

# **CBN-EHB**

**Epoch CBN High Precision Ball End Mill  
For High-Accuracy Machining of Hardened Steels**

**CBN**  
Cubic Boron Nitride

**D 0.2 mm ~ D 2 mm**  
• For Materials  $\leq 70\text{HRC}$   
•  $l_n$  up to  $7.5 \times D$

**Diameter  
checked**  
Labelled on box

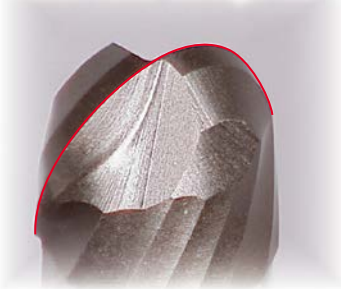
D  $\mu\text{m}$  ☒



## CBN-EHB | Epoch CBN High Precision Ball End Mill | Features

### Newly designed low cutting force high-strength flute shape

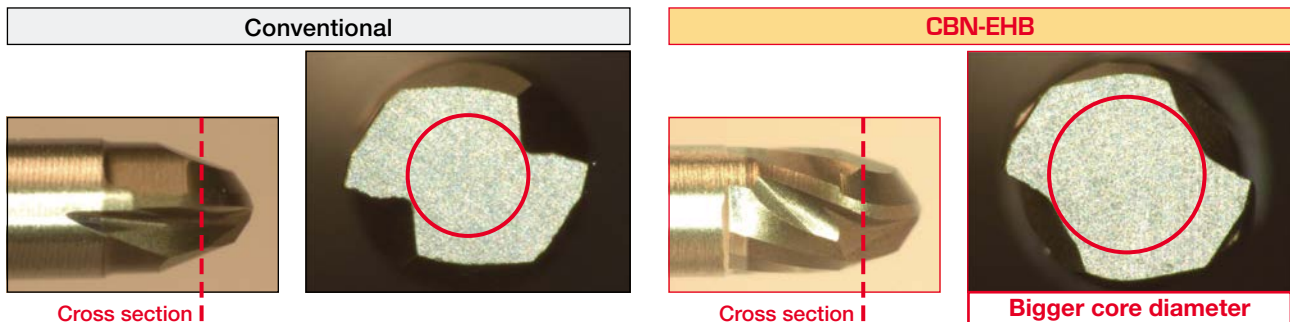
#### Helix flute design for excellent cutting performance



- ➔ Applications from roughing to finishing
- ➔ High-strength cutting edge to improve tool life
- ➔ New high helix flute design to reduce cutting forces
- ➔ High-rigidity design improves machining accuracy
- ➔ High-quality flute edge improves surface roughness

### ► Dedication to high accuracy and long tool life


#### Bigger core diameter to increase rigidity and to maintain high accuracy machining





#### New grinding method for improved surface roughness in finishing





#### Input of diameter correction value


 To improve final machining accuracy, input the real tool diameter stated on the case into CAM system.

 Zur Verbesserung der finalen Bearbeitungsgenauigkeit, sollte der auf der Verpackung aufgedruckte, tatsächliche Werkzeuggestrichmesser im CAM hinterlegt werden.

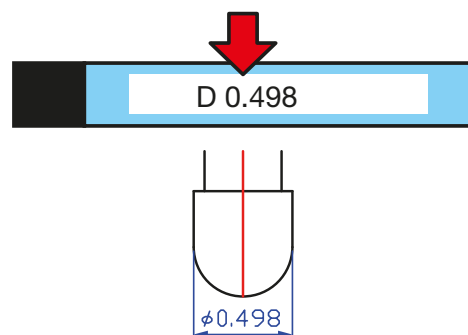
 Per una superiore precisione di esecuzione programmare nel vostro sistema CAM il diametro reale rilevato, che troverete.

 Para mejorar la precisión del mecanizado final, programar en el CAM el diámetro real de la herramienta indicado en la caja.

 Pour améliorer la précision de l'usinage final, saisissez le diamètre réel de l'outil indiqué sur le boîtier dans le système FAO.

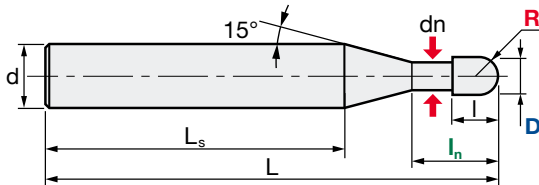
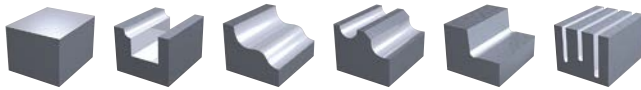
 Para melhorar a precisão da maquinação final. Introduzir o diâmetro real da ferramenta no sistema de CAM conforme tabela de medição.

Measured tool diameter stated on case

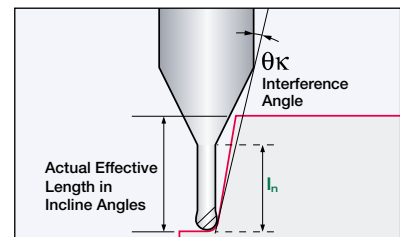


## CBN-EHB | Epoch CBN High Precision Ball End Mill

CBN	V max					HRC	No. of Teeth	Rake Angle
Cubic Boron Nitride	High Speed	Roughing	Semi-Finishing	Finishing	Super-Finishing	70	2	Negative



Helix Angle	R Tol. [mm]	d Tol.
25°	R0.1~R0.3: ± 0.003 R0.4 ~R1: ± 0.005	h4



ID Code	Item Code	Size										Actual Effective Length in Incline Angles				
		Z	D	R	In	I	dn	Ls	L	d	θκ	0.5°	1°	1.5°	2°	3°
CB041	CBN-EHB-2002-0.3	2	0.2	0.1	0.3	0.12	0.18	42.57	50	4	14.52°	0.34	0.35	0.36	0.37	0.39
CB042	CBN-EHB-2002-0.5				0.5			42.37			14.15°	0.55	0.56	0.58	0.60	0.64
CB043	CBN-EHB-2002-1				1			41.87			13.30°	1.06	1.10	1.13	1.17	1.26
CB044	CBN-EHB-2002-1.5				1.5			41.37			12.55°	1.58	1.63	1.69	1.75	1.88
CB045	CBN-EHB-2003-0.5		0.3	0.15	0.5	0.18	0.27	42.54			14.17°	0.56	0.58	0.60	0.61	0.65
CB046	CBN-EHB-2003-0.75				0.75			42.29			13.72°	0.82	0.85	0.87	0.90	0.96
CB047	CBN-EHB-2003-1				1			42.04			13.30°	1.08	1.11	1.15	1.19	1.27
CB048	CBN-EHB-2003-1.5				1.5			41.54			12.53°	1.60	1.65	1.70	1.76	1.89
CB049	CBN-EHB-2003-2		0.4	0.2	2		0.37	41.04			11.84°	2.12	2.18	2.26	2.34	2.52
CB050	CBN-EHB-2004-0.75				0.75			42.48			13.77°	0.82	0.84	0.87	0.89	0.95
CB051	CBN-EHB-2004-1				1			42.23			13.33°	1.08	1.11	1.14	1.18	1.26
CB052	CBN-EHB-2004-1.5				1.5			41.73			12.54°	1.6	1.65	1.7	1.75	1.88
CB053	CBN-EHB-2004-2		0.5	0.25	2		0.47	41.23			11.83°	2.11	2.18	2.25	2.33	2.5
CB054	CBN-EHB-2004-3				3			40.23			10.63°	3.15	3.25	3.36	3.48	3.75
CB055	CBN-EHB-2005-1				1			42.41			13.37°	1.08	1.11	1.14	1.17	1.25
CB056	CBN-EHB-2005-1.5				1.5			41.91			12.55°	1.6	1.64	1.69	1.75	1.87
CB057	CBN-EHB-2005-2.5		0.6	0.3	2.5	0.55	0.57	40.91			11.18°	2.63	2.71	2.8	2.9	3.11
CB058	CBN-EHB-2005-3				3			40.41			10.59°	3.15	3.25	3.36	3.47	3.73
CB059	CBN-EHB-2006-1				1			42.60			13.40°	1.08	1.10	1.13	1.17	1.24
CB060	CBN-EHB-2006-1.5		0.8	0.4	1.5		0.77	42.10			12.56°	1.59	1.64	1.69	1.74	1.86
CB061	CBN-EHB-2006-3				3			40.60			10.55°	3.14	3.24	3.35	3.46	3.72
CB062	CBN-EHB-2006-4				4			39.60			9.54°	4.18	4.31	4.46	4.61	4.97
CB063	CBN-EHB-2008-1.5		1	0.5	1.5		0.96	42.47			12.58°	1.59	1.63	1.68	1.73	1.83
CB064	CBN-EHB-2008-2.5				2.5			41.47			11.09°	2.62	2.70	2.79	2.88	3.08
CB065	CBN-EHB-2008-4				4			39.97			9.41°	4.17	4.31	4.45	4.60	4.94
CB066	CBN-EHB-2008-5				5			38.97			8.54°	5.21	5.38	5.56	5.75	6.19
CB067	CBN-EHB-2010-1.5	1.5	0.75	1	1.5	1.35	1.45	42.83			12.57°	1.61	1.64	1.69	1.73	1.83
CB068	CBN-EHB-2010-2.5				2.5			41.83			11.00°	2.64	2.71	2.80	2.88	3.08
CB069	CBN-EHB-2010-4				4			40.33			9.25°	4.19	4.32	4.46	4.61	4.94
CB070	CBN-EHB-2010-5				5			39.33			8.36°	5.22	5.39	5.57	5.76	6.19
CB071	CBN-EHB-2010-6	2	1	0.75	6	1.65	1.94	38.33			7.63°	6.26	6.46	6.67	6.91	7.43
CB072	CBN-EHB-2010-8				8			36.33			6.49°	8.32	8.60	8.89	9.21	9.91
CB073	CBN-EHB-2015-2.5				2.5			42.74			10.76°	2.65	2.72	2.79	2.87	3.04
CB074	CBN-EHB-2015-5				5			40.24			7.86°	5.23	5.39	5.56	5.74	6.15
CB075	CBN-EHB-2015-7.5	2	1	0.75	7.5			37.74			6.18°	7.82	8.07	8.33	8.62	9.26
CB076	CBN-EHB-2015-10				10			35.24			5.09°	10.40	10.74	11.10	11.49	12.36
CB077	CBN-EHB-2020-2.5				2.5			43.66			10.43°	2.66	2.72	2.78	2.85	3.01
CB078	CBN-EHB-2020-5				5			41.16			7.21°	5.25	5.39	5.55	5.73	6.11
CB079	CBN-EHB-2020-7.5	2	1	0.75	7.5			38.66			5.50°	7.83	8.07	8.32	8.60	9.22
CB080	CBN-EHB-2020-10				10			36.16			4.44°	10.41	10.74	11.10	11.48	12.33

## CBN-EHB | Recommended Cutting Conditions

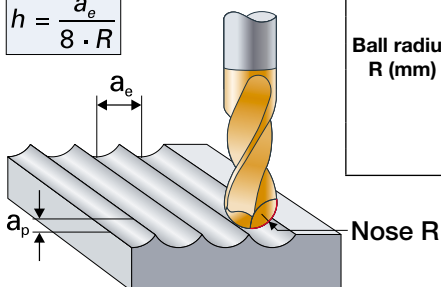
Material		Material Class I – Hardened Steels (50 ~ 55 HRC)													
Parameter		Semi Finishing							Finishing						
D	I <sub>n</sub>	a <sub>p</sub>	a <sub>e</sub>	n	V <sub>c</sub>	f <sub>z</sub>	V <sub>f</sub>		a <sub>p</sub>	a <sub>e</sub>	n	V <sub>c</sub>	f <sub>z</sub>	V <sub>f</sub>	
		mm	mm	min <sup>-1</sup>	m/min	mm/t	mm/min		mm	mm	min <sup>-1</sup>	m/min	mm/t	mm/min	
0.2	0.3	0.007	0.021	42000	26	0.0048	400		0.005	0.005	42000	26	0.0042	350	
	0.5	0.006	0.018	42000	26	0.0048	400		0.004	0.004	42000	26	0.0042	350	
	1	0.003	0.009	42000	26	0.0048	400		0.002	0.002	42000	26	0.0042	350	
	1.5	0.002	0.006	42000	26	0.0048	400		0.001	0.001	42000	26	0.0042	350	
0.3	0.5	0.009	0.027	42000	40	0.0072	605		0.006	0.006	42000	40	0.0062	520	
	0.75	0.009	0.027	42000	40	0.0072	605		0.006	0.006	42000	40	0.0062	520	
	1	0.008	0.024	42000	40	0.0072	605		0.005	0.005	42000	40	0.0062	520	
	1.5	0.005	0.015	42000	40	0.0072	605		0.003	0.003	42000	40	0.0062	520	
0.4	2	0.003	0.009	42000	40	0.0072	605		0.003	0.003	42000	40	0.0062	520	
	0.75	0.012	0.036	42000	53	0.0102	860		0.008	0.008	42000	53	0.0088	740	
	1	0.012	0.036	42000	53	0.0102	860		0.008	0.008	42000	53	0.0088	740	
	1.5	0.008	0.024	42000	53	0.0102	860		0.005	0.005	42000	53	0.0088	740	
0.5	2	0.006	0.018	42000	53	0.0102	860		0.004	0.004	42000	53	0.0088	740	
	3	0.004	0.012	42000	53	0.0102	860		0.003	0.003	42000	53	0.0088	740	
	1	0.015	0.045	42000	66	0.0128	1075		0.010	0.010	42000	66	0.0111	930	
	1.5	0.015	0.045	42000	66	0.0128	1075		0.010	0.010	42000	66	0.0111	930	
0.6	2.5	0.008	0.024	42000	66	0.0128	1075		0.005	0.005	42000	66	0.0111	930	
	3	0.006	0.018	42000	66	0.0128	1075		0.005	0.005	42000	66	0.0111	930	
	1	0.018	0.054	42000	79	0.0162	1360		0.012	0.012	42000	79	0.0140	1175	
	1.5	0.018	0.054	42000	79	0.0162	1360		0.012	0.012	42000	79	0.0140	1175	
0.8	3	0.009	0.027	42000	79	0.0162	1360		0.006	0.006	42000	79	0.0140	1175	
	4	0.006	0.018	42000	79	0.0162	1360		0.004	0.004	42000	79	0.0140	1175	
	1.5	0.024	0.072	42000	106	0.0216	1815		0.016	0.016	42000	106	0.0187	1570	
	2.5	0.024	0.072	42000	106	0.0216	1815		0.016	0.016	42000	106	0.0187	1570	
1	4	0.012	0.036	40000	101	0.0216	1730		0.008	0.008	40000	101	0.0187	1495	
	5	0.009	0.027	40000	101	0.0216	1730		0.005	0.005	40000	101	0.0187	1495	
	1.5	0.030	0.090	40000	126	0.0300	2400		0.020	0.020	40000	126	0.0260	2080	
	2.5	0.030	0.090	40000	126	0.0300	2400		0.020	0.020	40000	126	0.0260	2080	
1.5	4	0.020	0.060	36000	113	0.0300	2160		0.013	0.013	36000	113	0.0260	1870	
	5	0.015	0.045	32000	101	0.0300	1920		0.010	0.010	32000	101	0.0259	1660	
	6	0.012	0.036	32000	101	0.0300	1920		0.008	0.008	32000	101	0.0259	1660	
	8	0.008	0.024	30000	94	0.0300	1800		0.005	0.005	30000	94	0.0258	1550	
2	2.5	0.045	0.135	27000	127	0.0450	2430		0.030	0.030	27000	127	0.0391	2110	
	5	0.045	0.135	27000	127	0.0450	2430		0.030	0.030	27000	127	0.0391	2110	
	7.5	0.030	0.090	21000	99	0.0450	1890		0.020	0.020	21000	99	0.0390	1640	
	10	0.020	0.060	21000	99	0.0450	1890		0.013	0.013	21000	99	0.0390	1640	
2	2.5	0.060	0.180	20000	126	0.0600	2400		0.040	0.040	20000	126	0.0520	2080	
	5	0.060	0.180	20000	126	0.0600	2400		0.040	0.040	20000	126	0.0520	2080	
	7.5	0.040	0.120	18000	113	0.0600	2160		0.027	0.027	18000	113	0.0519	1870	
	10	0.030	0.090	16000	101	0.0600	1920		0.020	0.020	16000	101	0.0519	1660	

**Please Note:** These Conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If rpm of machine is lower than these conditions, please reduce rpm and V<sub>f</sub> as same ratio.

### Ball end mill pitch feed and theoretical cusp height table (μm)

$$h = R - \sqrt{\frac{(2 \cdot R)^2 - a_e^2}{4}}$$

$$h = \frac{a_e^2}{8 \cdot R}$$



		Pitch (a <sub>e</sub> mm)									
		0.005	0.01	0.015	0.02	0.03	0.04	0.05	0.06	0.08	0.10
Ball radius R (mm)	0.1	0.031	0.13	0.28	0.50	1.13	2.02	3.18	4.61	8.35	13.40
	0.15	0.021	0.08	0.19	0.33	0.75	1.34	2.10	3.03	5.43	8.58
	0.2	0.016	0.06	0.14	0.25	0.56	1.00	1.57	2.26	4.04	6.35
	0.25	0.013	0.05	0.11	0.20	0.45	0.80	1.25	1.81	3.22	5.05
	0.3	0.010	0.04	0.09	0.17	0.38	0.67	1.04	1.50	2.68	4.20
	0.4	0.008	0.03	0.07	0.13	0.28	0.50	0.78	1.13	2.01	3.14
	0.5	0.006	0.03	0.06	0.10	0.23	0.40	0.63	0.90	1.60	2.51
	0.75	0.004	0.02	0.04	0.07	0.15	0.27	0.42	0.60	1.07	1.67
	1	0.003	0.01	0.03	0.05	0.11	0.20	0.31	0.45	0.80	1.25

## CBN-EHB | Recommended Cutting Conditions

Material		Material Class II – Hardened Steels (55 ~ 62 HRC)											
Parameter		Semi Finishing						Finishing					
D	I <sub>n</sub>	a <sub>p</sub>	a <sub>e</sub>	n	V <sub>c</sub>	f <sub>z</sub>	V <sub>f</sub>	a <sub>p</sub>	a <sub>e</sub>	n	V <sub>c</sub>	f <sub>z</sub>	V <sub>f</sub>
		mm	mm	min <sup>-1</sup>	m/min	mm/t	mm/min	mm	mm	min <sup>-1</sup>	m/min	mm/t	mm/min
0.2	0.3	0.007	0.021	42000	26	0.0042	350	0.005	0.005	42000	26	0.0035	295
	0.5	0.006	0.018	42000	26	0.0042	350	0.004	0.004	42000	26	0.0035	295
	1	0.003	0.009	42000	26	0.0042	350	0.002	0.002	42000	26	0.0035	295
	1.5	0.002	0.006	42000	26	0.0042	350	0.001	0.001	42000	26	0.0035	295
0.3	0.5	0.009	0.027	42000	40	0.0062	520	0.006	0.006	42000	40	0.0053	445
	0.75	0.009	0.027	42000	40	0.0062	520	0.006	0.006	42000	40	0.0053	445
	1	0.008	0.024	42000	40	0.0062	520	0.005	0.005	42000	40	0.0053	445
	1.5	0.005	0.015	42000	40	0.0062	520	0.003	0.003	42000	40	0.0053	445
0.4	2	0.003	0.009	42000	40	0.0062	520	0.003	0.003	42000	40	0.0053	445
	0.75	0.012	0.036	42000	53	0.0088	740	0.008	0.008	42000	53	0.0075	630
	1	0.012	0.036	42000	53	0.0088	740	0.008	0.008	42000	53	0.0075	630
	1.5	0.008	0.024	42000	53	0.0088	740	0.005	0.005	42000	53	0.0075	630
0.5	2	0.006	0.018	42000	53	0.0088	740	0.004	0.004	42000	53	0.0075	630
	3	0.004	0.012	42000	53	0.0088	740	0.003	0.003	42000	53	0.0075	630
	1	0.015	0.045	42000	66	0.0111	930	0.010	0.010	42000	66	0.0094	790
	1.5	0.015	0.045	42000	66	0.0111	930	0.010	0.010	42000	66	0.0094	790
0.6	2.5	0.008	0.024	42000	66	0.0111	930	0.005	0.005	42000	66	0.0094	790
	3	0.006	0.018	42000	66	0.0111	930	0.005	0.005	42000	66	0.0094	790
	1	0.018	0.054	42000	79	0.0140	1180	0.012	0.012	42000	79	0.0119	1000
	1.5	0.018	0.054	42000	79	0.0140	1180	0.012	0.012	42000	79	0.0119	1000
0.8	3	0.009	0.027	42000	79	0.0140	1180	0.006	0.006	42000	79	0.0119	1000
	4	0.006	0.018	42000	79	0.0140	1180	0.004	0.004	42000	79	0.0119	1000
	1.5	0.024	0.072	42000	106	0.0187	1570	0.016	0.016	42000	106	0.0158	1330
	2.5	0.024	0.072	42000	106	0.0187	1570	0.016	0.016	42000	106	0.0158	1330
1	4	0.012	0.036	40000	101	0.0188	1500	0.008	0.008	40000	101	0.0158	1265
	5	0.009	0.027	40000	101	0.0188	1500	0.005	0.005	40000	101	0.0158	1265
	1.5	0.030	0.090	40000	126	0.0260	2080	0.020	0.020	40000	126	0.0220	1760
	2.5	0.030	0.090	40000	126	0.0260	2080	0.020	0.020	40000	126	0.0220	1760
1.5	4	0.020	0.060	36000	113	0.0260	1870	0.013	0.013	36000	113	0.0219	1580
	5	0.015	0.045	32000	101	0.0259	1660	0.010	0.010	32000	101	0.0220	1410
	6	0.012	0.036	32000	101	0.0259	1660	0.008	0.008	32000	101	0.0220	1410
	8	0.008	0.024	30000	94	0.0258	1550	0.005	0.005	30000	94	0.0220	1320
2	2.5	0.045	0.135	27000	127	0.0391	2110	0.030	0.030	27000	127	0.0330	1780
	5	0.045	0.135	27000	127	0.0391	2110	0.030	0.030	27000	127	0.0330	1780
	7.5	0.030	0.090	21000	99	0.0390	1640	0.020	0.020	21000	99	0.0331	1390
	10	0.020	0.060	21000	99	0.0390	1640	0.013	0.013	21000	99	0.0331	1390
2	2.5	0.060	0.180	20000	126	0.0520	2080	0.040	0.040	20000	126	0.0440	1760
	5	0.060	0.180	20000	126	0.0520	2080	0.040	0.040	20000	126	0.0440	1760
	7.5	0.040	0.120	18000	113	0.0519	1870	0.027	0.027	18000	113	0.0439	1580
	10	0.030	0.090	16000	101	0.0519	1660	0.020	0.020	16000	101	0.0441	1410

**Please Note:** These Conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If rpm of machine is lower than these conditions, please reduce rpm and V<sub>f</sub> as same ratio.



**CBN-EHB | Recommended Cutting Conditions**

Material		Material Class III – Hardened Steels (62 ~ 64 HRC)													
Parameter		Semi Finishing							Finishing						
D	I <sub>n</sub>	a <sub>p</sub>	a <sub>e</sub>	n	V <sub>c</sub>	f <sub>z</sub>	V <sub>f</sub>	a <sub>p</sub>	a <sub>e</sub>	n	V <sub>c</sub>	f <sub>z</sub>	V <sub>f</sub>	a <sub>p</sub>	a <sub>e</sub>
		mm	mm	min <sup>-1</sup>	m/min	mm/t	mm/min								
0.2	0.3	0.0050	0.015	42000	26	0.0035	295	0.005	0.005	42000	26	0.0029	245	0.004	0.004
	0.5	0.0040	0.012	42000	26	0.0035	295	0.004	0.004	42000	26	0.0029	245	0.002	0.002
	1	0.0020	0.006	42000	26	0.0035	295	0.002	0.002	42000	26	0.0029	245	0.001	0.001
	1.5	0.0010	0.003	42000	26	0.0035	295	0.001	0.001	42000	26	0.0029	245	0.006	0.006
0.3	0.5	0.0070	0.021	42000	40	0.0053	445	0.006	0.006	42000	40	0.0043	360	0.006	0.006
	0.75	0.0070	0.021	42000	40	0.0053	445	0.006	0.006	42000	40	0.0043	360	0.005	0.005
	1	0.0060	0.018	42000	40	0.0053	445	0.005	0.005	42000	40	0.0043	360	0.003	0.003
	1.5	0.0040	0.012	42000	40	0.0053	445	0.003	0.003	42000	40	0.0043	360	0.003	0.003
0.4	2	0.0020	0.006	42000	40	0.0053	445	0.003	0.003	42000	40	0.0043	360	0.008	0.008
	0.75	0.0100	0.030	42000	53	0.0075	630	0.008	0.008	42000	53	0.0061	510	0.008	0.008
	1	0.0100	0.030	42000	53	0.0075	630	0.008	0.008	42000	53	0.0061	510	0.005	0.005
	1.5	0.0070	0.021	42000	53	0.0075	630	0.005	0.005	42000	53	0.0061	510	0.004	0.004
0.5	2	0.0050	0.015	42000	53	0.0075	630	0.004	0.004	42000	53	0.0061	510	0.003	0.003
	3	0.0030	0.009	42000	53	0.0075	630	0.003	0.003	42000	53	0.0061	510	0.010	0.010
	1	0.0120	0.036	42000	66	0.0094	790	0.010	0.010	42000	66	0.0077	650	0.010	0.010
	1.5	0.0120	0.036	42000	66	0.0094	790	0.010	0.010	42000	66	0.0077	650	0.005	0.005
0.6	2.5	0.0060	0.018	42000	66	0.0094	790	0.005	0.005	42000	66	0.0077	650	0.012	0.012
	3	0.0050	0.015	42000	66	0.0094	790	0.012	0.012	42000	66	0.0077	650	0.012	0.012
	1	0.0150	0.045	42000	79	0.0119	1000	0.012	0.012	42000	79	0.0097	815	0.006	0.006
	1.5	0.0150	0.045	42000	79	0.0119	1000	0.012	0.012	42000	79	0.0097	815	0.004	0.004
0.8	3	0.0070	0.021	42000	79	0.0119	1000	0.004	0.004	42000	79	0.0097	815	0.016	0.016
	4	0.0040	0.012	42000	79	0.0119	1000	0.016	0.016	42000	79	0.0097	815	0.016	0.016
	1.5	0.0200	0.060	42000	106	0.0158	1330	0.016	0.016	42000	106	0.0130	1090	0.008	0.008
	2.5	0.0200	0.060	42000	106	0.0158	1330	0.008	0.008	40000	101	0.0130	1040	0.005	0.005
1	4	0.0100	0.030	40000	101	0.0159	1270	0.020	0.020	40000	126	0.0180	1440	0.010	0.010
	5	0.0070	0.021	40000	101	0.0159	1270	0.013	0.013	36000	113	0.0181	1300	0.008	0.008
	6	0.0095	0.029	32000	101	0.0220	1410	0.010	0.010	32000	101	0.0180	1150	0.005	0.005
	8	0.0060	0.019	30000	94	0.0220	1320	0.008	0.008	32000	101	0.0180	1150	0.030	0.030
1.5	2.5	0.0360	0.108	27000	127	0.0330	1780	0.030	0.030	27000	127	0.0270	1460	0.030	0.030
	5	0.0360	0.108	27000	127	0.0330	1780	0.030	0.030	27000	127	0.0270	1460	0.020	0.020
	7.5	0.0240	0.072	21000	99	0.0331	1390	0.020	0.020	21000	99	0.0269	1130	0.013	0.013
	10	0.0160	0.048	21000	99	0.0331	1390	0.013	0.013	21000	99	0.0269	1130	0.040	0.040
2	2.5	0.0480	0.144	20000	126	0.0440	1760	0.040	0.040	20000	126	0.0360	1440	0.027	0.027
	5	0.0480	0.144	20000	126	0.0440	1760	0.040	0.040	20000	126	0.0360	1440	0.027	0.027
	7.5	0.0320	0.096	18000	113	0.0439	1580	0.027	0.027	18000	113	0.0361	1300	0.020	0.020
	10	0.0240	0.072	16000	101	0.0441	1410	0.020	0.020	16000	101	0.0359	1150		

**Please Note:** These Conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If rpm of machine is lower than these conditions, please reduce rpm and V<sub>f</sub> as same ratio.

## CBN-EHB | Recommended Cutting Conditions

Material		Material Class IV – Hardened Steels (64 ~ 70 HRC)													
Parameter		Semi Finishing							Finishing						
D	I <sub>n</sub>	a <sub>p</sub>	a <sub>e</sub>	n	V <sub>c</sub>	f <sub>z</sub>	V <sub>f</sub>	a <sub>p</sub>	a <sub>e</sub>	n	V <sub>c</sub>	f <sub>z</sub>	V <sub>f</sub>	a <sub>p</sub>	a <sub>e</sub>
		mm	mm	min <sup>-1</sup>	m/min	mm/t	mm/min								
0.2	0.3	0.005	0.015	42000	26	0.0029	245	0.005	0.005	42000	26	0.0022	185	0.004	0.004
	0.5	0.004	0.012	42000	26	0.0029	245	0.004	0.004	42000	26	0.0022	185	0.002	0.002
	1	0.002	0.006	42000	26	0.0029	245	0.002	0.002	42000	26	0.0022	185	0.001	0.001
	1.5	0.001	0.003	42000	26	0.0029	245	0.001	0.001	42000	26	0.0022	185	0.006	0.006
0.3	0.5	0.006	0.018	42000	40	0.0043	360	0.006	0.006	42000	40	0.0034	285	0.006	0.006
	0.75	0.006	0.018	42000	40	0.0043	360	0.006	0.006	42000	40	0.0034	285	0.005	0.005
	1	0.005	0.015	42000	40	0.0043	360	0.005	0.005	42000	40	0.0034	285	0.003	0.003
	1.5	0.003	0.009	42000	40	0.0043	360	0.003	0.003	42000	40	0.0034	285	0.003	0.003
0.4	2	0.002	0.006	42000	40	0.0043	360	0.003	0.003	42000	40	0.0034	285	0.008	0.008
	0.75	0.008	0.024	42000	53	0.0061	515	0.008	0.008	42000	53	0.0048	405	0.008	0.008
	1	0.008	0.024	42000	53	0.0061	515	0.008	0.008	42000	53	0.0048	405	0.005	0.005
	1.5	0.005	0.015	42000	53	0.0061	515	0.005	0.005	42000	53	0.0048	405	0.004	0.004
0.5	2	0.004	0.012	42000	53	0.0061	515	0.004	0.004	42000	53	0.0048	405	0.003	0.003
	3	0.002	0.006	42000	53	0.0061	515	0.003	0.003	42000	53	0.0048	405	0.010	0.010
	1	0.010	0.030	42000	66	0.0077	650	0.010	0.010	42000	66	0.0060	505	0.010	0.010
	1.5	0.010	0.030	42000	66	0.0077	650	0.010	0.010	42000	66	0.0060	505	0.005	0.005
0.6	2.5	0.005	0.015	42000	66	0.0077	650	0.005	0.005	42000	66	0.0060	505	0.012	0.012
	3	0.004	0.012	42000	66	0.0077	650	0.012	0.012	42000	66	0.0060	505	0.012	0.012
	1	0.012	0.036	42000	79	0.0097	815	0.012	0.012	42000	79	0.0076	640	0.006	0.006
	1.5	0.012	0.036	42000	79	0.0097	815	0.012	0.012	42000	79	0.0076	640	0.004	0.004
0.8	3	0.006	0.018	42000	79	0.0097	815	0.006	0.006	42000	79	0.0076	640	0.016	0.016
	4	0.003	0.009	42000	79	0.0097	815	0.016	0.016	42000	106	0.0101	850	0.016	0.016
	1.5	0.016	0.048	42000	106	0.0130	1090	0.016	0.016	42000	106	0.0101	850	0.008	0.008
	2.5	0.016	0.048	42000	106	0.0130	1090	0.008	0.008	40000	101	0.0101	810	0.005	0.005
1	4	0.008	0.024	40000	101	0.0130	1040	0.005	0.005	40000	101	0.0101	810	0.020	0.020
	5	0.006	0.018	40000	101	0.0130	1040	0.020	0.020	40000	126	0.0140	1120	0.013	0.013
	1.5	0.020	0.060	40000	126	0.0180	1440	0.013	0.013	36000	113	0.0140	1010	0.010	0.010
	2.5	0.020	0.060	40000	126	0.0180	1440	0.010	0.010	32000	101	0.0141	900	0.008	0.008
1.5	4	0.013	0.039	36000	113	0.0181	1300	0.008	0.008	32000	101	0.0141	900	0.005	0.005
	5	0.010	0.030	32000	101	0.0180	1150	0.005	0.005	30000	94	0.0140	840	0.030	0.030
	6	0.008	0.024	32000	101	0.0180	1150	0.030	0.030	27000	127	0.0209	1130	0.030	0.030
	8	0.005	0.016	30000	94	0.0180	1080	0.030	0.030	27000	127	0.0209	1130	0.020	0.020
2	2.5	0.040	0.120	20000	126	0.0360	1440	0.020	0.020	21000	99	0.0210	880	0.013	0.013
	5	0.040	0.120	20000	126	0.0360	1440	0.040	0.040	20000	126	0.0280	1120	0.040	0.040
	7.5	0.027	0.081	18000	113	0.0361	1300	0.027	0.027	18000	113	0.0281	1010	0.027	0.027
	10	0.020	0.060	16000	101	0.0359	1150	0.020	0.020	16000	101	0.0281	900	0.020	0.020

**Please Note:** These Conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If rpm of machine is lower than these conditions, please reduce rpm and V<sub>f</sub> as same ratio.

**Always up to date: Please check our P50 QuickFinder**



### **Attentions on Safety**

#### **1. Cautions regarding handling**

- (1) When removing the tool from its case (packaging), be careful that the tool does not pop out or is dropped. Be particularly careful regarding contact with the tool flutes.
- (2) When handling tools with sharp cutting flutes, be careful not to touch the cutting flutes directly with your bare hands.

#### **2. Cautions regarding mounting**

- (1) Before use, check the outside appearance of the tool for scratches, cracks, etc. and that it is firmly mounted in the collet chuck, etc.
- (2) When preparing for use, be sure that the inserts are firmly mounted in place and that they are firmly mounted on the arbor, etc.
- (3) If abnormal chattering, etc. occurs during use, stop the machine immediately and remove the cause of the chattering.

#### **3. Cautions during use**

- (1) Before use, confirm the dimensions and direction of rotation of the tool and milling work material.
- (2) The numerical values in the standard cutting conditions table should be used as criteria when starting new work. The cutting conditions should be adjusted as appropriate when the cutting depth is large, the rigidity of the machine being used is low, or according to the conditions of the work material.
- (3) Cutting tools are made of a hard material. During use, they may break and fly off. In addition, cutting chips may also fly off. Since there is a danger of injury to workers, fire, or eye damage from such flying pieces, a safety cover should be attached when work is performed and safety equipment such as safety goggles should be worn to create a safe environment for work.
- (4) There is a risk of fire or inflammation due to sparks, heat due to breakage, and cutting chips. Do not use where there is a risk of fire or explosion. Please caution of fire while using oil base coolant, fire prevention is necessary.
- (5) Do not use the tool for any purpose other than that for which it is intended.

#### **4. Cautions regarding regrinding**

- (1) If regrinding is not performed at the proper time, there is a risk of the tool breaking. Replace the tool with one in good condition, or perform regrinding.
- (2) Grinding dust will be created when regrinding a tool. When regrinding, be sure to attach a safety cover over the work area and wear safety clothes such as safety goggles, etc.
- (3) This product contains the specified chemical substance cobalt and its inorganic compounds. When performing regrinding or similar processing, be sure to handle the processing in accordance with the local laws and regulations regarding prevention of hazards due to specified chemical substances.

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**Specifications for the products listed in this catalog are subject to change without notice due to replacement or modification.**

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