42	0.9 to 1.1	—	—	Grade with solid CBN structure that has excellent thermal shock resistance
	BN7000	Co Compound	90 to 95	2	41 to 44	1.8 to 1.9	—	—	Grade exhibiting wear and fracture resistance in cutting of cast iron and exotic alloys.
	BN500	TiC	65 to 70	6	32 to 34	1.0 to 1.1	—	—	Grade optimised for cast iron cutting. Provides superior wear and fracture resistance.
	BNC500 (For Ductile Cast Iron)	TiC	60 to 65	4	32 to 34	1.1 to 1.2	TiAlN	3	Grade suitable for machining of hard-to-cut cast iron, thanks to the highly wear-resistant substrate and coating.
S Exotic Alloy	NCB100	—	100	to0.5	51 to 54	1.8 to 1.9	—	—	Achieves high efficiency, improved machining accuracy, and longer tool life in machining of exotic alloys such as titanium alloy and cobalt-chrome alloys

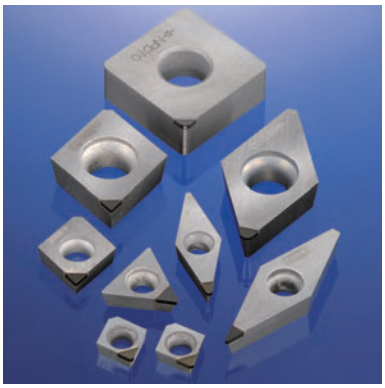
TRS measured with test piece equivalent to insert CBN layer

CBN SUMIBORON Coated SUMIBORON Series ••• L2 on

Polycrystalline Diamond

Excellent wear resistance, longer tool life and high-speed, high-efficiency, 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 machining of non-metal and non-ferrous metal applications including aluminum, copper, magnesium and zinc alloys.

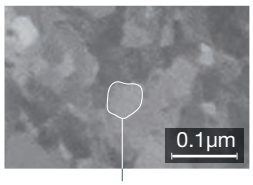
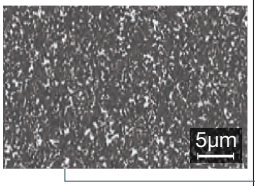
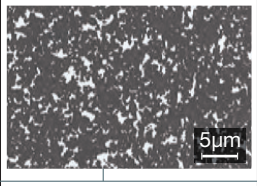
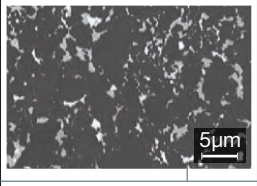
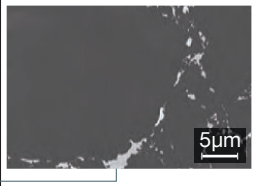


SUMIDIA BINDERLESS uses nano-polycrystalline diamond for the cutting edge, demonstrating excellent wear resistance and fracture resistance.
In particular, it achieves extended tool life and machining accuracy superior to conventional polycrystalline diamond when machining hard brittle materials such as cemented carbide.

Features

● High density sintered material made of diamond particles of various particle sizes ranging from sub-microns to tens of microns.

Structure

SUMIDIA BINDERLESS	SUMIDIA			
NPD10	**DA1000**	**DA2200**	**DA150**	**DA90**
				
Diamond particles	*Black areas in image are diamond particles			

Grade Range Map

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

Polycrystalline Diamond

Characteristic Values

Work Material	Grades	Binder	CBN Content (%)	Grain Size (μm)	Hardness HK (GPa)	TRS (GPa)	Features
Hard Brittle Material	**NPD10**	—	100	up to 0.05	120 to 130	≈ 3.15	100% diamond structure that directly binds nano-order diamond particles with high strength. Demonstrates optimum wear and fracture resistance as well as the best edge sharpness.
N Non-Ferrous Metal	**DA1000**	Co	90 to 95	up to 0.5	50 to 60	≈ 2.60	High-density sintered material made of ultra-fine grain diamond that exhibits optimum wear and fracture resistance as well as excellent edge sharpness.
	DA2200	Co	85 to 90	0.5	45 to 55	≈ 2.45	Sintered material made of ultra-fine grain diamond that demonstrates both wear and fracture resistance and excellent edge sharpness.
	DA150	Co	85 to 90	5	50 to 60	≈ 1.95	Micro-grained sintered diamond particles with both machinability and wear resistance.
	DA90	Co	90 to 95	50	50 to 65	≈ 1.10	Coarse sintered diamond particles, with high diamond content for excellent wear resistance.

TRS measured with test piece equivalent to insert PCD layer

PCD **SUMIDIA Series** ••• ☞M2

PCD **SUMIDIA BINDERLESS** ••• ☞M4

Ceramic

Superb wear resistance enables ultra-high-speed machining.

Sumitomo Electric Hardmetal's Advanced Ceramic utilises a special process to produce extremely tough grades.
This new development permits ultra-high-speed cutting of cast iron, heat-resistant alloy, and ultra-hard rolled material with stability.

Grade Range Map

For Turning

For Turning	High-speed Cutting	Finishing to Light Cutting		Medium Cutting	Rough to Heavy Cutting	
	—	01	10	20	30	40
K Cast Iron	NB90S					
S Exotic Alloy			WX120★			
H Hardened Steel		NB100C				

Characteristic Values

For Turning

Work Material	Grades	Hardness (HRA)	TRS (GPa)	Main Coating Components	Coating Thickness (μm)	Features
K Cast Iron	**NB90S**	94.8	0.9	—	—	Al_2O_3+ carbon-based ceramics Suitable for medium cutting to finishing of cast iron
S Exotic Alloy	**WX120★**	90.0	1.2	—	—	Reinforced with SiC whiskers For heat-resistant alloy and ultra-hard roll cutting
H Hardened Steel	**NB100C**	95.0	1.0	TiAlN Type	2	Al_2O_3-based high strength ceramic with ZX Coat Low-speed/continuous light cutting of hardened steel

★WX120 is only sold in Japan.

Material Properties

■ Material Properties

Material		Specific Gravity	Hardness (mHv) (GPa)	Young Modulus (GPa)	Thermal Conductivity (W/m/°C)	Coefficient of Linear Expansion (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
Niobium 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	**Al_2O_3**	3.98	29	410	29	8.5	2,050
Silicon Nitride	**Si_3N_4**	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
Cemented 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	—