Recommended chip breaker for workpiece

Materials : 1010, 1015, 1025, 8615, 5120, 4130
Hardness : under 180HB

Workpiece
P
Steel

	Depth of cut (inch)	C/B	Cutting edge	Feed (ipr)	Grades	Cutting Speed (sfm)	Insert shape 80°	55°	90°	60°	35°	80°
Negative	0.008 ~ 0.031 ~ 0.059 finishing	VL		0.004 ~ 0.008 ~ 0.014	NC3010 NC3220 CN1000 CN2000	990 990 891 858	CNMG p. B20	DNMG p. B25	SNMG p. B31	TNMG p. B38	VNMG p. B43	WNMG p. B46
	0.020 ~ 0.039 ~ 0.059 finishing	VF		0.002 ~ 0.006 ~ 0.014	NC3010 NC3120 NC3220 NC5330	1023 891 1023 759	CNMG p. B20	DNMG p. B25	SNMG p. B32	TNMG p. B39	VNMG p. B43	WNMG p. B46
	0.020 ~ 0.039 ~ 0.079 finishing	VB		0.006 ~ 0.008 ~ 0.016	NC3010 NC3220 CN1000 CN2000	990 825 755 656	CNMG p. B20	DNMG p. B25		TNMG p. B38		WNMG p. B46
	0.020 ~ 0.059 ~ 0.138 medium to finishing	VC		0.005 ~ 0.010 ~ 0.018	NC3010 NC3220 NC3120 NC5330	957 825 825 660	CNMG p. B20	DNMG p. B25	SNMG p. B31	TNMG p. B38	VNMG p. B43	WNMG p. B46
	0.031 ~ 0.059 ~ 0.138 medium to finishing	HA		0.004 ~ 0.008 ~ 0.016	NC3010 NC3120 NC3220 NC9025	990 759 759 594	CNMG p. B19	DNMG p. B24	SNMG p. B30	TNMG p. B37	VNMG p. B42	WNMG p. B45
	0.039 ~ 0.098 ~ 0.197 medium machining	VM		0.004 ~ 0.010 ~ 0.020	NC3010 NC3120 NC3220 NC3030 NC5330 CN2000	891 759 759 693 660 726	CNMG p. B21	DNMG p. B25	SNMG p. B32	TNMG p. B39	VNMG p. B44	WNMG p. B47
	0.098 ~ 0.157 ~ 0.276 roughing	HR		0.010 ~ 0.018 ~ 0.026	NC3010 NC3120 NC3220 NC3030	495 429 429 330	CNMG p. B19	DNMG p. B24	SNMG p. B31	TNMG p. B38		WNMG p. B45
	0.236 ~ 0.394 ~ 0.591 Heavy (General)	VH		0.028 ~ 0.039 ~ 0.055	NC3010 NC3030 NC500H NC5330	165~825 165~495 165~495 165~495	CNMM p. B22		SNMM p. B33			
	0.276 ~ 0.472 ~ 0.669 Heavy (High feed cutting)	VT		0.030 ~ 0.047 ~ 0.063	NC3010 NC3030 NC500H NC5330	165~825 165~495 165~495 165~495	CNMM p. B33		SNMM p. B33			

●: The first recommended cutting condition

Recommended chip breaker for workpiece

Materials : 1010, 1015, 1025, 8615, 5120, 4130
Hardness : under 180HB

Workpiece
P
Steel

Positive

Depth of cut (inch)	C/B	Cutting edge	Feed (ipr)	Grades	Cutting Speed (sfm)	Insert shape 80°	55°	90°	60°	35°	80°
0.004 ~ 0.020 ~ 0.039 finishing	VL  	0.002 ~ 0.004 ~ 0.008	NC3010 957 NC3220 825 NC3120 825 NC5330 660 CN1000 787 CN2000 722	CCMT  p. B50	DCMT  p. B53	SCMT  p. B55	TC(P)MT  p. B59	VC(B)MT  p. B65		
0.004 ~ 0.020 ~ 0.059 finishing	VF  	0.020 ~ 0.006 ~ 0.010	NC3010 924 NC3120 825 NC3220 825 NC5330 825 CC105 858 CN1000 792 CN2000 759	CCMT  p. B50	DCMT  p. B53	SCMT  p. B55	TCMT  p. B59	VCMT  p. B45		
0.020 ~ 0.059 ~ 0.138 medium to finishing	HMP  	0.003 ~ 0.008 ~ 0.016	NC3010 858 NC3120 759 NC3220 759 NC5330 660 CN1000 792 CN2000 759	CCMT  p. B50	DCMT  p. B53	SCMT  p. B55	TCMT  p. B59	VCMT  p. B64		
0.039 ~ 0.079 ~ 0.118 medium machining	C25  	0.004 ~ 0.010 ~ 0.014	NC3010 825 NC3120 726 NC3220 726 NC5330 660 CN1000 792 CN2000 759	CCMT  p. B50	DCMT  p. B54	SCMT  p. B55	TCMT  p. B59			

●: The first recommended cutting condition

Recommended chip breaker for workpiece

Materials : 1045, 1049, 4140, 1522
Hardness : under 180~260HB

Workpiece **P** Steel

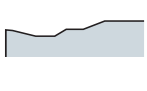
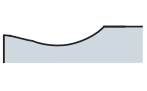
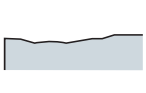
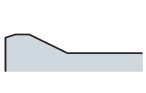
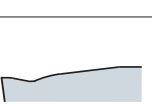
	Depth of cut (inch)	C/B	Cutting edge	Feed (ipr)	Grades	Cutting Speed (sfm)	Insert shape: 80°	55°	90°	60°	35°	80°
Negative	0.020 ~ 0.039 ~ 0.059 finishing	VF		0.002 ~ 0.006 ~ 0.014	NC3010 NC3220 NC3120	726 660 627	CNMG p. B20	DNMG p. B25	SNMG p. B32	TNMG p. B39	VNMG p. B43	WNMG p. B47
	0.020 ~ 0.039 ~ 0.079 finishing	VB		0.006 ~ 0.008 ~ 0.016	NC3010 NC3220 CN1000 CN2000	990 825 755 656	CNMG p. B20	DNMG p. B25		TNMG p. B38		WNMG p. B46
	0.020 ~ 0.059 ~ 0.138 Medium to finishing	VC		0.005 ~ 0.010 ~ 0.018	NC3010 NC3220 NC3120 CN5330	957 825 825 660	CNMG p. B20	DNMG p. B25	SNMG p. B31	TNMG p. B38	VNMG p. B43	WNMG p. B47
	0.039 ~ 0.098 ~ 0.197 medium machining	VM		0.004 ~ 0.010 ~ 0.002	NC3010 NC3120 NC3220 NC3030 CN2000	660 561 594 495 561	CNMG p. B21	DNMG p. B25	SNMG p. B32	TNMG p. B39	VNMG p. B44	WNMG p. B47
	0.098 ~ 0.157 ~ 0.276 roughing	HR		0.010 ~ 0.018 ~ 0.026	NC3010 NC3120 NC3220 NC3030	561 495 495 429	CNMG p. B19	DNMG p. B24	SNMG p. B31	TNMG p. B38		WNMG p. B46
	0.236 ~ 0.394 ~ 0.591 Heavy (General)	VH		0.028 ~ 0.039 ~ 0.055	NC3010 NC3030 NC500H NC5330	165~825 165~495 165~495 165~495	CNMM p. B22		SNMM p. B33			
	0.276 ~ 0.472 ~ 0.669 Heavy (High feed cutting)	VT		0.030 ~ 0.047 ~ 0.063	NC3010 NC3030 NC500H NC5330	165~825 165~495 165~495 165~495	CNMM p. B22		SNMM p. B33			
Positive	0.004 ~ 0.020 ~ 0.039 Finishing	VL		0.002 ~ 0.004 ~ 0.008	NC3010 NC3220 NC3120 NC5330 CN1000 CN2000	957 825 825 660 787 722	p. B50	p. B53	p. B55	p. B59	p. B65	
	0.004 ~ 0.020 ~ 0.059 finishing	VF		0.002 ~ 0.006 ~ 0.010	NC3010 NC3120 NC3220 NC5330 CC105 CN1000 CN2000	924 825 825 825 858 891 858	CCMT p. B50	DCMT p. B53	SCMT p. B55	TCMT p. B59	VCMT p. B64	
	0.020 ~ 0.059 ~ 0.138 finishing	HFP		0.003 ~ 0.008 ~ 0.016	NC3010 NC3120 NC3220 NC5330 CC105 CN1000	726 627 627 594 858 660	CCG(M)T p. B50	DCG(M)T p. B53	SCG(M)T p. B55	TCG(M)T p. B59	VCG(M)T p. B64	
	0.039 ~ 0.079 ~ 0.118 medium machining	C25		0.004 ~ 0.010 ~ 0.014	NC3010 NC3120 NC3220 NC3030 CN1000 CN2000	660 561 594 495 561 528	CCMT p. B50	DCMT p. B54	SCMT p. B55	TCMT p. B59		

●: The first recommended cutting condition

Recommended chip breaker for workpiece

Materials : 4320, 4340, 5140, F2, D3, 4140, Hardened steel
Hardness : 260~350HB

Workpiece **P** Steel

	Depth of cut (inch)	C/B	Cutting edge	Feed (ipr)	Grades	Cutting Speed (sfm)	Insert shape: 80°	55°	90°	60°	35°	80°
Negative	0.020 ~ 0.039 ~ 0.059 finishing	VF		0.003 ~ 0.006 ~ 0.012	NC3010 NC3220 NC3120	429 363 363	CNMG p. B20	DNMG p. B25	SNMG p. B32	TNMG p. B39	VNMG p. B43	WNMG p. B47
	0.020 ~ 0.039 ~ 0.079 finishing	VB		0.006 ~ 0.008 ~ 0.016	NC3010 NC3220 CN1000 CN2000	990 825 756 656	CNMG p. B20	DNMG p. B25		TNMG p. B38		WNMG p. B46
	0.020 ~ 0.059 ~ 0.138 Medium to finishing	VC		0.005 ~ 0.010 ~ 0.018	NC3010 NC3220 NC3120 CN5330	957 825 825 660	CNMG p. B20	DNMG p. B25	SNMG p. B31	TNMG p. B38	VNMG p. B43	WNMG p. B47
	0.039 ~ 0.098 ~ 0.197 medium to roughing	VM		0.004 ~ 0.010 ~ 0.002	NC3010 NC3120 NC3220 CN2000	429 330 363 297	CNMG p. B21	DNMG p. B25	SNMG p. B32	TNMG p. B39	VNMG p. B44	WNMG p. B47
	0.098 ~ 0.157 ~ 0.276 roughing	HR		0.010 ~ 0.014 ~ 0.024	NC3010 NC3120 NC3220 NC3030	330 297 297 264	CNMG p. B19	DNMG p. B24	SNMG p. B31	TNMG p. B38		WNMG p. B46
	0.236 ~ 0.394 ~ 0.591 Heavy (General)	VH		0.028 ~ 0.039 ~ 0.055	NC3010 NC3030 NC500H NC5330	165~825 165~495 165~495 165~495	CNMM p. B22		SNMM p. B33			
	0.276 ~ 0.472 ~ 0.669 Heavy (High feed cutting)	VT		0.030 ~ 0.047 ~ 0.063	NC3010 NC3030 NC500H NC5330	165~825 165~495 165~495 165~495	CNMM p. B22		SNMM p. B33			
Positive	0.004 ~ 0.020 ~ 0.039 Finishing	VL		0.002 ~ 0.004 ~ 0.008	NC3010 NC3220 NC3120 NC5330 CN1000 CN2000	957 825 825 660 656 591	CCMT p. B50	DCMT p. B53	SCMT p. B55	TC(P)MT p. B59	VC(B)MT p. B65	
	0.004 ~ 0.020 ~ 0.059 finishing	VF		0.002 ~ 0.006 ~ 0.010	NC3010 NC3120 NC3220 NC5330 CC105 CN1000 CN2000	924 825 825 825 858 825 792	CCMT p. B50	DCMT p. B53	SCMT p. B55	TCMT p. B59	VCMT p. B64	
	0.020 ~ 0.059 ~ 0.138 finishing	HFP		0.003 ~ 0.008 ~ 0.016	NC3010 NC3120 NC3220 CC105	429 363 396 396	CCG(M)T p. B50	DCG(M)T p. B53	SCG(M)T p. B55	TCG(M)T p. B59	VCG(M)T p. B64	
	0.039 ~ 0.079 ~ 0.118 medium machining	C25		0.004 ~ 0.010 ~ 0.014	NC3010 NC3120 NC3220 NC3030 CN1000 CN2000	363 330 330 297 330 297	CCMT p. B50	DCMT p. B54	SCMT p. B55	TCMT p. B59		

●: The first recommended cutting condition

Recommended chip breaker for workpiece

Materials : 304, 316, 430, 630
Ferrite, austenite, martensite, precipitation hardening stainless steels
Hardness : 135~300HB

Workpiece **M** Stainless steel

	Depth of cut (inch)	C/B	Cutting edge	Feed (ipr)	Grades	Cutting Speed (sfm)	Insert shape 80°	55°	90°	60°	35°	80°
Negative	0.039~ **0.098** ~0.157 medium machining	HS		0.004 ~ **0.010** ~0.016	PC8110 NC9025 PC5300 PC9030	924 660 528 396	CNMG p. B20	DNMG p. B24	SNMG p. B31	TNMG p. B38	VNMG p. B42	WNMG p. B46
	0.079 ~ **0.177** ~0.256 roughing	VM		0.008 ~ **0.016** ~0.024	PC8110 NC5330 PC5300 PC9030	825 594 495 396	CNMG p. B21	DNMG p. B25	SNMG p. B32	TNMG p. B39	VNMG p. B44	WNMG p. B47
	0.020 ~ **0.059** ~0.157 Medium to finishing	VP2		0.002 ~ **0.008** ~0.016	PC8110 NC9025 PC5300 PC9030	825 594 495 396	CNMG p. B21	DNMG p. B26	SNMG p. B32	TNMG p. B39		WNMG p. B48
	0.039 ~ **0.079** ~0.177 Medium	VP3		0.004 ~ **0.010** ~0.018	PC8110 NC9025 PC5300 PC9030	924 660 528 396	CNMG p. B21	DNMG p. B26	SNMG p. B32	TNMG p. B39	VNMG p. B43	WNMG p. B48
Positive	0.004 ~ **0.020** ~0.059 finishing	VF		0.002 ~ **0.006** ~0.010	NC3010 NC3120 NC3220 NC5330 CC105 CN1000 CN2000	924 825 825 825 858 891 858	CCMT p. B50	DCMT p. B53	SCMT p. B55	TCMT p. B59	VCMT p. B65	
	0.020 ~ **0.059** ~0.118 medium to finishing	HMP		0.004 ~ **0.008** ~0.012	PC8110 NC9025 PC5300 PC9030 CN1000 CN2000	825 660 594 495 858 792	CCMT p. B50	DCMT p. B53	SCMT p. B55	TCMT p. B59	VCMT p. B65	
	0.039 ~ **0.079** ~0.118 medium machining	C25		0.004 ~ **0.010** ~0.014	PC8110 NC9025 PC5300 PC9030 CN1000 CN2000	825 660 561 462 495 429	CCMT p. B50	DCMT p. B54	SCMT p. B55	TCMT p. B59		

●: The first recommended cutting condition

Recommended chip breaker for workpiece

Materials : No208B, No55B, 60-40-18, 80-55-06, etc : Gray cast iron, Ductile cast iron
Hardness : 135 ~185HB
Tensile strength : 450N/mm²

Workpiece **K** Cast iron

	Depth of cut (inch)	C/B	Cutting edge	Feed (ipr)	Grades	Cutting Speed (sfm)	Insert shape 80°	55°	90°	60°	35°	80°
Negative	0.039 ~ 0.098 ~ 0.236 roughing	C/B None		0.002 ~ 0.004 ~ 0.024	KB410 KB350 KB370 NC6205 NC6210 NC315K	495 ~ 660 660 ~ 1650 1650 ~ 6600 825 ~ 1485 660 ~ 1155 495 ~ 990	CNMA p. B18	DNMA p. B23	SNMA p. B29	TNMA p. B36		
	0.020 ~ 0.079 ~ 0.138 medium to finishing	B25		0.008 ~ 0.014 ~ 0.024	NC6205 NC6210 NC315K	1320~1485 990~1320 495~825	CNMG p. B18	DNMG p. B23	SNMG p. B29	TNMG p. B36	VNMG p. B45	
	0.039 ~ 0.098 ~ 0.157 medium machining	VM		0.006 ~ 0.012 ~ 0.020	NC6205 NC6210 NC315K	1485~1815 1155~1485 660~825	CNMG p. B21	DNMG p. B25	SNMG p. B32	TNMG p. B39	VNMG p. B44	WNMG p. B47
	0.039 ~ 0.118 ~ 0.177 medium to roughing	GR		0.008 ~ 0.014 ~ 0.020	NC6205 NC6210 NC315K	1485~1815 1155~1485 660~825	CNMG p. B19	DNMG p. B23	SNMG p. B30	TNMG p. B37		WNMG p. B45
	0.039 ~ 0.098 ~ 0.197 medium to roughing	VK		0.006 ~ 0.010 ~ 0.020	NC6205 NC6210 NC315K	1485~1815 1155~1485 660~825	CNMG p. B22	DNMG p. B26	SNMG p. B33	TNMG p. B40	VNMG p. B44	WNMG p. B48
	0.169 ~ 0.256 ~ 0.394 heavy roughing	GH		0.012 ~ 0.028 ~ 0.043	NC6210 NC315K	594 495	CNMM p. B22		SNMM p. B33			
Positive	0.020 ~ 0.059 ~ 0.138 medium to finishing	HMP		0.003 ~ 0.008 ~ 0.016	NC6205 NC6210 NC315K	825 795 660	CCMT p. B50	DCMT p. B53	SCMT p. B55	TCMT p. B59	VCMT p. B65	
	0.039 ~ 0.079 ~ 0.138 medium machining	C25		0.004 ~ 0.010 ~ 0.016	NC6205 NC6210 NC315K	825 795 660	CCMT p. B50	DCMT p. B54	SCMT p. B55	TCMT p. B59		

●: The first recommended cutting condition

Recommended chip breaker for workpiece

Materials : Aluminum alloy
Hardness : 20~110HB

Workpiece **N** Aluminum alloy

	Depth of cut (inch)	C/B	Cutting edge	Feed (ipr)	Grades	Cutting Speed (sfm)	Insert shape 80°	55°	90°	60°	35°	80°
Negative	0.020 ~ 0.079 ~ 0.236 medium machining	HA		0.004 ~ 0.008 ~ 0.020	H01	1650	CNMG p. B19	DNMG p. B24	SNMG p. B30	TNMG p. B37	VNMG p. B42	WNMG p. B45
Positive	0.004 ~ 0.039 ~ 0.157 medium to finishing	AK		0.001 ~ 0.008 ~ 0.016	H01 ND1000 PD1000	3300 3300 3300	CCGT p. B68	DCGT p. B69	SCGT p. B71	TCGT p. B72	VCGT p. B73	RCGT p. B70
	0.020 ~ 0.059 ~ 0.157 medium machining	AR		0.002 ~ 0.012 ~ 0.020	H01 ND1000 PD1000	3300 3300 3300	CCGT p. B68	DCGT p. B69	SCGT p. B71	TCGT p. B72	VCGT p. B73	RCGT p. B70

●: The first recommended cutting condition

Recommended chip breaker for workpiece

Materials : Copper Bronze alloy
Hardness : 20~110HB

Workpiece **N** Aluminum alloy

	Depth of cut (inch)	C/B	Cutting edge	Feed (ipr)	Grades	Cutting Speed (sfm)	Insert shape 80°	55°	90°	60°	35°	80°
Negative	0.020 ~ 0.079 ~ 0.157 medium machinin	HA		0.004 ~ 0.008 ~ 0.020	H01	3300	CNMG p. B19	DNMG p. B24	SNMG p. B30	TNMG p. B37	VNMG p. B42	WNMG p. B45
Positive	0.004 ~ 0.039 ~ 0.118 medium to finishing	AK		0.001 ~ 0.008 ~ 0.012	H01	3300	CCGT p. B68	DCGT p. B69	SCGT p. B71	TCGT p. B72	VCGT p. B73	RCGT p. B70
	0.020 ~ 0.059 ~ 0.118 medium machinin	AR		0.002 ~ 0.010 ~0.016	H01	3300	CCGT p. B68	DCGT p. B69	SCGT p. B71	TCGT p. B72	VCGT p. B73	RCGT p. B70

●: The first recommended cutting condition

Recommended chip breaker for workpiece

Materials : Inconel, Nimonic, Stellite, Ti alloy
Hardness : 160~350HB

Workpiece
S
Heat resistant alloy

	Depth of cut (inch)	C/B	Cutting edge	Feed (ipr)	Grades	Cutting Speed (sfm)	Insert shape 80°	55°	90°	60°	35°	80°
Negative	0.059 ~ **0.118** ~ 0.217 medium to roughing	GS		0.006 ~ **0.012** ~ 0.020	PC8110 NC9025 PC5300	264 165 99	CNMG p. B19	DNMG p. B24	SNMG p. B30	TNMG p. B37		WNMG p. B45
	0.079 ~ **0.177** ~ 0.236 medium to roughing	VM		0.008 ~ **0.016** ~ 0.024	PC8110 NC5330 PC5300	264 165 99	CNMG p. B21	DNMG p. B25	SNMG p. B32	TNMG p. B39	VNMG p. B44	WNMG p. B47
	0.004 ~ **0.020** ~ 0.059 Finishing	VP1		0.002 ~ **0.004** ~ 0.008	PC8110 PC5300 NC5330	198 165 165	CNMG p. B21	DNMG p. B26				
	0.020 ~ **0.059** ~ 0.157 Medium to finishing	VP2		0.004 ~ **0.008** ~ 0.016	PC8110 PC5300 NC5330	198 165 165	CNMG p. B21	DNMG p. B26	SNMG p. B32	TNMG p. B39		WNMG p. B48
	0.039 ~ **0.079** ~ 0.177 Medium	VP3		0.004~ **0.010** ~ 0.018	PC8110 PC5300 NC5330	198 165 165	CNMG p. B21	DNMG p. B26	SNMG p. B32	TNMG p. B39	VNMG p. B43	WNMG p. B48
Positive	0.004 ~ **0.020** ~ 0.059 finishing	HFP		0.002 ~ **0.006** ~ 0.010	PC8110 NC9025 PC5300	264 165 99	CCG(M)T p. B50	DCG(M)T p. B53	SCG(M)T p. B55	TCG(M)T p. B59	VCG(M)T p. B65	
	0.020 ~ **0.059** ~ 0.118 medium to finishing	HMP		0.004 ~ **0.008** ~ 0.012	PC8110 NC9025 PC5300 PC9030	264 165 198 99	CCMT p. B50	DCMT p. B53	SCMT p. B55	TCMT p. B59	VCMT p. B65	
	0.039 ~ **0.059** ~ 0.118 medium machining	C25		0.006 ~ **0.010** ~ 0.014	PC8110 NC9025 PC5300	264 165 99	CCMT p. B50	DCMT p. B54	SCMT p. B55	TCMT p. B59		

●: The first recommended cutting condition