MOLDINO
The Edge To Innovation

Ball End Mill for Hardened Steel

EPDBEH-TH3

Epoch Deep Ball Evolution Hard-TH3

MOLDINO Tool Engineering, Ltd.

New Product News | No. H1902A-2 | 2019-4

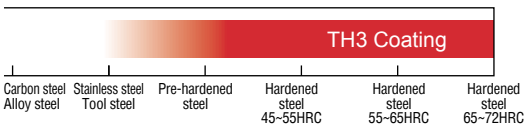
Applies next-generation hard coating "TH3" Excellent wear resistance when machining hardened steel

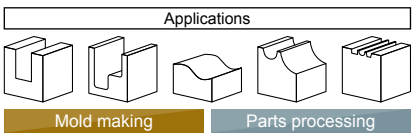
Features of EPDBEH-TH3

01 New coating "TH3" for hardened steel machining

02 Double-face cutting edge geometry for hardened steel machining

03 Designed for high-accuracy machining





EPDBEH-TH3

R0.05～R6 [220 Items]

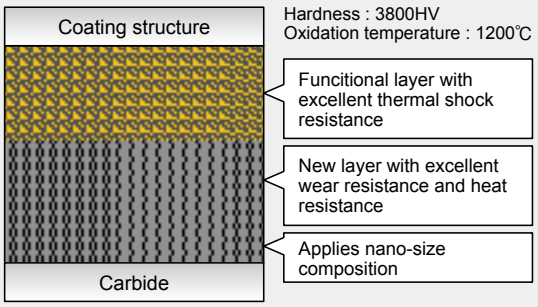
Features 01 New coating "TH3" for hardened steel machining

Features and performance

- High hardness coating with excellent wear resistance and heat resistance
- Has excellent thermal shock resistance enables to suppress sudden chipping
- Long tool life when cutting high-hardness materials (50HRC or higher) such as hardened steel

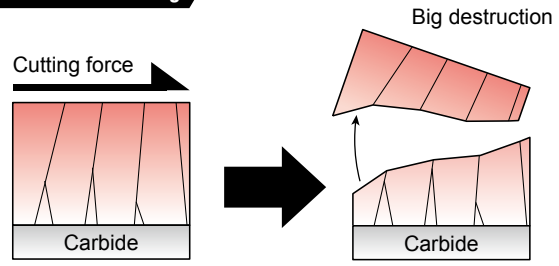
Target steel grade

- Hardened steel (especially 50HRC or higher), high-speed steel

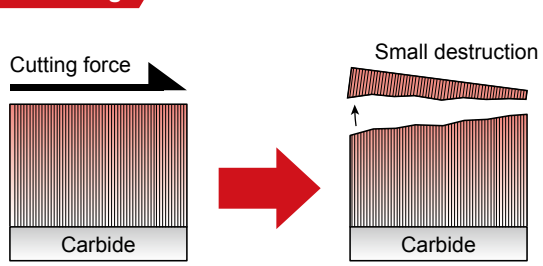


! Point New coating controls chipping using. "nano-size composition".

Conventional coating



New coating



Features 02 Optimized cutting edge geometry "double-face" for hardened steel machining.

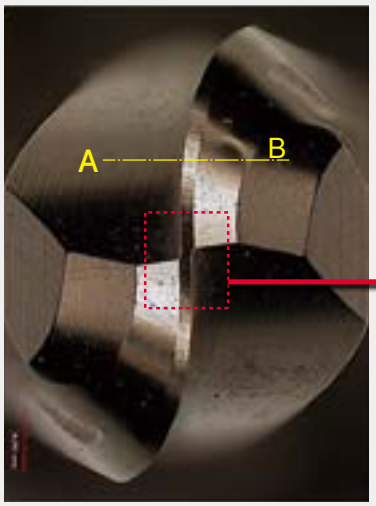
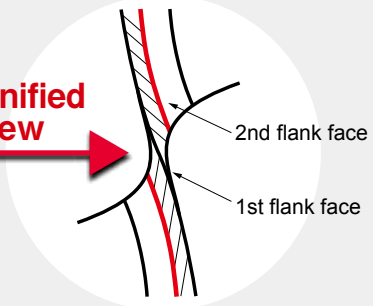


Figure Double Face geometry

Flank of ball area has double face (two-stage flank)

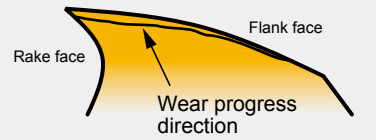
Magnified view



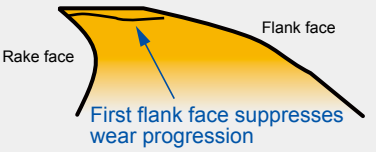
Double-face effect prevents shape from deteriorating

Figure A-B cross section view

General geometry

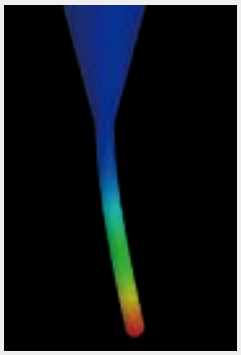


Double face geometry



※R2 or larger tools does not apply Double-Face edge preparation

Features 03 Designed for pursue high-accuracy machining

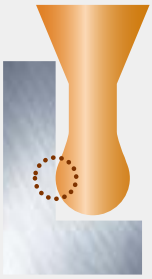


In case of *R*0.5
- under neck length 10mm,

10% of deflection is suppressed compared to conventional neck shape

(Theoretical value by our calculation)

Backdraft shape

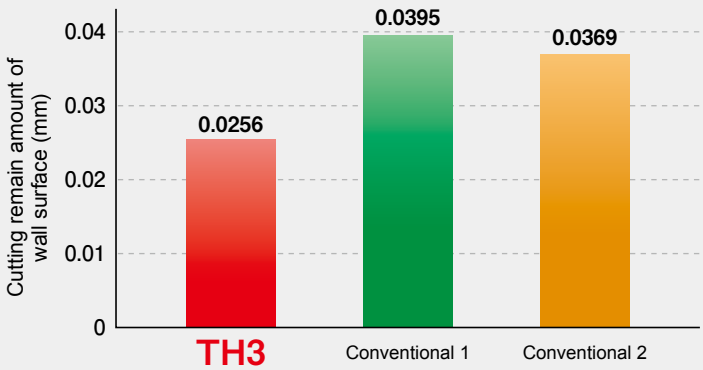


Backdraft shape enables good-quality processed surfaces to be achieved.

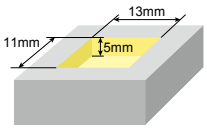
Inherits the reliable backdraft shape to enable chattering to be reduced by performing point cutting.

Better surface finish on pocket wall

Figure Cutting remain amount of wall surface



Work material : Matrix High Speed Steel (58HRC)
Machine : Vertical MC(HSK-E32)
Tool : EPDBEH2010-6-TH3
Cutting conditions : n=22,600min^{-1}
(v_c=71m/min)
v_f=820mm/min
(f_z=0.018mm/t)
a_p=0.03mm a_e=0.01mm
OH=18mm Mist



Pocket size :
13×11×5mm(Wall)

By increasing the neck rigidity along with Z axis flute clearance, the result is 30% better wall surface finish.

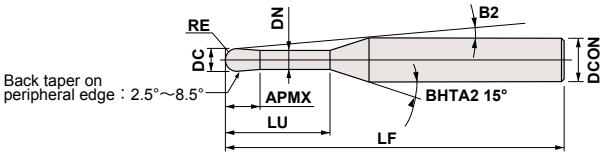
Effective neck length is shorter than existing Epoch Deep Evolution series (EPDBEH, EPDBE). Please use with checking interference area.

⇒Please use CAD/CAM Support Data Pack Vol.6 for checking interference area. For details, please visit our web site. http://www.www.moldino.com/

Line up

2Flutes

【Note】*R2* or higher does not have backdraft shape.



(mm)

Ball Radius RE	Tolerance on RE
RE0.05～RE0.25	±0.003
RE0.3～RE6	±0.005

EPDBEH2○○○-○○.○○-(S6)-TH3

Carbide | TH3 Coated | 72 HRC | Helix 30° | h5

Item Code	Stock	Size(mm) Ball radius RE	Tool dia. DC	Under neck length LU	Flute Length APMX	Neck Dia. DN	Overall Length LF	Shank Dia. DCON	Interference Angle B2	The effective under-neck length for the various draft angles 0.5°	1°	1.5°	2°	3°
EPDBEH2001-0.2-TH3	●	0.05	0.1	0.2	0.08	0.08	45	4	14.64	0.24	0.25	0.25	0.26	0.28
EPDBEH2001-0.3-TH3	●			0.3					14.46	0.34	0.35	0.36	0.38	0.40
EPDBEH2001-0.5-TH3	●			0.5					14.1	0.55	0.57	0.59	0.61	0.65
EPDBEH20015-0.3-TH3	★	0.075	0.15	0.3	0.12	0.13	45	4	14.5	0.34	0.35	0.36	0.37	0.40
EPDBEH20015-0.5-TH3	★			0.5					14.14	0.55	0.56	0.58	0.6	0.65
EPDBEH20015-0.75-TH3	★			0.75					13.71	0.81	0.83	0.86	0.89	0.96
EPDBEH20015-1-TH3	★			1					13.3	1.06	1.1	1.14	1.18	1.27
EPDBEH2002-0.3-TH3	●	0.1	0.2	0.3	0.15	0.18	50	4	14.54	0.34	0.35	0.36	0.37	0.39
EPDBEH2002-0.5-TH3	●			0.5					14.17	0.55	0.56	0.58	0.60	0.64
EPDBEH2002-0.75-TH3	●			0.75					13.73	0.81	0.83	0.86	0.89	0.95
EPDBEH2002-1-TH3	●			1					13.32	1.06	1.10	1.13	1.17	1.26
EPDBEH2002-1.25-TH3	●			1.25					12.93	1.32	1.37	1.41	1.46	1.57
EPDBEH2002-1.5-TH3	●			1.5					12.56	1.58	1.63	1.69	1.75	1.88
EPDBEH2002-2-TH3	★			2					11.89	2.10	2.17	2.24	2.32	2.50
EPDBEH2002-2.5-TH3	★			2.5					11.28	2.61	2.70	2.80	2.90	3.13
EPDBEH2002-3-TH3	★			3					10.73	3.13	3.24	3.35	3.47	3.75
EPDBEH2003-0.5-TH3	●	0.15	0.3	0.5	0.25	0.27	50	4	14.21	0.56	0.58	0.60	0.61	0.65
EPDBEH2003-0.75-TH3	●			0.75					13.76	0.82	0.85	0.87	0.90	0.96
EPDBEH2003-1-TH3	●			1					13.33	1.08	1.11	1.15	1.19	1.27
EPDBEH2003-1.25-TH3	★			1.25					12.93	1.34	1.38	1.43	1.47	1.58
EPDBEH2003-1.5-TH3	●			1.5					12.56	1.60	1.65	1.70	1.76	1.89
EPDBEH2003-2-TH3	●			2					11.86	2.12	2.18	2.26	2.34	2.52
EPDBEH2003-2.5-TH3	★			2.5					11.24	2.63	2.72	2.81	2.91	3.14
EPDBEH2003-3-TH3	★			3					10.68	3.15	3.25	3.37	3.49	3.76
EPDBEH2003-3.5-TH3	★			3.5					10.18	3.67	3.79	3.92	4.06	4.38
EPDBEH2003-4-TH3	★			4					9.72	4.18	4.32	4.47	4.64	5.00
EPDBEH2004-0.5-TH3	●	0.2	0.4	0.5	0.3	0.37	50	4	14.28	0.56	0.58	0.59	0.60	0.64
EPDBEH2004-0.75-TH3	●			0.75					13.81	0.82	0.84	0.87	0.89	0.95
EPDBEH2004-1-TH3	●			1					13.37	1.08	1.11	1.14	1.18	1.26
EPDBEH2004-1.5-TH3	●			1.5					12.57	1.60	1.65	1.70	1.75	1.88
EPDBEH2004-2-TH3	●			2					11.86	2.11	2.18	2.25	2.33	2.50
EPDBEH2004-2.5-TH3	●			2.5					11.23	2.63	2.72	2.81	2.90	3.13
EPDBEH2004-3-TH3	●			3					10.65	3.15	3.25	3.36	3.48	3.75
EPDBEH2004-3.5-TH3	★			3.5					10.14	3.66	3.78	3.91	4.05	4.37
EPDBEH2004-4-TH3	●			4					9.67	4.18	4.32	4.47	4.63	4.99
EPDBEH2004-4.5-TH3	●			4.5					9.24	4.70	4.85	5.02	5.20	5.61
EPDBEH2004-5-TH3	★			5					8.85	5.21	5.39	5.58	5.78	6.23
EPDBEH2005-0.75-TH3	●	0.25	0.5	0.75	0.35	0.47	50	4	13.88	0.82	0.84	0.86	0.88	0.94
EPDBEH2005-1-TH3	●			1					13.42	1.08	1.11	1.14	1.17	1.25
EPDBEH2005-1.5-TH3	●			1.5					12.59	1.59	1.64	1.69	1.75	1.87
EPDBEH2005-2-TH3	●			2					11.86	2.11	2.18	2.25	2.32	2.49
EPDBEH2005-2.5-TH3	●			2.5					11.21	2.63	2.71	2.80	2.90	3.11
EPDBEH2005-3-TH3	●			3					10.62	3.15	3.25	3.36	3.47	3.73
EPDBEH2005-4-TH3	●			4					9.61	4.18	4.32	4.46	4.62	4.98
EPDBEH2005-5-TH3	●			5					8.78	5.21	5.39	5.57	5.77	6.22
EPDBEH2005-5.5-TH3	●			5.5					8.41	5.73	5.92	6.13	6.35	6.84
EPDBEH2005-6-TH3	●			6					8.08	6.25	6.46	6.68	6.92	7.46
EPDBEH2005-7-TH3	●			7					7.48	7.28	7.53	7.79	8.07	8.71
EPDBEH2005-8-TH3	●			8					6.96	8.31	8.60	8.90	9.22	9.95

EPDBEH2○○○-○○.○○-(S6)-TH3

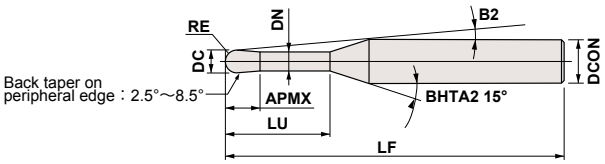
Item Code	Stock	Size(mm)								The effective under-neck length for the various draft angles				
		Ball radius **RE**	Tool dia. **DC**	Under neck length **LU**	Flute Length **APMX**	Neck Dia. **DN**	Overall Length **LF**	Shank Dia. **DCON**	Interference Angle **B2**	0.5°	1°	1.5°	2°	3°
EPDBEH2006-0.75-TH3	●	0.3	0.6	0.75	0.4	0.57	50	4	13.94	0.82	0.84	0.86	0.88	0.93
EPDBEH2006-1-TH3	●			1					13.47	1.08	1.10	1.13	1.17	1.24
EPDBEH2006-1.5-TH3	●			1.5					12.61	1.59	1.64	1.69	1.74	1.86
EPDBEH2006-2-TH3	●			2					11.86	2.11	2.17	2.24	2.31	2.48
EPDBEH2006-2.5-TH3	●			2.5					11.19	2.63	2.71	2.80	2.89	3.10
EPDBEH2006-3-TH3	●			3					10.59	3.14	3.24	3.35	3.46	3.72
EPDBEH2006-3.5-TH3	●			3.5					10.05	3.66	3.78	3.90	4.04	4.34
EPDBEH2006-4-TH3	●			4					9.56	4.18	4.31	4.46	4.61	4.97
EPDBEH2006-4.5-TH3	●			4.5					9.12	4.69	4.85	5.01	5.19	5.59
EPDBEH2006-5-TH3	●			5					8.71	5.21	5.38	5.57	5.76	6.21
EPDBEH2006-5.5-TH3	●			5.5					8.34	5.73	5.92	6.12	6.34	6.83
EPDBEH2006-6-TH3	●			6					8	6.24	6.45	6.67	6.91	7.45
EPDBEH2006-7-TH3	●			7					7.4	7.28	7.52	7.78	8.06	8.70
EPDBEH2006-8-TH3	●			8					6.88	8.31	8.59	8.89	9.21	9.94
EPDBEH2006-9-TH3	●			9					6.43	9.35	9.66	10.00	10.36	11.18
EPDBEH2006-10-TH3	●			10					6.03	10.38	10.73	11.11	11.51	12.43
EPDBEH2006-12-TH3	★			12					5.37	12.45	12.87	13.32	13.81	14.91
EPDBEH2007-2-TH3	●	0.35	0.7	2	0.45	0.67	50	4	11.85	2.11	2.17	2.24	2.31	2.47
EPDBEH2007-4-TH3	●			4					9.5	4.18	4.31	4.45	4.61	4.95
EPDBEH2007-6-TH3	★			6					7.92	6.24	6.45	6.67	6.91	7.44
EPDBEH2007-8-TH3	★			8					6.79	8.31	8.59	8.89	9.21	9.93
EPDBEH2008-1-TH3	●	0.4	0.8	1	0.5	0.77	50	4	13.58	1.07	1.10	1.12	1.15	1.21
EPDBEH2008-1.5-TH3	●			1.5					12.66	1.59	1.63	1.68	1.73	1.83
EPDBEH2008-2-TH3	●			2					11.85	2.11	2.17	2.23	2.30	2.46
EPDBEH2008-2.5-TH3	●			2.5					11.14	2.62	2.70	2.79	2.88	3.08
EPDBEH2008-3-TH3	●			3					10.51	3.14	3.24	3.34	3.45	3.70
EPDBEH2008-4-TH3	●			4					9.44	4.17	4.31	4.45	4.60	4.94
EPDBEH2008-5-TH3	●			5					8.57	5.21	5.38	5.56	5.75	6.19
EPDBEH2008-6-TH3	●			6					7.84	6.24	6.45	6.66	6.90	7.43
EPDBEH2008-8-TH3	●			8					6.7	8.31	8.58	8.88	9.20	9.92
EPDBEH2008-10-TH3	★			10					5.85	10.38	10.72	11.10	11.50	12.40
EPDBEH2008-12-TH3	★			12					5.19	12.44	12.86	13.31	13.80	14.89
EPDBEH2009-2-TH3	★	0.45	0.9	2	0.6	0.87	50	4	11.85	2.11	2.16	2.23	2.29	2.44
EPDBEH2009-4-TH3	★			4					9.38	4.17	4.30	4.44	4.59	4.93
EPDBEH2009-6-TH3	★			6					7.75	6.24	6.44	6.66	6.89	7.42
EPDBEH2009-8-TH3	★			8					6.61	8.31	8.58	8.88	9.19	9.90
EPDBEH2010-1.5-TH3	●	0.5	1	1.5	0.8	0.96	50	4	12.67	1.61	1.64	1.69	1.73	1.83
EPDBEH2010-2-TH3	●			2					11.82	2.12	2.18	2.24	2.31	2.46
EPDBEH2010-2.5-TH3	●			2.5					11.07	2.64	2.71	2.80	2.88	3.08
EPDBEH2010-3-TH3	●			3					10.41	3.16	3.25	3.35	3.46	3.70
EPDBEH2010-4-TH3	●			4					9.29	4.19	4.32	4.46	4.61	4.94
EPDBEH2010-5-TH3	●			5					8.39	5.22	5.39	5.57	5.76	6.19
EPDBEH2010-6-TH3	●			6					7.65	6.26	6.46	6.67	6.91	7.43
EPDBEH2010-7-TH3	●			7					7.03	7.29	7.53	7.78	8.06	8.67
EPDBEH2010-8-TH3	●			8					6.5	8.32	8.60	8.89	9.21	9.91

● : Inventory maintained in US ★ : Inventory maintained in Japan

Line up

2Flutes

【Note】*R2* or higher does not have backdraft shape.



(mm)

Ball Radius RE	Tolerance on RE
RE0.05～RE0.25	±0.003
RE0.3～RE6	±0.005

EPDBEH2○○○-○○.○○-(S6)-TH3

Carbide | TH3 Coated | 72 HRC | Helix 30 | h5

Item Code	Stock	Size(mm) Ball radius RE	Tool dia. DC	Under neck length LU	Flute Length APMX	Neck Dia. DN	Overall Length LF	Shank Dia. DCON	Interference Angle B2	The effective under-neck length for the various draft angles 0.5°	1°	1.5°	2°	3°
EPDBEH2010-9-TH3	●	0.5	1	9	0.8	0.96	50	4	6.05	9.36	9.67	10.00	10.36	11.16
EPDBEH2010-10-TH3	●			10					5.65	10.39	10.74	11.11	11.51	12.40
EPDBEH2010-12-TH3	●			12			55		5	12.46	12.88	13.32	13.81	14.89
EPDBEH2010-13-TH3	★			13					4.72	13.49	13.95	14.43	14.96	16.13
EPDBEH2010-14-TH3	●			14					4.48	14.53	15.02	15.54	16.11	17.37
EPDBEH2010-16-TH3	●			16					4.06	16.59	17.16	17.76	18.40	19.86
EPDBEH2010-18-TH3	★			18			60		3.71	18.66	19.29	19.97	20.70	22.35
EPDBEH2010-20-TH3	●			20					3.42	20.73	21.43	22.19	23.00	24.83
EPDBEH2010-2-S6-TH3	●			2			50	6	12.92	2.12	2.18	2.24	2.31	2.46
EPDBEH2010-3-S6-TH3	●			3					11.86	3.16	3.25	3.35	3.46	3.70
EPDBEH2010-6-S6-TH3	●			6					9.53	6.26	6.46	6.67	6.91	7.43
EPDBEH2010-8-S6-TH3	●			8					8.42	8.32	8.60	8.89	9.21	9.91
EPDBEH2010-10-S6-TH3	★			10					7.54	10.39	10.74	11.11	11.51	12.40
EPDBEH2011-2-TH3	★	0.55	1.1	2	1	1.05	50	4	11.78	2.14	2.20	2.26	2.32	2.47
EPDBEH2011-4-TH3	★			4					9.2	4.21	4.34	4.47	4.62	4.95
EPDBEH2011-6-TH3	★			6					7.54	6.28	6.47	6.69	6.92	7.44
EPDBEH2011-8-TH3	★			8					6.39	8.34	8.61	8.91	9.22	9.93
EPDBEH2011-10-TH3	★			10					5.54	10.41	10.75	11.12	11.52	12.41
EPDBEH2012-2-TH3	●	0.6	1.2	2	1.1	1.15	50	4	11.78	2.14	2.19	2.25	2.31	2.46
EPDBEH2012-3-TH3	●			3					10.29	3.17	3.26	3.36	3.46	3.70
EPDBEH2012-4-TH3	●			4					9.13	4.21	4.33	4.47	4.61	4.94
EPDBEH2012-6-TH3	●			6					7.45	6.27	6.47	6.68	6.91	7.43
EPDBEH2012-8-TH3	★			8					6.29	8.34	8.61	8.90	9.21	9.91
EPDBEH2012-10-TH3	★			10					5.44	10.41	10.75	11.12	11.51	12.40
EPDBEH2012-12-TH3	★			12			55		4.79	12.48	12.89	13.33	13.81	14.89
EPDBEH2012-2-S6-TH3	★			2			50	6	12.94	2.14	2.19	2.25	2.31	2.46
EPDBEH2012-4-S6-TH3	★			4					10.92	4.21	4.33	4.47	4.61	4.94
EPDBEH2014-3-TH3	●	0.7	1.4	3	1.3	1.34	50	4	10.15	3.19	3.28	3.37	3.47	3.7
EPDBEH2014-8-TH3	●			8					6.06	8.36	8.62	8.91	9.22	9.91
EPDBEH2014-12-TH3	★			12			55		4.58	12.49	12.90	13.34	13.82	14.89
EPDBEH2014-16-TH3	★			16					3.68	16.63	17.18	17.78	18.42	19.86
EPDBEH2015-2-TH3	●	0.75	1.5	2	1.35	1.45	50	4	11.76	2.13	2.18	2.23	2.29	2.42
EPDBEH2015-2.5-TH3	●			2.5					10.88	2.65	2.72	2.79	2.87	3.04
EPDBEH2015-3-TH3	●			3					10.12	3.17	3.25	3.34	3.44	3.66
EPDBEH2015-4-TH3	●			4					8.88	4.20	4.32	4.45	4.59	4.91
EPDBEH2015-5-TH3	●			5					7.9	5.23	5.39	5.56	5.74	6.15
EPDBEH2015-6-TH3	●			6					7.12	6.27	6.46	6.67	6.89	7.39
EPDBEH2015-8-TH3	●			8					5.95	8.34	8.60	8.88	9.19	9.88
EPDBEH2015-10-TH3	●			10					5.1	10.40	10.74	11.10	11.49	12.36
EPDBEH2015-12-TH3	●			12			55		4.47	12.47	12.88	13.32	13.79	14.85
EPDBEH2015-14-TH3	●			14					3.98	14.54	15.02	15.53	16.09	17.34
EPDBEH2015-16-TH3	●			16					3.58	16.60	17.16	17.75	18.39	19.82

EPDBEH2○○○-○○.○○-(S6)-TH3

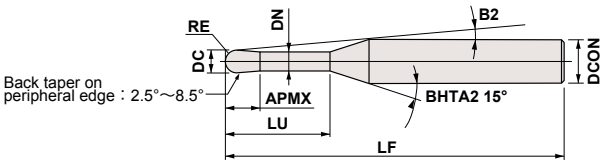
Item Code	Stock	Size(mm)								The effective under-neck length for the various draft angles				
		Ball radius **RE**	Tool dia. **DC**	Under neck length **LU**	Flute Length **APMX**	Neck Dia. **DN**	Overall Length **LF**	Shank Dia. **DCON**	Interference Angle **B2**	0.5°	1°	1.5°	2°	3°
EPDBEH2015-18-TH3	●	0.75	1.5	18	1.35	1.45	60	4	3.26	18.67	19.30	19.97	20.69	22.31
EPDBEH2015-20-TH3	●			20					2.99	20.74	21.44	22.18	22.99	No interference
EPDBEH2015-3-S6-TH3	●			3			50	6	11.84	3.17	3.25	3.34	3.44	3.66
EPDBEH2015-5-S6-TH3	●			5					10.02	5.23	5.39	5.56	5.74	6.15
EPDBEH2015-8-S6-TH3	★			8					8.14	8.34	8.60	8.88	9.19	9.88
EPDBEH2015-12-S6-TH3	★			12					6.51	12.47	12.88	13.32	13.79	14.85
EPDBEH2016-4-TH3	●	0.8	1.6	4	1.4	1.54	50	4	8.76	4.22	4.34	4.47	4.61	4.92
EPDBEH2016-8-TH3	●			8					5.82	8.35	8.62	8.90	9.20	9.89
EPDBEH2016-12-TH3	★			12			55		4.35	12.49	12.90	13.33	13.80	14.86
EPDBEH2016-16-TH3	★			16					3.47	16.62	17.17	17.77	18.40	19.84
EPDBEH2016-20-TH3	★			20			60		2.89	20.76	21.45	22.20	23.00	No interference
EPDBEH2018-4-TH3	●	0.9	1.8	4	1.6	1.73	50	4	8.53	4.23	4.35	4.48	4.61	4.92
EPDBEH2018-8-TH3	●			8					5.55	8.37	8.63	8.91	9.21	9.89
EPDBEH2018-12-TH3	★			12			55		4.11	12.50	12.91	13.34	13.81	14.86
EPDBEH2018-16-TH3	★			16					3.26	16.64	17.19	17.78	18.41	19.83
EPDBEH2018-20-TH3	★			20			60		2.7	20.77	21.47	22.21	23.01	No interference
EPDBEH2020-2.5-TH3	●	1	2	2.5	1.7	1.94	50	4	10.6	2.66	2.72	2.78	2.85	3.01
EPDBEH2020-3-TH3	●			3					9.72	3.18	3.25	3.34	3.43	3.63
EPDBEH2020-4-TH3	●			4					8.32	4.21	4.32	4.45	4.58	4.87
EPDBEH2020-5-TH3	●			5					7.27	5.25	5.39	5.55	5.73	6.11
EPDBEH2020-6-TH3	●			6					6.46	6.28	6.46	6.66	6.88	7.36
EPDBEH2020-8-TH3	●			8					5.27	8.35	8.60	8.88	9.18	9.84
EPDBEH2020-10-TH3	●			10					4.46	10.41	10.74	11.10	11.48	12.33
EPDBEH2020-12-TH3	●			12			55		3.86	12.48	12.88	13.31	13.77	14.82
EPDBEH2020-13-TH3	●			13					3.62	13.51	13.95	14.42	14.92	16.06
EPDBEH2020-14-TH3	●			14					3.4	14.55	15.02	15.53	16.07	17.30
EPDBEH2020-16-TH3	●			16					3.04	16.62	17.16	17.75	18.37	19.79
EPDBEH2020-18-TH3	●			18			60		2.75	18.68	19.30	19.96	20.67	No interference
EPDBEH2020-20-TH3	●			20					2.51	20.75	21.44	22.18	22.97	No interference
EPDBEH2020-22-TH3	●			22					2.31	22.82	23.58	24.40	25.27	No interference
EPDBEH2020-25-TH3	●			25			65		2.06	25.92	26.79	27.72	28.72	No interference
EPDBEH2020-30-TH3	●			30			70		1.75	31.09	32.14	33.26	No interference	No interference
EPDBEH2020-35-TH3	●			35			75		1.52	36.26	37.48	38.80	No interference	No interference
EPDBEH2020-40-TH3	●			40			80		1.34	41.42	42.83	No interference	No interference	No interference
EPDBEH2020-3-S6-TH3	●			3			50	6	11.8	3.18	3.25	3.34	3.43	3.63
EPDBEH2020-6-S6-TH3	●			6					9.04	6.28	6.46	6.66	6.88	7.36
EPDBEH2020-8-S6-TH3	●			8					7.82	8.35	8.60	8.88	9.18	9.84
EPDBEH2020-12-S6-TH3	●			12					6.15	12.48	12.88	13.31	13.77	14.82
EPDBEH2020-16-S6-TH3	★			16					5.07	16.62	17.16	17.75	18.37	19.79
EPDBEH2020-20-S6-TH3	★			20			60		4.31	20.75	21.44	22.18	22.97	24.76

● : Inventory maintained in US ★ : Inventory maintained in Japan

Line up

2Flutes

【Note】*R2* or higher does not have backdraft shape.



(mm)

Ball Radius RE	Tolerance on RE
RE0.05～RE0.25	±0.003
RE0.3～RE6	±0.005

EPDBEH2○○○-○○.○○-(S6)-TH3

Carbide | TH3 Coated | 72 HRC | Helix 30 | h5

Item Code	Stock	Size(mm)								The effective under-neck length for the various draft angles				
		Ball radius **RE**	Tool dia. **DC**	Under neck length **LU**	Flute Length **APMX**	Neck Dia. **DN**	Overall Length **LF**	Shank Dia. **DCON**	Interference Angle **B2**	0.5°	1°	1.5°	2°	3°
EPDBEH2025-6-TH3	●	1.25	2.5	6	2	2.4	50	4	5.54	6.35	6.53	6.72	6.92	7.39
EPDBEH2025-10-TH3	●			10					3.66	10.48	10.81	11.15	11.52	12.36
EPDBEH2025-15-TH3	●			15			55		2.57	15.65	16.15	16.69	17.27	No interference
EPDBEH2025-20-TH3	★			20			60		1.98	20.82	21.5	22.23	No interference	No interference
EPDBEH2025-25-TH3	★			25			65		1.61	25.99	26.85	27.78	No interference	No interference
EPDBEH2025-30-TH3	★			30			70		1.36	31.16	32.2	No interference	No interference	No interference
EPDBEH2030-6-TH3	●	1.5	3	6	2.5	2.88	50	6	8.27	6.38	6.55	6.73	6.93	7.38
EPDBEH2030-8-TH3	●			8			55		6.95	8.45	8.69	8.95	9.23	9.86
EPDBEH2030-10-TH3	●			10					5.98	10.51	10.83	11.17	11.53	12.35
EPDBEH2030-13-TH3	●			13			60		4.95	13.61	14.04	14.49	14.98	16.08
EPDBEH2030-16-TH3	●			16					4.23	16.71	17.25	17.82	18.43	19.81
EPDBEH2030-20-TH3	●			20			65		3.53	20.85	21.52	22.25	23.03	24.78
EPDBEH2030-25-TH3	●			25			70		2.93	26.02	26.87	27.79	28.78	No interference
EPDBEH2030-30-TH3	●			30			75		2.51	31.19	32.22	33.33	34.53	No interference
EPDBEH2030-35-TH3	●			35			80		2.19	36.35	37.57	38.87	40.28	No interference
EPDBEH2035-10-TH3	★	1.75	3.5	10	2.75	3.35	55	6	5.42	10.56	10.87	11.20	11.56	12.36
EPDBEH2035-15-TH3	★			15			60		3.94	15.73	16.22	16.74	17.31	18.58
EPDBEH2035-25-TH3	★			25			70		2.54	26.07	26.92	27.83	28.81	No interference
EPDBEH2035-35-TH3	★			35			80		1.88	36.4	37.61	38.91	No interference	No interference
EPDBEH2035-45-TH3	★			45			90		1.49	46.74	48.31	No interference	No interference	No interference
EPDBEH2040-8-TH3	●	2	4	8	3	3.85	55	6	5.71	8.49	8.71	8.96	9.22	9.81
EPDBEH2040-10-TH3	●			10					4.76	10.55	10.85	11.17	11.52	12.30
EPDBEH2040-12-TH3	●			12			60		4.09	12.62	12.99	13.39	13.82	14.79
EPDBEH2040-13-TH3	●			13					3.82	13.65	14.06	14.50	14.97	16.03
EPDBEH2040-16-TH3	●			16					3.18	16.76	17.27	17.82	18.42	19.76
EPDBEH2040-20-TH3	●			20			65		2.61	20.89	21.55	22.26	23.02	No interference
EPDBEH2040-25-TH3	●			25			70		2.13	26.06	26.9	27.80	28.77	No interference
EPDBEH2040-30-TH3	●			30			75		1.79	31.23	32.25	33.34	No interference	No interference
EPDBEH2040-35-TH3	★			35			80		1.55	36.4	37.6	38.88	No interference	No interference
EPDBEH2040-40-TH3	★			40					1.37	41.56	42.94	No interference	No interference	No interference
EPDBEH2040-45-TH3	★			45			90		1.22	46.73	48.29	No interference	No interference	No interference
EPDBEH2040-50-TH3	★			50			100		1.11	51.9	53.64	No interference	No interference	No interference
EPDBEH2050-10-TH3	●	2.5	5	10	3.5	4.85	55	6	2.97	10.54	10.82	11.12	11.45	No interference
EPDBEH2050-20-TH3	●			20			65		1.46	20.87	21.52	No interference	No interference	No interference
EPDBEH2050-25-TH3	●			25			70		1.17	26.04	26.86	No interference	No interference	No interference
EPDBEH2050-30-TH3	★			30			75		0.97	31.21	No interference	No interference	No interference	No interference
EPDBEH2050-40-TH3	★			40			80		0.73	41.55	No interference	No interference	No interference	No interference
EPDBEH2060-12-TH3	●	3	6	12	6	5.85	60	6	0	No interference	No interference	No interference	No interference	No interference
EPDBEH2060-20-TH3	●			20			65		0	No interference	No interference	No interference	No interference	No interference
EPDBEH2060-30-TH3	●			30			75		0	No interference	No interference	No interference	No interference	No interference
EPDBEH2060-50-TH3	●			50			100		0	No interference	No interference	No interference	No interference	No interference
EPDBEH2080-24-TH3	●	4	8	24	12	7.6	100	8	0	No interference	No interference	No interference	No interference	No interference
EPDBEH2100-30-TH3	●	5	10	30	15	9.5	100	10	0	No interference	No interference	No interference	No interference	No interference
EPDBEH2120-36-TH3	●	6	12	36	18	11.5	110	12	0	No interference	No interference	No interference	No interference	No interference

● : Inventory maintained in US ★ : Inventory maintained in Japan

Recommended Cutting Conditions

High efficiency cuttiing condition | High accuracy cuttiing condition

Please refer to P.12 about high accuracy cutting conditions

Work material				1 Pre-hardened Steels (35～45HRC)			2 Hardened Steels (45～55HRC)			3 Hardened Steels (55～65HRC)			4 Hardened Steels (65～68HRC)			5 Hardened Steels (68～72HRC)		
Ratio to standard depth of cut				100%			85%			80%			65%			55%		
Ball Radius **RE** (mm)	Tool dia. **DC** (mm)	Under neck length **LU** (mm)	**APMX** (mm)	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM
0.05	0.1	0.2	0.006	50,000	230	9.1	50,000	200	7.9	50,000	190	7.5	45,000	170	6.7	42,500	130	5.1
		0.3	0.005	50,000	230	9.1	50,000	200	7.9	50,000	190	7.5	45,000	170	6.7	42,500	130	5.1
		0.5	0.003	50,000	230	9.1	50,000	200	7.9	50,000	190	7.5	45,000	170	6.7	42,500	130	5.1
0.075	0.15	0.3	0.009	50,000	280	11	46,000	230	9.1	42,000	180	7.1	37,500	160	6	35,500	120	5
		0.5	0.008	50,000	280	11	46,000	230	9.1	42,000	180	7.1	37,500	160	6	35,500	120	5
		0.75	0.007	50,000	280	11	46,000	230	9.1	42,000	180	7.1	37,500	160	6	35,500	120	5
		1	0.005	46,000	230	9.1	41,400	190	7.5	37,800	150	5.9	33,750	130	5	31,950	100	4
0.1	0.2	0.3	0.016	50,000	330	13	45,500	270	10.6	42,000	210	8.3	37,800	190	7.5	35,700	150	5.9
		0.5	0.016	50,000	330	13	45,500	270	10.6	42,000	210	8.3	37,800	190	7.5	35,700	150	5.9
		0.75	0.014	50,000	330	13	45,500	270	10.6	42,000	210	8.3	37,800	190	7.5	35,700	150	5.9
		1	0.011	50,000	330	13	45,500	270	10.6	42,000	210	8.3	37,800	190	7.5	35,700	150	5.9
		1.25	0.009	45,900	270	10.6	40,500	220	8.7	37,800	170	6.7	34,020	150	5.9	32,130	120	4.7
		1.5	0.006	45,900	270	10.6	40,500	220	8.7	37,800	170	6.7	34,020	150	5.9	32,130	120	4.7
		2	0.006	45,900	270	10.6	40,500	220	8.7	37,800	170	6.7	34,020	150	5.9	32,130	120	4.7
		2.5	0.005	40,800	210	8.3	36,000	170	6.7	33,600	130	5.1	30,240	120	4.7	28,560	90	3.5
		3	0.003	40,800	210	8.3	36,000	170	6.7	33,600	130	5.1	30,240	120	4.7	28,560	90	3.5
0.15	0.3	0.5	0.022	50,000	450	17.7	45,000	380	15	42,000	340	13.4	37,800	300	11.8	35,700	240	9.4
		0.75	0.019	50,000	450	17.7	45,000	380	15	42,000	340	13.4	37,800	300	11.8	35,700	240	9.4
		1	0.017	50,000	450	17.7	45,000	380	15	42,000	340	13.4	37,800	300	11.8	35,700	240	9.4
		1.25	0.015	50,000	450	17.7	45,000	380	15	42,000	340	13.4	37,800	300	11.8	35,700	240	9.4
		1.5	0.013	50,000	450	17.7	45,000	380	15	42,000	340	13.4	37,800	300	11.8	35,700	240	9.4
		2	0.01	45,900	370	14.6	40,500	310	12.2	37,800	270	10.6	34,020	250	9.8	32,130	190	7.5
		2.5	0.008	45,900	370	14.6	40,500	310	12.2	37,800	270	10.6	34,020	250	9.8	32,130	190	7.5
		3	0.006	45,900	370	14.6	40,500	310	12.2	37,800	270	10.6	34,020	250	9.8	32,130	190	7.5
		3.5	0.004	36,720	260	10.2	29,400	210	8.3	26,400	180	7.1	23,760	160	6.3	22,440	130	5.1
		4	0.003	36,720	260	10.2	29,400	210	8.3	26,400	180	7.1	23,760	160	6.3	22,440	130	5.1
0.2	0.4	0.5	0.034	50,000	770	30.3	46,800	660	26	43,680	610	24	39,310	550	21.7	37,130	430	16.9
		0.75	0.034	50,000	770	30.3	46,800	660	26	43,680	610	24	39,310	550	21.7	37,130	430	16.9
		1	0.032	50,000	770	30.3	46,800	660	26	43,680	610	24	39,310	550	21.7	37,130	430	16.9
		1.5	0.027	50,000	660	26	46,800	470	18.5	43,680	440	17.3	39,310	390	15.4	37,130	310	12.2
		2	0.022	50,000	550	21.7	46,800	470	18.5	43,680	440	17.3	39,310	390	15.4	37,130	310	12.2
		2.5	0.018	36,720	360	14.2	32,400	290	11.4	36,290	270	10.6	32,660	250	9.8	30,850	190	7.5
		3	0.013	36,720	360	14.2	32,400	290	11.4	36,290	270	10.6	32,660	250	9.8	30,850	190	7.5
		3.5	0.01	36,720	360	14.2	32,400	290	11.4	36,290	270	10.6	32,660	250	9.8	30,850	190	7.5
		4	0.008	36,720	360	14.2	32,400	290	11.4	36,290	270	10.6	32,660	250	9.8	30,850	190	7.5
		4.5	0.006	32,640	310	12	28,800	250	10	26,880	230	9.1	24,190	210	8.3	22,850	160	6.3
		5	0.004	32,640	310	12	28,800	250	10	26,880	230	9.1	24,190	210	8.3	22,850	160	6.3
0.25	0.5	0.75	0.036	50,000	1,190	47	47,130	1,050	41	43,930	740	29.1	39,820	670	26.4	37,560	520	20.5
		1	0.036	50,000	1,190	47	47,130	1,050	41	43,930	740	29.1	39,820	670	26.4	37,560	520	20.5
		1.5	0.032	50,000	1,190	47	47,130	1,050	41	43,930	680	26.8	39,820	610	24	37,560	480	18.9
		2	0.028	50,000	960	37.8	47,130	840	33.1	43,930	680	26.8	39,820	610	24	37,560	480	18.9
		2.5	0.026	45,450	650	25.6	42,840	570	22.4	39,940	500	19.7	36,220	450	17.7	34,180	350	13.8
		3	0.024	45,450	650	25.6	42,840	570	22.4	39,940	390	15.4	36,220	350	13.8	34,180	270	10.6
		4	0.016	34,970	500	19.7	32,950	520	20.5	30,730	390	15.4	28,540	350	13.8	26,290	270	10.6
		5	0.014	34,970	500	19.7	32,950	520	20.5	30,730	390	15.4	28,540	350	13.8	26,290	270	10.6
		5.5	0.012	31,080	420	16.5	29,300	370	14.6	27,310	320	12.6	24,770	290	11.4	23,370	230	9.1
		6	0.01	31,080	420	16.5	29,300	370	14.6	27,310	320	12.6	24,770	290	11.4	23,370	230	9.1
		7	0.008	31,080	420	17	29,300	370	15	27,310	320	13	24,770	290	11	23,370	230	9
		8	0.006	31,080	420	17	29,300	370	15	27,310	320	13	24,770	290	11	23,370	230	9
0.3	0.6	0.75	0.06	50,000	1,950	77	48,000	1,730	68	44,800	1,340	53	40,320	1,210	48	38,080	940	37
		1	0.06	50,000	1,950	77	48,000	1,730	68	44,800	1,340	53	40,320	1,210	48	38,080	940	37
		1.5	0.055	50,000	1,950	77	48,000	1,730	68	44,800	1,340	53	40,320	1,210	48	38,080	940	37
		2	0.05	50,000	1,950	77	48,000	1,730	68	44,800	1,340	53	40,320	1,210	48	38,080	940	37
		2.5	0.036	50,000	1,560	61	48,000	1,380	54	44,800	990	39	40,320	890	35	38,080	690	27.2
		3	0.033	50,000	1,560	61	48,000	1,380	54	44,800	990	39	40,320	890	35	38,080	690	27.2
		3.5	0.028	48,960	1,450	57	43,200	1,180	47	40,320	840	33.1	36,290	760	29.9	34,270	590	23.2
		4	0.021	48,960	1,450	57	43,200	1,180	47	40,320	770	30.3	36,290	690	27.2	34,270	540	21.3
		4.5	0.018	45,900	1,070	42	40,500	880	34.6	37,800	680	26.8	34,020	610	24	32,130	480	18.9
		5	0.016	39,780	930	36.6	35,100	760	29.9	32,760	590	23.2	29,480	530	20.9	27,850	410	16.1
		5.5	0.014	39,780	930	36.6	35,100	760	29.9	32,760	590	23.2	29,480	530	20.9	27,850	410	16.1
		6	0.012	39,780	930	36.6	35,100	760	29.9	32,760	590	23.2	29,480	530	20.9	27,850	410	16.1
		7	0.012	27,200	600	23.6	24,000	490	19.3	22,400	420	16.5	20,160	370	14.6	19,040	290	11.4
		8	0.012	27,200	600	23.6	24,000	490	19.3	22,400	380	15	20,160	340	13.4	19,040	270	10.6
		9	0.01	27,200	600	23.6	24,000	490	19.3	22,400	380	15	20,160	340	13.4	19,040	270	10.6
		10	0.007	23,800	530	21	21,000	430	17	19,600	330	13	17,640	300	12	16,660	230	9
		12	0.006	20,400	420	17	18,000	350	14	16,800	270	10.6	15,120	240	9.4	14,280	190	7.5
0.35	0.7	2	0.073	50,000	2,160	85	48,000	1,930	76	44,800	1,190	47	40,320	1,070	42	38,080	830	33
		4	0.033	48,960	1,600	63	43,200	1,320	52	43,870	850	33.5	39,480	760	29.9	37,370	590	23.2
		6	0.022	39,780	1,030	41	35,100	850	34	35,650	640	25	32,080	580	23	30,370	450	18
		8	0.016	27,200	630	25	24,000	520	21	24,370	420	17	21,940	380	15	20,760	300	12
0.4	0.8	1	0.12	50,000	2,400	95	48,000	2,590	102	44,800	1,880	74	40,320	1,690	67	38,080	1,320	52
		1.5	0.12	50,000	2,400	95	48,000	2,590	102	44,800	1,880	74	40,320	1,690	67	38,080	1,320	52
		2	0.096	50,000	2,400	95	48,000	2,590	102	44,800	1,880	74	40,320	1,690	67	38,080	1,320	52
		2.5	0.088	50,000	2,400	95	48,000	2,590	102	44,800	1,880	74	40,320	1,690	67	38,080	1,320	52

【Note】 Upon usage, please refer to comments and notes below table on page 11.

Recommended Cutting Conditions

High efficiency cuttiing condition | High accuracy cuttiing condition

Please refer to P.12 about high accuracy cutting conditions

Work material				1 Pre-hardened Steels (35～45HRC)			2 Hardened Steels (45～55HRC)			3 Hardened Steels (55～65HRC)			4 Hardened Steels (65～68HRC)			5 Hardened Steels (68～72HRC)		
Ratio to standard depth of cut				100%			85%			80%			65%			55%		
Ball Radius **RE** (mm)	Tool dia. **DC** (mm)	Under neck length **LU** (mm)	**APMX** (mm)	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM
0.4	0.8	3	0.08	50,000	2,400	95	48,000	2,590	102	44,800	1,880	74	40,320	1,690	67	38,080	1,320	52
		4	0.063	50,000	2,400	95	48,000	2,590	102	44,800	1,880	74	40,320	1,690	67	38,080	1,320	52
		5	0.047	48,960	2,110	83	43,200	2,120	84	40,320	1,520	60	36,290	1,370	54	34,270	1,070	42
		6	0.033	42,840	1,730	68	37,800	1,430	56	35,280	1,250	49	31,750	1,120	44	29,990	870	34
		8	0.016	35,360	1,020	40	31,200	840	33	29,120	730	29	26,210	660	26	24,750	510	20
		10	0.016	27,200	740	29	24,000	610	24	22,400	530	21	20,160	480	19	19,040	370	15
		12	0.01	27,200	740	29	24,000	610	24	22,400	530	21	20,160	480	19	19,040	370	15
0.45	0.9	2	0.108	50,000	2,820	111	45,600	2,410	95	42,560	2,140	84	38,300	1,930	76	36,180	1,500	59
		4	0.065	48,450	2,370	93	42,750	1,960	77	39,900	1,740	69	35,910	1,560	61	33,920	1,220	48
		6	0.044	40,700	1,520	60	35,910	1,250	49	33,520	1,110	44	30,160	1,000	39	28,490	780	31
		8	0.029	31,010	1,050	41	27,360	870	34	25,540	770	30	22,980	690	27	21,710	540	21
0.5	1	1.5	0.18	45,900	3,100	122	43,200	2,720	107	37,800	2,270	89	34,020	2,040	80	32,130	1,590	63
		2	0.16	45,900	3,100	122	43,200	2,720	107	37,800	2,270	89	34,020	2,040	80	32,130	1,590	63
		2.5	0.16	45,900	3,100	122	43,200	2,720	107	37,800	2,270	89	34,020	2,040	80	32,130	1,590	63
		3	0.16	45,900	3,100	122	43,200	2,720	107	37,800	2,270	89	34,020	2,040	80	32,130	1,590	63
		4	0.112	45,900	3,100	122	43,200	2,720	107	37,800	2,270	89	34,020	2,040	80	32,130	1,590	63
		5	0.072	39,780	2,600	102	43,200	2,540	100	32,760	1,840	72	29,480	1,650	65	27,850	1,280	50
		6	0.048	38,560	2,320	91	38,880	2,350	93	29,480	1,380	54	26,540	1,240	49	25,060	970	38
		7	0.048	33,050	1,340	53	31,590	1,320	52	27,220	1,060	42	24,490	960	37.8	23,130	740	29.1
		8	0.048	33,050	1,340	53	31,590	1,320	52	27,220	980	38.6	24,490	880	34.6	23,130	690	27.2
		9	0.036	33,050	1,340	53	31,590	1,320	52	27,220	980	38.6	24,490	880	34.6	23,130	690	27.2
		10	0.03	33,050	1,340	53	31,590	1,320	52	27,220	980	38.6	24,490	880	34.6	23,130	690	27.2
		12	0.02	24,480	940	37	21,600	770	30.3	20,160	690	27.2	18,140	620	24.4	17,140	480	18.9
		13	0.018	24,480	940	37	21,600	770	30	20,160	690	27	18,140	620	24	17,140	480	19
		14	0.016	24,480	940	37	21,600	770	30	20,160	690	27	18,140	620	24	17,140	480	19
		16	0.012	24,480	940	37	21,600	770	30	20,160	690	27	18,140	620	24	17,140	480	19
		18	0.01	21,420	770	30	18,900	640	25	17,640	560	22	15,880	510	20.1	14,990	400	15.7
		20	0.008	18,360	660	26	16,200	540	21	15,120	480	18.9	13,610	440	17.3	12,850	340	13.4
0.55	1.1	2	0.16	42,840	2,930	115	37,800	2,450	97	35,280	2,180	86	31,750	1,960	77	29,990	1,520	60
		4	0.112	42,840	2,930	115	37,800	2,450	97	35,280	2,180	86	31,750	1,960	77	29,990	1,520	60
		6	0.048	33,810	1,710	67	29,840	1,430	56	27,850	1,270	50	25,060	1,140	45	23,670	890	35
		8	0.048	31,210	1,310	52	27,540	1,100	43	25,700	980	39	23,130	880	35	21,850	680	27
		10	0.03	31,210	1,310	52	27,540	1,100	43	25,700	980	39	23,130	880	34.6	21,850	680	26.8
0.6	1.2	2	0.154	39,230	2,720	107	36,920	2,560	101	32,310	1,860	73	29,080	1,670	66	27,460	1,300	51
		3	0.154	39,230	2,720	107	36,920	2,560	101	32,310	1,860	73	29,080	1,670	66	27,460	1,300	51
		4	0.128	39,230	2,720	107	36,920	2,560	101	32,310	1,860	73	29,080	1,670	66	27,460	1,300	51
		6	0.088	39,230	2,720	107	36,920	2,560	101	32,310	1,860	73	29,080	1,670	66	27,460	1,300	51
		8	0.048	31,820	2,070	82	30,240	2,060	81	26,210	1,050	41	23,590	940	37	22,280	730	28.7
		10	0.042	29,380	1,320	52	27,000	1,070	42	24,190	870	34	21,770	780	31	20,560	610	24
		12	0.036	29,380	1,320	52	25,920	1,030	41	24,190	870	34	21,770	780	31	20,560	610	24
0.7	1.4	3	0.158	33,420	2,350	93	29,480	1,990	78	27,520	1,790	71	24,770	1,610	63	23,390	1,250	49
		8	0.088	27,850	1,810	71	24,570	1,530	60	22,930	1,380	54	20,640	1,240	49	19,490	960	38
		12	0.042	25,700	1,250	49	22,680	1,060	42	21,170	950	37	19,050	860	34	17,990	670	26
		16	0.028	19,040	870	34	16,800	740	29	15,680	670	26	14,110	600	24	13,330	470	19
0.75	1.5	2	0.192	35,700	3,210	126	31,500	2,550	100	29,400	2,210	87	26,460	1,990	78	24,990	1,540	61
		2.5	0.192	35,700	3,210	126	31,500	2,550	100	29,400	2,210	87	26,460	1,990	78	24,990	1,540	61
		3	0.192	35,700	3,210	126	31,500	2,550	100	29,400	2,210	87	26,460	1,990	78	24,990	1,540	61
		4	0.16	35,700	3,210	126	31,500	2,550	100	29,400	2,210	87	26,460	1,990	78	24,990	1,540	61
		5	0.16	35,700	3,210	126	31,500	2,550	100	29,400	2,210	87	26,460	1,990	78	24,990	1,540	61
		6	0.16	35,700	3,210	126	31,500	2,550	100	29,400	2,210	87	26,460	1,990	78	24,990	1,540	61
		8	0.072	27,850	1,810	71	24,570	1,430	56	22,930	1,240	49	20,640	1,120	44	19,490	870	34
		10	0.072	25,700	1,670	66	22,680	1,320	52	21,170	1,140	45	19,050	1,030	41	17,990	800	32
		12	0.072	25,700	1,390	55	22,680	1,100	43	21,170	950	37	19,050	860	34	17,990	670	26
		14	0.06	22,850	1,170	46	20,160	930	37	18,820	800	31.5	16,930	720	28.3	15,990	560	22
		16	0.03	19,040	970	38.2	16,800	770	30.3	15,680	670	26.4	14,110	600	23.6	13,330	470	18.5
		18	0.03	19,040	970	38	16,800	770	30	15,680	670	26	14,110	600	24	13,330	470	19
		20	0.03	19,040	970	38	16,800	770	30	15,680	670	26	14,110	600	23.6	13,330	470	18.5
0.8	1.6	4	0.23	33,110	3,340	132	29,210	2,850	112	25,320	2,130	84	22,780	1,920	76	21,520	1,490	59
		8	0.176	30,940	2,490	98	27,300	2,130	84	23,660	1,590	63	21,290	1,430	56	20,110	1,110	44
		12	0.078	27,850	2,180	86	24,570	1,860	73	21,290	1,290	51	19,170	1,160	46	18,100	900	35
		16	0.048	23,870	1,330	52	21,060	1,140	45	19,660	990	39	17,690	890	35	16,710	690	27
		20	0.032	17,680	930	37	15,600	800	32	14,560	690	27	13,100	620	24	12,380	490	19
0.9	1.8	4	0.29	28,730	2,410	95	25,350	2,010	79	23,660	1,700	67	21,290	1,530	60	20,110	1,190	47
		8	0.208	28,730	2,410	95	25,350	2,010	79	23,660	1,700	67	21,290	1,530	60	20,110	1,190	47
		12	0.084	23,870	1,500	59	21,060	1,250	49	19,660	1,060	42	17,690	960	38	16,710	740	29
		16	0.054	23,870	1,500	59	21,060	1,250	49	19,660	1,060	42	17,690	960	38	16,710	740	29
		20	0.036	17,680	1,050	41	15,600	880	35	14,560	740	29	13,100	670	26	12,380	520	21
1	2	2.5	0.32	26,780	3,620	143	23,630	3,050	120	22,050	2,650	104	19,850	2,380	94	18,740	1,850	73
		3	0.32	26,780	3,620	143	23,630	3,050	120	22,050	2,650	104	19,850	2,380	94	18,740	1,850	73
		4	0.32	26,780	3,620	143	23,630	3,050	120	22,050	2,650	104	19,850	2,380	94	18,740	1,850	73
		5	0.32	26,780	3,620	143	23,630	3,050	120	22,050	2,650	104	19,850	2,380	94	18,740	1,850	73
		6	0.32	26,780	3,210	126	23,630	2,690	106	22,050	2,380	94	19,850	2,140	84	18,740	1,670	66
		8	0.224	26,780	3,210	126	23,630	2,690	106	22,050	2,380	94	19,850	2,140	84	18,740	1,670	66
		10	0.168	24,990	2,700	106	22,050	2,250	89	19,110	1,470	58	17,200	1,320	52	16,240	1,030	41

Work material				1			2			3			4			5		
				Pre-hardened Steels (35～45HRC)			Hardened Steels (45～55HRC)			Hardened Steels (55～65HRC)			Hardened Steels (65～68HRC)			Hardened Steels (68～72HRC)		
Ratio to standard depth of cut				100%			85%			80%			65%			55%		
Ball Radius **RE** (mm)	Tool dia. **DC** (mm)	Under neck length **LU** (mm)	**APMX** (mm)	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM
1	2	**12**	0.096	22,490	2,430	96	19,850	2,050	81	17,200	1,320	52	15,480	1,190	47	14,620	930	37
		13	0.096	22,490	2,430	96	19,850	2,020	80	15,880	1,020	40	14,290	920	36	13,500	710	28
		14	0.096	22,490	2,110	83	18,430	1,630	64	15,880	1,020	40	14,290	920	36	13,500	710	28
		16	0.096	20,890	1,350	53	18,430	1,470	58	15,880	910	36	14,290	820	32	13,500	640	25
		18	0.072	19,280	1,250	49	18,430	1,350	53	15,880	910	36	14,290	820	32	13,500	640	25
		20	0.06	19,280	1,250	49	18,430	1,130	45	15,880	910	36	14,290	820	32	13,500	640	25
		22	0.04	15,170	930	37	13,390	770	30	14,990	820	32	13,500	730	29	12,750	570	22
		25	0.04	14,280	870	34	12,600	730	29	14,110	770	30	12,700	690	27	12,000	540	21
		30	0.024	14,280	870	34	12,600	730	29	14,110	770	30	12,700	690	27	12,000	540	21
		35	0.02	12,500	720	28	11,030	600	24	10,290	530	21	9,260	470	19	8,750	370	15
		40	0.018	10,710	620	24	9,450	510	20	8,820	450	18	7,940	410	16	7,500	320	13
1.25	2.5	**6**	0.4	23,590	3,800	150	20,810	3,090	122	19,430	2,530	100	17,480	2,280	90	16,610	1,820	72
		10	0.272	23,590	3,800	150	20,810	3,090	122	19,430	2,530	100	17,480	2,280	90	16,610	1,820	72
		15	0.12	18,400	2,130	84	16,230	2,020	80	15,150	1,420	56	13,640	1,280	50	12,950	1,020	40
		20	0.096	16,980	1,640	65	16,230	1,450	57	13,990	1,090	43	12,590	980	39	11,960	790	31
		25	0.078	16,980	1,480	58	14,990	1,200	47	13,990	980	39	12,590	880	35	11,960	710	28
		30	0.044	12,580	1,150	45	11,100	930	37	10,360	770	30	9,320	690	27	8,860	550	22
1.5	3	**6**	0.48	20,400	4,100	161	18,000	3,400	134	16,800	3,020	119	15,120	2,720	107	14,360	2,180	86
		8	0.48	20,400	4,100	161	18,000	3,400	134	16,800	3,020	119	15,120	2,720	107	14,360	2,180	86
		10	0.336	20,400	4,100	161	18,000	3,400	134	16,800	3,020	119	15,120	2,720	107	14,360	2,180	86
		13	0.252	19,040	3,060	121	16,800	2,540	100	15,680	2,260	89	14,110	2,030	80	13,410	1,630	64
		16	0.252	19,040	2,760	109	16,800	2,290	90	14,560	1,890	74	13,100	1,700	67	12,450	1,360	54
		20	0.144	15,910	1,920	76	14,040	1,590	63	12,100	1,310	52	10,890	1,180	47	10,340	940	37
		25	0.096	15,910	1,920	76	14,040	1,590	63	12,100	1,310	52	10,890	1,180	47	10,340	940	37
		30	0.096	14,690	1,770	70	12,960	1,470	58	12,100	1,310	52	10,890	1,180	47	10,340	940	37
		35	0.064	10,880	1,240	49	9,600	1,030	41	10,750	1,100	43	9,680	990	39	9,190	790	31
1.75	3.5	**10**	0.328	15,190	2,750	108	13,410	2,240	88	12,510	1,830	72	11,260	1,650	65	10,700	1,320	52
		15	0.288	15,190	2,750	108	13,410	2,240	88	12,510	1,830	72	11,260	1,650	65	10,700	1,320	52
		25	0.168	12,620	1,710	67	11,140	1,390	55	10,400	1,140	45	9,360	1,030	41	8,890	820	32
		35	0.072	12,620	1,710	67	11,140	1,390	55	10,400	1,140	45	9,360	1,030	41	8,890	820	32
		45	0.072	9,350	1,200	47	8,250	980	39	7,700	800	32	6,930	720	28	6,580	580	23
2	4	**8**	0.48	14,660	3,960	156	12,940	3,300	130	12,080	2,900	114	10,870	2,610	103	10,320	2,090	82
		10	0.48	14,660	3,960	156	12,940	3,300	130	12,080	2,900	114	10,870	2,610	103	10,320	2,090	82
		12	0.384	14,660	3,960	156	12,940	3,300	130	12,080	2,900	114	10,870	2,610	103	10,320	2,090	82
		13	0.384	14,660	3,960	156	12,940	3,300	130	12,080	2,900	114	10,870	2,610	103	10,320	2,090	82
		16	0.336	14,660	3,960	156	12,940	3,300	130	12,080	2,900	114	10,870	2,610	103	10,320	2,090	82
		20	0.336	12,710	2,750	108	11,210	2,290	90	10,470	2,010	79	9,420	1,810	71	8,950	1,450	57
		25	0.192	11,440	2,220	87	10,090	2,160	85	9,420	1,630	64	8,480	1,460	58	8,050	1,170	46
		30	0.128	10,560	1,710	67	9,320	1,430	56	8,690	1,250	49	7,820	1,130	45	7,430	900	35
		35	0.08	10,560	1,710	67	9,320	1,430	56	8,690	1,250	49	7,820	1,130	45	7,430	900	35
		40	0.08	10,560	1,710	67	9,320	1,430	56	8,690	1,250	49	7,820	1,130	45	7,430	900	35
		45	0.08	7,820	1,200	47	6,900	1,000	39	6,440	880	35	5,800	790	31	5,510	630	25
		50	0.08	7,820	1,200	47	6,900	1,000	39	6,440	880	35	5,800	790	31	5,510	630	25
2.5	5	**10**	0.584	10,710	3,210	126	9,450	2,840	112	8,820	2,380	94	7,940	2,140	84	7,540	1,710	67
		20	0.42	10,710	3,210	126	9,450	2,840	112	8,820	2,380	94	7,940	2,140	84	7,540	1,710	67
		25	0.42	9,950	2,980	117	8,780	2,630	104	8,190	2,210	87	7,370	1,990	78	7,000	1,590	63
		30	0.24	8,950	2,690	106	7,900	2,370	93	7,370	1,990	78	6,630	1,790	71	6,300	1,430	56
		40	0.16	8,260	1,490	59	7,290	1,310	52	6,800	1,100	43	6,120	990	39	5,820	790	31
3	6	**12**	0.48	11,480	4,250	167	10,130	3,460	136	9,450	2,840	112	8,510	2,550	100	8,080	2,040	80
		20	0.4	10,840	3,730	147	9,560	3,030	119	8,930	2,490	98	8,030	2,240	88	7,630	1,790	71
		30	0.336	8,840	2,120	84	7,800	2,030	80	7,280	1,570	62	6,550	1,410	56	6,220	1,130	45
		50	0.12	7,340	1,590	63	6,480	1,400	55	6,050	1,180	47	5,440	1,060	42	5,170	850	34
4	8	**24**	0.5	8,750	3,420	135	7,550	2,600	102	7,100	2,450	97	6,390	1,850	73	5,750	1,270	50
5	10	**30**	0.6	7,000	3,000	118	6,050	2,250	89	5,680	2,130	84	5,110	1,610	63	4,600	1,030	41
6	12	**36**	0.8	5,850	2,600	102	5,050	1,980	78	4,720	1,840	72	4,250	1,440	57	3,820	880	35

※(1) a_p is shown as the criteria for Group 1 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.
※(2) When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc., cutting depth setting should be set by multiplying a cutting depth factor to calculate the cutting depth amount, and this amount should then be reduced to 80% of the calculated value.
※(3) Adjust by setting a_e to (3 to 5)×(a_p)×(cutting depth ratio). When performing finishing processing, calculate the theoretical cusp height and set accordingly.

Cutting depth setting example: When cutting rib groove contours in hardened steel (50HRC) using an EPDBEH2020-10-TH3 tool:
Cutting depth = 0.168 (a_p) × 0.85 (cutting depth factor for Group 2 hardened steel) × 0.8 (for closed-area cutting) = 0.011mm

【Note】

① Although basically dry (air blow) cutting is recommended, please use appropriate coolant according to the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

Recommended Cutting Conditions

High efficiency cuttiing condition

High accuracy cuttiing condition

Please refer to P.9 about high efficiency cutting conditions

Work material				1 Pre-hardened Steels (35～45HRC)			2 Hardened Steels (45～55HRC)			3 Hardened Steels (55～65HRC)			4 Hardened Steels (65～68HRC)			5 Hardened Steels (68～72HRC)		
Ratio to standard depth of cut				100%			85%			80%			65%			55%		
Ball Radius **RE** (mm)	Tool dia. **DC** (mm)	Under neck length **LU** (mm)	**APMX** (mm)	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM
0.05	**0.1**	**0.2**	0.003	50,000	230	9	50,000	200	8	50,000	190	8	45,000	170	7	42,500	130	5
		0.3	0.002	50,000	230	9	50,000	200	8	50,000	190	7.5	45,000	170	7	42,500	130	5
		0.5	0.002	50,000	230	9	50,000	200	7.9	50,000	190	7.5	45,000	170	7	42,500	130	5
0.075	**0.15**	**0.3**	0.007	50,000	280	11	46,000	230	9.1	42,000	180	7.1	37,500	160	6	35,500	120	5
		0.5	0.006	50,000	280	11	46,000	230	9.1	42,000	180	7.1	37,500	160	6	35,500	120	5
		0.75	0.005	50,000	280	11	46,000	230	9.1	42,000	180	7.1	37,500	160	6	35,500	120	5
		1	0.003	46,000	230	9	41,400	190	7.5	37,800	150	5.9	33,750	130	5	31,950	100	4
0.1	**0.2**	**0.3**	0.012	50,000	330	13	45,500	270	11	42,000	210	8	37,800	190	8	35,700	150	6
		0.5	0.012	50,000	330	13	45,500	270	11	42,000	210	8	37,800	190	8	35,700	150	6
		0.75	0.01	50,000	330	13	45,500	270	11	42,000	210	8	37,800	190	8	35,700	150	6
		1	0.009	50,000	330	13	45,500	270	11	42,000	210	8	37,800	190	8	35,700	150	6
		1.25	0.006	45,900	270	11	40,500	220	9	37,800	170	7	34,020	150	6	32,130	120	5
		1.5	0.006	45,900	270	11	40,500	220	9	37,800	170	7	34,020	150	6	32,130	120	5
		2	0.005	45,900	270	11	40,500	220	9	37,800	170	7	34,020	150	6	32,130	120	5
		2.5	0.004	40,800	210	8	36,000	170	7	33,600	130	5	30,240	120	5	28,560	90	4
		3	0.002	40,800	210	8	36,000	170	7	33,600	130	5.1	30,240	120	5	28,560	90	4
0.15	**0.3**	**0.5**	0.016	50,000	450	18	45,000	380	15	42,000	340	13.4	37,800	300	12	35,700	240	9
		0.75	0.014	50,000	450	18	45,000	380	15	42,000	340	13.4	37,800	300	12	35,700	240	9
		1	0.013	50,000	450	18	45,000	380	15	42,000	340	13.4	37,800	300	12	35,700	240	9
		1.25	0.011	50,000	450	18	45,000	380	15	42,000	340	13.4	37,800	300	12	35,700	240	9
		1.5	0.01	50,000	450	18	45,000	380	15	42,000	340	13	37,800	300	12	35,700	240	9
		2	0.007	45,900	370	15	40,500	310	12	37,800	270	11	34,020	250	10	32,130	190	8
		2.5	0.006	45,900	370	15	40,500	310	12	37,800	270	10.6	34,020	250	10	32,130	190	8
		3	0.005	45,900	370	15	40,500	310	12.2	37,800	270	10.6	34,020	250	10	32,130	190	8
		3.5	0.003	36,720	260	10	29,400	210	8	26,400	180	7	23,760	160	6	22,440	130	5
		4	0.002	36,720	260	10	29,400	210	8	26,400	180	7	23,760	160	6	22,440	130	5
0.2	**0.4**	**0.5**	0.034	40,800	450	18	36,000	360	14	33,600	340	13	30,240	300	12	28,560	240	9
		0.75	0.034	40,800	450	18	36,000	360	14.2	33,600	340	13.4	30,240	300	12	28,560	240	9
		1	0.032	40,800	450	18	36,000	360	14	33,600	340	13	30,240	300	12	28,560	240	9
		1.5	0.027	40,800	450	18	36,000	360	14	33,600	340	13	30,240	300	12	28,560	240	9
		2	0.022	40,800	450	18	36,000	360	14	33,600	340	13	30,240	300	12	28,560	240	9
		2.5	0.013	36,720	360	14	32,400	290	11	30,240	270	11	27,220	250	10	25,700	190	8
		3	0.009	36,720	360	14	32,400	290	11	30,240	270	11	27,220	250	10	25,700	190	8
		3.5	0.006	36,720	360	14	32,400	290	11	30,240	270	11	27,220	250	10	25,700	190	8
		4	0.004	36,720	360	14	32,400	290	11	30,240	270	11	27,220	250	10	25,700	190	8
		4.5	0.003	32,640	310	12	28,800	250	10	26,880	230	9	24,190	210	8	22,850	160	6
		5	0.002	32,640	310	12	28,800	250	10	26,880	230	9	24,190	210	8	22,850	160	6
0.25	**0.5**	**0.75**	0.036	34,000	610	24	30,000	540	21	28,000	480	19	25,200	430	17	23,800	330	13
		1	0.036	34,000	610	24	30,000	540	21	28,000	480	19	25,200	430	17	23,800	330	13
		1.5	0.032	34,000	610	24	30,000	540	21	28,000	480	18.9	25,200	430	17	23,800	330	13
		2	0.028	34,000	610	24	30,000	540	21	28,000	480	18.9	25,200	430	17	23,800	330	13
		2.5	0.026	30,600	500	20	27,000	440	17	25,200	390	15.4	22,680	350	14	21,420	270	11
		3	0.024	30,600	500	20	27,000	440	17.3	25,200	390	15.4	22,680	350	14	21,420	270	11
		4	0.016	30,600	500	20	27,000	440	17.3	25,200	390	15.4	22,680	350	14	21,420	270	11
		5	0.014	30,600	500	20	27,000	440	17.3	25,200	390	15.4	22,680	350	14	21,420	270	11
		5.5	0.006	27,200	420	17	24,000	370	14.6	22,400	320	12.6	20,160	290	11	19,040	230	9
		6	0.005	27,200	420	17	24,000	370	14.6	22,400	320	12.6	20,160	290	11	19,040	230	9
		7	0.004	27,200	420	17	24,000	370	15	22,400	320	13	20,160	290	11	19,040	230	9
		8	0.003	27,200	420	17	24,000	370	15	22,400	320	13	20,160	290	11	19,040	230	9
0.3	**0.6**	**0.75**	0.04	34,000	880	35	30,000	720	28	28,000	560	22	25,200	500	20	23,800	390	15
		1	0.04	34,000	880	35	30,000	720	28	28,000	560	22	25,200	500	20	23,800	390	15
		1.5	0.038	34,000	880	35	30,000	720	28	28,000	560	22	25,200	500	20	23,800	390	15
		2	0.034	34,000	880	35	30,000	720	28	28,000	560	22	25,200	500	20	23,800	390	15
		2.5	0.03	34,000	880	35	30,000	720	28	28,000	560	22	25,200	500	20	23,800	390	15
		3	0.027	34,000	880	35	30,000	720	28	28,000	560	22	25,200	500	20	23,800	390	15
		3.5	0.023	30,600	760	30	27,000	620	24.4	25,200	480	18.9	22,680	430	17	21,420	340	13
		4	0.019	30,600	760	29.9	27,000	620	24.4	25,200	480	18.9	22,680	430	17	21,420	340	13
		4.5	0.018	30,600	720	28.3	27,000	580	22.8	25,200	450	17.7	22,680	410	16	21,420	320	13
		5	0.016	30,600	720	28.3	27,000	580	22.8	25,200	450	17.7	22,680	410	16	21,420	320	13
		5.5	0.014	30,600	720	28.3	27,000	580	22.8	25,200	450	17.7	22,680	410	16	21,420	320	13
		6	0.012	30,600	720	28.3	27,000	580	22.8	25,200	450	17.7	22,680	410	16	21,420	320	13
		7	0.006	27,200	600	23.6	24,000	490	19.3	22,400	380	15	20,160	340	13.4	19,040	270	10.6
		8	0.006	27,200	600	23.6	24,000	490	19.3	22,400	380	15	20,160	340	13.4	19,040	270	10.6
		9	0.005	27,200	600	23.6	24,000	490	19.3	22,400	380	15	20,160	340	13.4	19,040	270	10.6
		10	0.004	23,800	530	21	21,000	430	17	19,600	330	13	17,640	300	12	16,660	230	9
		12	0.003	20,400	420	17	18,000	350	14	16,800	270	10.6	15,120	240	9.4	14,280	190	7.5
0.35	**0.7**	**2**	0.049	34,000	980	39	30,000	810	31.9	28,000	660	26	25,200	590	23.2	23,800	460	18.1
		4	0.027	30,600	840	33.1	27,000	690	27.2	25,200	560	22	22,680	510	20.1	21,420	400	15.7
		6	0.022	30,600	790	31	27,000	650	26	25,200	540	21	22,680	480	19	21,420	370	15
		8	0.008	27,200	630	25	24,000	520	21	22,400	420	17	20,160	380	15	19,040	300	12
0.4	**0.8**	**1**	0.08	34,000	1,090	43	30,000	900	35	28,000	780	31	25,200	710	28	23,800	550	22
		1.5	0.08	34,000	1,090	43	30,000	900	35	28,000	780	31	25,200	710	28	23,800	550	22
		2	0.064	34,000	1,090	43	30,000	900	35	28,000	780	31	25,200	710	28	23,800	550	22
		2.5	0.06	34,000	1,090	43	30,000	900	35	28,000	780	31	25,200	710	28	23,800	550	22
		3	0.055	34,000	1,090	43	30,000	900	35	28,000	780	31	25,200	710	28	23,800	550	22

Work material				1			2			3			4			5		
				Pre-hardened Steels (35～45HRC)			Hardened Steels (45～55HRC)			Hardened Steels (55～65HRC)			Hardened Steels (65～68HRC)			Hardened Steels (68～72HRC)		
Ratio to standard depth of cut				100%			85%			80%			65%			55%		
Ball Radius **RE** (mm)	Tool dia. **DC** (mm)	Under neck length **LU** (mm)	**APMX** (mm)	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM
0.4	0.8	**4**	0.045	34,000	1,090	43	30,000	900	35.4	28,000	780	30.7	25,200	710	28	23,800	550	21.7
		5	0.036	30,600	880	34.6	27,000	730	28.7	25,200	640	25.2	22,680	570	22.4	21,420	450	17.7
		6	0.026	30,600	880	34.6	27,000	730	28.7	25,200	640	25.2	22,680	570	22.4	21,420	450	17.7
		8	0.016	27,200	780	31	24,000	650	26	22,400	560	22	20,160	510	20	19,040	400	16
		10	0.008	27,200	740	29	24,000	610	24	22,400	530	21	20,160	480	19	19,040	370	15
		12	0.006	27,200	740	29	24,000	610	24	22,400	530	21	20,160	480	19	19,040	370	15
0.45	0.9	**2**	0.072	32,300	1,220	48	28,500	1,000	39	26,600	890	35	23,940	800	31.5	22,610	620	24.4
		4	0.046	32,300	1,220	48	28,500	1,000	39	26,600	890	35	23,940	800	32	22,610	620	24
		6	0.034	29,070	980	39	25,650	810	32	23,940	720	28	21,550	650	26	20,350	510	20
		8	0.024	25,840	880	35	22,800	720	28	21,280	640	25	19,150	580	23	18,090	450	18
0.5	1	**1.5**	0.09	30,600	1,380	54	27,000	1,130	45	25,200	1,010	40	22,680	910	36	21,420	710	28
		2	0.08	30,600	1,380	54	27,000	1,130	45	25,200	1,010	40	22,680	910	36	21,420	710	28
		2.5	0.08	30,600	1,380	54	27,000	1,130	45	25,200	1,010	40	22,680	910	35.8	21,420	710	28
		3	0.08	30,600	1,380	54	27,000	1,130	45	25,200	1,010	40	22,680	910	35.8	21,420	710	28
		4	0.056	30,600	1,380	54	27,000	1,130	45	25,200	1,010	40	22,680	910	35.8	21,420	710	28
		5	0.048	30,600	1,380	54	27,000	1,130	45	25,200	1,010	40	22,680	910	35.8	21,420	710	28
		6	0.032	27,540	1,120	44	24,300	920	36.2	22,680	820	32.3	20,410	730	28.7	19,280	570	22.4
		7	0.032	27,540	1,120	44	24,300	920	36.2	22,680	820	32.3	20,410	730	28.7	19,280	570	22.4
		8	0.032	27,540	1,120	44	24,300	920	36.2	22,680	820	32.3	20,410	730	28.7	19,280	570	22.4
		9	0.024	27,540	1,120	44	24,300	920	36.2	22,680	820	32.3	20,410	730	28.7	19,280	570	22.4
		10	0.02	27,540	1,120	44	24,300	920	36.2	22,680	820	32.3	20,410	730	28.7	19,280	570	22.4
		12	0.01	24,480	940	37	21,600	770	30.3	20,160	690	27.2	18,140	620	24.4	17,140	480	18.9
		13	0.009	24,480	940	37	21,600	770	30	20,160	690	27	18,140	620	24	17,140	480	19
		14	0.008	24,480	940	37	21,600	770	30	20,160	690	27	18,140	620	24	17,140	480	19
		16	0.006	24,480	940	37	21,600	770	30	20,160	690	27	18,140	620	24	17,140	480	19
		18	0.005	21,420	770	30	18,900	640	25	17,640	560	22	15,880	510	20.1	14,990	400	15.7
		20	0.004	18,360	660	26	16,200	540	21	15,120	480	18.9	13,610	440	17.3	12,850	340	13.4
0.55	1.1	**2**	0.08	28,560	1,300	51	25,200	1,090	43	23,520	970	38	21,170	870	34	19,990	680	27
		4	0.056	28,560	1,300	51	25,200	1,090	43	23,520	970	38	21,170	870	34	19,990	680	27
		6	0.032	26,010	1,090	43	22,950	920	36	21,420	810	32	19,280	730	29	18,210	570	22
		8	0.032	26,010	1,090	43	22,950	920	36	21,420	810	32	19,280	730	29	18,210	570	22
		10	0.02	26,010	1,090	43	22,950	920	36	21,420	810	32	19,280	730	28.7	18,210	570	22.4
0.6	1.2	**2**	0.077	26,150	1,210	48	23,080	1,000	39	21,540	890	35	19,380	800	31.5	18,310	620	24.4
		3	0.077	26,150	1,210	48	23,080	1,000	39	21,540	890	35	19,380	800	31.5	18,310	620	24.4
		4	0.064	26,150	1,210	48	23,080	1,000	39	21,540	890	35	19,380	800	32	18,310	620	24
		6	0.048	26,150	1,210	48	23,080	1,000	39	21,540	890	35	19,380	800	31.5	18,310	620	24.4
		8	0.032	24,480	1,220	48	21,600	950	37.4	20,160	810	31.9	18,140	730	28.7	17,140	560	22
		10	0.028	24,480	1,100	43	21,600	860	34	20,160	730	29	18,140	650	26	17,140	510	20
		12	0.024	24,480	1,100	43	21,600	860	34	20,160	730	29	18,140	650	26	17,140	510	20
0.7	1.4	**3**	0.088	21,420	1,160	46	18,900	980	39	17,640	880	35	15,880	790	31	14,990	620	24
		8	0.044	21,420	1,160	46	18,900	980	39	17,640	880	35	15,880	790	31	14,990	620	24
		12	0.028	21,420	1,040	41	18,900	890	35	17,640	790	31	15,880	720	28	14,990	560	22
		16	0.014	19,040	870	34	16,800	740	29	15,680	670	26	14,110	600	24	13,330	470	19
0.75	1.5	**2**	0.096	23,800	1,430	56	21,000	1,130	45	19,600	980	39	17,640	880	35	16,660	690	27
		2.5	0.096	23,800	1,430	56	21,000	1,130	45	19,600	980	39	17,640	880	35	16,660	690	27
		3	0.096	23,800	1,430	56	21,000	1,130	45	19,600	980	38.6	17,640	880	34.6	16,660	690	27.2
		4	0.08	23,800	1,430	56	21,000	1,130	45	19,600	980	38.6	17,640	880	34.6	16,660	690	27.2
		5	0.08	23,800	1,430	56	21,000	1,130	45	19,600	980	38.6	17,640	880	34.6	16,660	690	27.2
		6	0.08	23,800	1,430	56	21,000	1,130	45	19,600	980	38.6	17,640	880	34.6	16,660	690	27.2
		8	0.048	21,420	1,160	46	18,900	920	36.2	17,640	790	31.1	15,880	720	28.3	14,990	560	22
		10	0.048	21,420	1,160	46	18,900	920	36	17,640	790	31	15,880	720	28	14,990	560	22
		12	0.048	21,420	1,160	46	18,900	920	36	17,640	790	31	15,880	720	28	14,990	560	22
		14	0.04	19,040	970	38	16,800	770	30	15,680	670	26.4	14,110	600	23.6	13,330	470	18.5
		16	0.015	19,040	970	38.2	16,800	770	30.3	15,680	670	26.4	14,110	600	23.6	13,330	470	18.5
		18	0.015	19,040	970	38	16,800	770	30	15,680	670	26	14,110	600	24	13,330	470	19
		20	0.015	19,040	970	38	16,800	770	30	15,680	670	26	14,110	600	23.6	13,330	470	18.5
0.8	1.6	**4**	0.11	22,100	1,370	54	19,500	1,170	46	18,200	1,020	40	16,380	920	36.2	15,470	710	28
		8	0.088	22,100	1,370	54	19,500	1,170	46	18,200	1,020	40	16,380	920	36.2	15,470	710	28
		12	0.052	19,890	1,110	44	17,550	950	37.4	16,380	830	32.7	14,740	740	29.1	13,920	580	22.8
		16	0.032	19,890	1,110	44	17,550	950	37	16,380	830	33	14,740	740	29	13,920	580	23
		20	0.016	17,680	930	37	15,600	800	32	14,560	690	27	13,100	620	24	12,380	490	19
0.9	1.8	**4**	0.147	22,100	1,550	61	19,500	1,290	51	18,200	1,090	43	16,380	980	39	15,470	760	30
		8	0.104	22,100	1,550	61	19,500	1,290	51	18,200	1,090	43	16,380	980	39	15,470	760	30
		12	0.056	19,890	1,250	49	17,550	1,040	41	16,380	890	35	14,740	800	32	13,920	620	24
		16	0.036	19,890	1,250	49	17,550	1,040	41	16,380	890	35	14,740	800	32	13,920	620	24
		20	0.018	17,680	1,050	41	15,600	880	35	14,560	740	29	13,100	670	26	12,380	520	21
1	2	**2.5**	0.16	17,850	1,610	63	15,750	1,360	54	14,700	1,180	47	13,230	1,060	42	12,500	820	32
		3	0.16	17,850	1,610	63	15,750	1,360	54	14,700	1,180	47	13,230	1,060	42	12,500	820	32
		4	0.16	17,850	1,610	63	15,750	1,360	54	14,700	1,180	47	13,230	1,060	42	12,500	820	32
		5	0.16	17,850	1,610	63	15,750	1,360	54	14,700	1,180	47	13,230	1,060	42	12,500	820	32
		6	0.16	17,850	1,430	56	15,750	1,200	47	14,700	1,060	42	13,230	950	37.4	12,500	740	29.1
		8	0.112	17,850	1,430	56	15,750	1,200	47	14,700	1,060	42	13,230	950	37.4	12,500	740	29.1
		10	0.112	17,850	1,290	51	15,750	1,070	42	14,700	940	37	13,230	850	33.5	12,500	660	26

【Note】 Upon usage, please refer to comments and notes below table on page 14.

Recommended Cutting Conditions

High efficiency cuttiing condition

High accuracy cuttiing condition

Please refer to P.9 about high efficiency cutting conditions

Work material				1			2			3			4			5		
				Pre-hardened Steels (35～45HRC)			Hardened Steels (45～55HRC)			Hardened Steels (55～65HRC)			Hardened Steels (65～68HRC)			Hardened Steels (68～72HRC)		
Ratio to standard depth of cut				100%			85%			80%			65%			55%		
Ball Radius **RE** (mm)	Tool dia. **DC** (mm)	Under neck length **LU** (mm)	**APMX** (mm)	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM	Revolution n min^{-1}	Tabel feed Feed rate V_f mm/min	IPM
1	2	**12**	0.064	16,070	1,160	46	14,180	960	38	13,230	850	33.5	11,910	760	29.9	11,250	590	23.2
		13	0.064	16,070	1,160	46	14,180	960	38	13,230	850	33.5	11,910	760	29.9	11,250	590	23.2
		14	0.064	16,070	1,160	46	14,180	960	38	13,230	850	33.5	11,910	760	29.9	11,250	590	23.2
		16	0.064	16,070	1,040	41	14,180	870	34	13,230	760	29.9	11,910	690	27.2	11,250	530	20.9
		18	0.048	16,070	1,040	41	14,180	870	34	13,230	760	29.9	11,910	690	27.2	11,250	530	20.9
		20	0.04	16,070	1,040	41	14,180	870	34	13,230	760	29.9	11,910	690	27.2	11,250	530	20.9
		22	0.034	15,170	930	37	13,390	770	30	12,500	680	26.8	11,250	610	24	10,620	480	18.9
		25	0.028	14,280	870	34	12,600	730	29	11,760	640	25.2	10,580	580	22.8	10,000	450	17.7
		30	0.012	14,280	870	34	12,600	730	29	11,760	640	25.2	10,580	580	22.8	10,000	450	17.7
		35	0.01	12,500	720	28	11,030	600	24	10,290	530	20.9	9,260	470	18.5	8,750	370	14.6
		40	0.008	10,710	620	24	9,450	510	20	8,820	450	17.7	7,940	410	16.1	7,500	320	12.6
1.25	2.5	**6**	0.2	15,730	1,690	67	13,880	1,370	54	12,950	1,130	45	11,660	1,010	40	11,070	810	32
		10	0.136	15,730	1,690	67	13,880	1,370	54	12,950	1,130	45	11,660	1,010	40	11,070	810	32
		15	0.08	14,150	1,370	54	12,490	1,110	44	11,660	910	36	10,490	820	32	9,970	660	26
		20	0.064	14,150	1,370	54	12,490	1,110	44	11,660	910	36	10,490	820	32	9,970	660	26
		25	0.052	14,150	1,230	48	12,490	1,000	39	11,660	820	32	10,490	740	29	9,970	590	23
		30	0.035	12,580	1,150	45	11,100	930	37	10,360	770	30	9,320	690	27	8,860	550	22
1.5	3	**6**	0.24	13,600	1,820	72	12,000	1,510	59	11,200	1,340	53	10,080	1,210	48	9,580	970	38
		8	0.24	13,600	1,820	72	12,000	1,510	59	11,200	1,340	53	10,080	1,210	48	9,580	970	38
		10	0.168	13,600	1,820	72	12,000	1,510	59	11,200	1,340	53	10,080	1,210	48	9,580	970	38
		13	0.168	13,600	1,820	72	12,000	1,510	59	11,200	1,340	53	10,080	1,210	48	9,580	970	38
		16	0.168	13,600	1,640	65	12,000	1,360	54	11,200	1,210	48	10,080	1,090	43	9,580	870	34
		20	0.096	12,240	1,480	58	10,800	1,230	48	10,080	1,090	43	9,070	980	39	8,620	780	31
		25	0.064	12,240	1,480	58	10,800	1,230	48	10,080	1,090	43	9,070	980	39	8,620	780	31
		30	0.064	12,240	1,480	58	10,800	1,230	48	10,080	1,090	43	9,070	980	39	8,620	780	31
		35	0.051	10,880	1,240	49	9,600	1,030	41	8,960	910	36	8,060	820	32	7,660	660	26
1.75	3.5	**10**	0.216	11,690	1,760	69	10,310	1,430	56	9,630	1,180	47	8,660	1,060	42	8,230	850	34
		15	0.192	11,690	1,760	69	10,310	1,430	56	9,630	1,180	47	8,660	1,060	42	8,230	850	34
		25	0.112	10,520	1,430	56	9,280	1,160	46	8,660	950	37	7,800	860	34	7,410	680	27
		35	0.072	10,520	1,430	56	9,280	1,160	46	8,660	950	37	7,800	860	34	7,410	680	27
		45	0.058	9,350	1,200	47	8,250	980	39	7,700	800	32	6,930	720	28	6,580	580	23
2	4	**8**	0.32	9,780	1,760	69	8,630	1,470	58	8,050	1,290	51	7,250	1,160	46	6,880	930	37
		10	0.32	9,780	1,760	69	8,630	1,470	58	8,050	1,290	51	7,250	1,160	46	6,880	930	37
		12	0.256	9,780	1,760	69	8,630	1,470	58	8,050	1,290	51	7,250	1,160	46	6,880	930	37
		13	0.256	9,780	1,760	69	8,630	1,470	58	8,050	1,290	51	7,250	1,160	46	6,880	930	37
		16	0.224	9,780	1,760	69	8,630	1,470	58	8,050	1,290	51	7,250	1,160	46	6,880	930	37
		20	0.224	9,780	1,760	69	8,630	1,470	58	8,050	1,290	51	7,250	1,160	46	6,880	930	37
		25	0.128	8,800	1,430	56	7,760	1,190	47	7,250	1,040	41	6,520	940	37	6,190	750	30
		30	0.128	8,800	1,430	56	7,760	1,190	47	7,250	1,040	41	6,520	940	37	6,190	750	30
		35	0.08	8,800	1,430	56	7,760	1,190	47	7,250	1,040	41	6,520	940	37	6,190	750	30
		40	0.08	8,800	1,430	56	7,760	1,190	47	7,250	1,040	41	6,520	940	37	6,190	750	30
		45	0.064	7,820	1,200	47	6,900	1,000	39	6,440	880	35	5,800	790	31	5,510	630	25
		50	0.056	7,820	1,200	47	6,900	1,000	39	6,440	880	35	5,800	790	31	5,510	630	25
2.5	5	**10**	0.392	7,650	1,530	60	6,750	1,350	53	6,300	1,130	45	5,670	1,020	40	5,390	820	32
		20	0.28	7,650	1,530	60	6,750	1,350	53	6,300	1,130	45	5,670	1,020	40	5,390	820	32
		25	0.28	7,650	1,530	60	6,750	1,350	53	6,300	1,130	45	5,670	1,020	40	5,390	820	32
		30	0.16	6,890	1,380	54	6,080	1,220	48	5,670	1,020	40	5,100	920	36	4,850	740	29
		40	0.16	6,890	1,240	49	6,080	1,090	43	5,670	920	36	5,100	830	33	4,850	660	26
3	6	**12**	0.48	7,650	1,890	74	6,750	1,540	61	6,300	1,260	50	5,670	1,130	45	5,390	910	36
		20	0.4	7,230	1,660	65	6,380	1,350	53	5,950	1,110	44	5,360	990	39	5,090	800	32
		30	0.336	6,800	1,360	54	6,000	1,200	47	5,600	1,010	40	5,040	910	36	4,790	730	29
		50	0.12	6,120	1,100	43	5,400	970	38	5,040	820	32	4,540	730	29	4,310	590	23
4	**8**	**24**	0.5	6,400	1,690	67	5,720	1,320	52	4,180	1,170	46	3,960	870	34	3,760	700	28
5	**10**	**30**	0.6	5,100	1,460	58	4,510	1,130	45	3,520	1,000	39	3,190	770	30	3,030	620	24
6	**12**	**36**	0.8	4,200	1,240	49	3,850	1,000	39	2,640	880	35	2,640	660	26	2,510	530	21

※(1) a_p is shown as the criteria for Group 1 workpieces. For other groups, adjust the cutting depth according to the cutting depth factors in the above table.
※(2) When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc., cutting depth setting should be set by multiplying a cutting depth factor to calculate the cutting depth amount, and this amount should then be reduced to 80% of the calculated value.
※(3) Adjust by setting a_e to (3 to 5)×(a_p)×(cutting depth ratio). When performing finishing processing, calculate the theoretical cusp height and set accordingly.

Cutting depth setting example: When cutting rib groove contours in hardened steel (50HRC) using an EPDBEH2020-10-TH3 tool:
Cutting depth = 0.112 (a_p) × 0.85 (cutting depth factor for Group 2 hardened steel) × 0.8 (for closed-area cutting) = 0.076mm

【Note】

① Although basically dry (air blow) cutting is recommended, please use appropriate coolant according to the work material and machining shape.
② These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
③ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

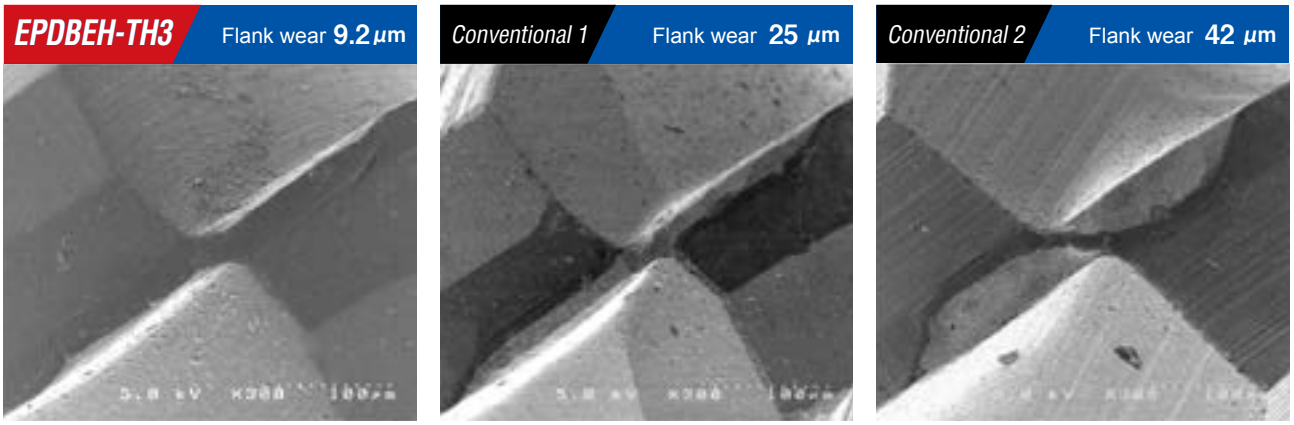
Application example

Pocketing of High-speed steel cutting

01 Direct cutting of powdered high-speed steel 【65HRC】

Tool：EPDBEH2010-3-TH3　Work material：Powdered High Speed Steel 65HRC　Machine：Vertical MC（HSK-F63）
Cutting method：Contour pocketing
Cutting conditions：n=24,000min^{-1}(v_c=75m/min)　v_f=860mm/min(f_z=0.018mm/t)　a_p 0.04mm　a_e 0.04mm　Dry(Air-blow)

Figure　Wear condition after 30 minutes of machining

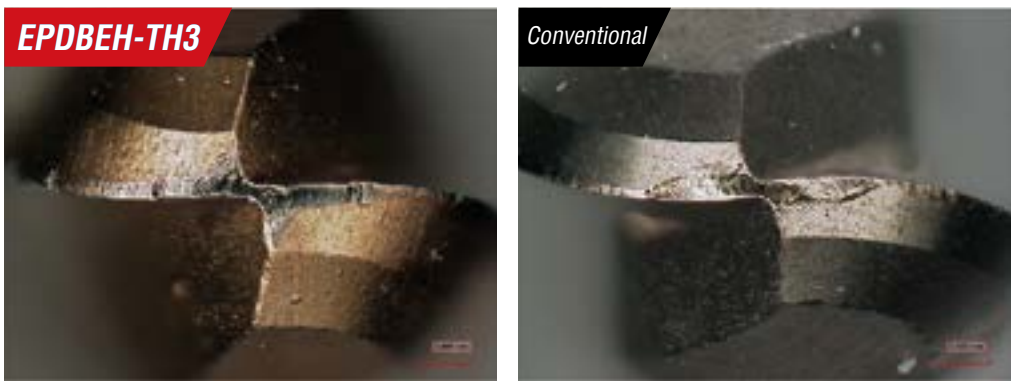


Wear amount is 1/3 that of conventional products!!
Demonstrates excellent wear resistance.

02 Pocketing of matrix high-speed steel 【58HRC】

Pocket size：12.8×10.8×5mm
Tool：EPDBEH2010-6-TH3　Work material：Matrix high-speed steel 58HRC　Machine： Vertical MC (HSK-E32)
Cutting conditions：n=22,600min^{-1}(v_c=71m/min)　v_f=820mm/min(f_z=0.018mm/t)
a_p 0.025mm　a_e 0.125mm　OH=18mm　Coolant：Mist blow

Figure　Wear condition after 60 minutes of machining



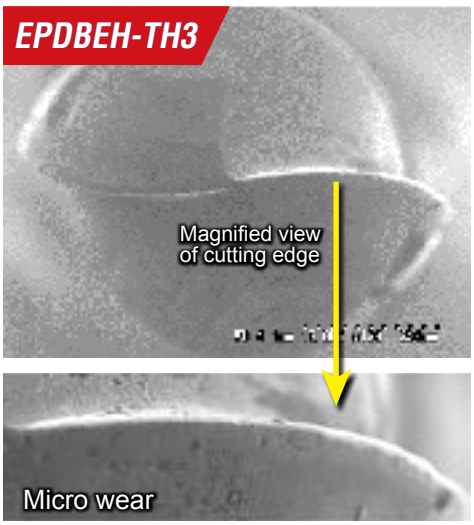
The amount of wear was only 11μm
even after processing for 1 hour.

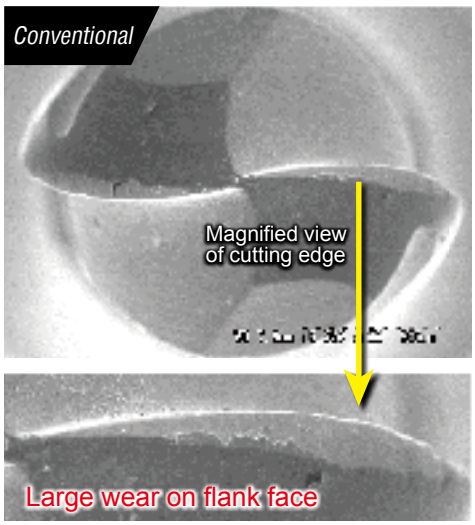
Application example

High-speed steel cutting

03 Dissolution high-speed steel 【62-63HRC】

Tool：EPDBEH2010-2-TH3　Work material：Dissolution high-speed steel（62-63HRC）　Machine：5-axis MC(BT40)
Cutting conditions：n=17,000min^{-1}(v_c=53m/min)　v_f=800mm/min(f_z=0.04mm/t)
a_p 0.023mm　a_e 0.05mm　Stock material 0.015mm　Coolant：Mist blow
Cutting time：45min





Plastic mold steel cutting

01 Cutting of equivalent to 420 Stainless Steel 【Relief engraving of "TH3"】

Machine: Vertical MC(HSK-E25)　Work material：420 Stainless Steel（57HRC）　Coolant：Mist-blow

Figure Wear condition after finishing

(R0.75-Under neck length 2mm)

Figure Work

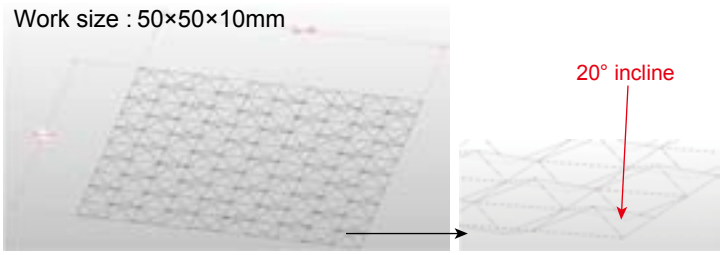
Work size : 50×50×10mm

Process	Item code	Tool dia. (mm)	Under neck length (mm)	Revolution (min^{-1})	Cutting speed (m/min)	Feed rate (mm/min)	Feed per tooth (mm/t)	a_p (mm)	a_e (mm)	Cutting time
Roughing	EPDBEH2030-8-TH3	ϕ3.0	8	21,221	100	2,122	0.05	0.2	0.4	38 min
Finishing	EPDBEH2015-2-TH3	ϕ1.5	2	40,000	188	2,400	0.03	0.04	0.104	76 min

Total 1hr 54 min

02 High speed cutting of equivalent to 440C Stainless Steel

Figure Work shape



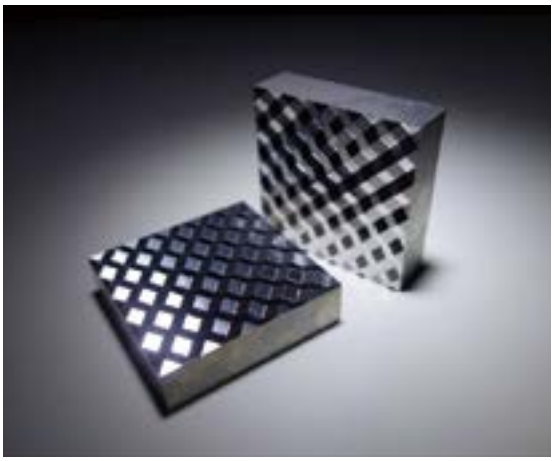
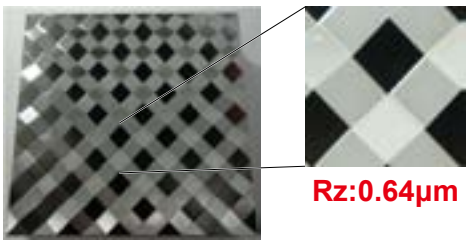


Figure Magnified view

Surface roughness of 20° incline



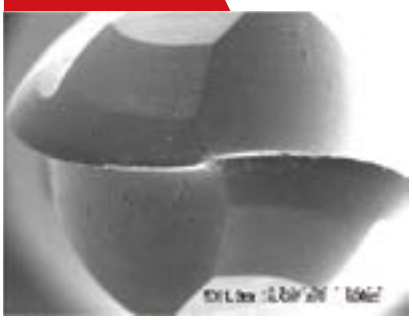
Machine: Vertical MC(HSK-E25) 440C Stainless Steel (60HRC) Coolant：Mist-blow

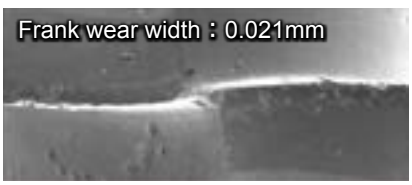
Process	Item code	Tool dia. (mm)	Under neck length (mm)	Revolution (min^{-1})	Cutting speed (m/min)	Feed rate (mm/min)	Feed per tooth (mm/t)	a_p (mm)	a_e (mm)	Cutting time
Roughing	EPDBEH2030-8-TH3	ϕ3.0	8	10,610	100	1,061	0.05	0.3	0.3	60 min
Semi-finishing	EPDBEH2030-8-TH3	ϕ3.0	8	15,915	150	1,592	0.05	0.1	0.1	28 min
Finishing	EPDBEH2010-2-TH3	ϕ1.0	2	31,831	100	1,910	0.03	0.03	0.03	56 min
									Total	**2hr 24 min**

03 Equivalent to 440C Stainless Steel (M 340) 【57HRC】

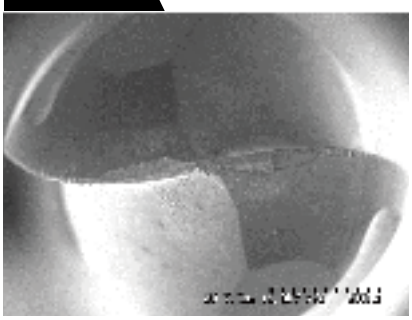
Tool：EPDBEH2020-10-TH3 Work material：440C Stainless Steel（57HRC） Machine：Vertical MC (HSK-E32)
Cutting conditions：n=15,000min^{-1}(v_c=94m/min) v_f=600mm/min(f_z=0.02mm/t) a_p 0.12mm a_e 0.15mm Coolant：Mist blow
Cutting time：180min

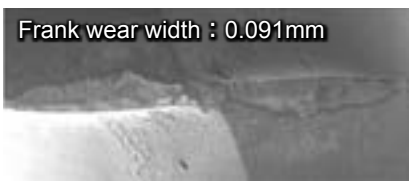
EPDBEH-TH3





Conventional





Multi-cavity model pocketing

Figure Work shape

Pocket size: 8mm×8mm×depth 5mm

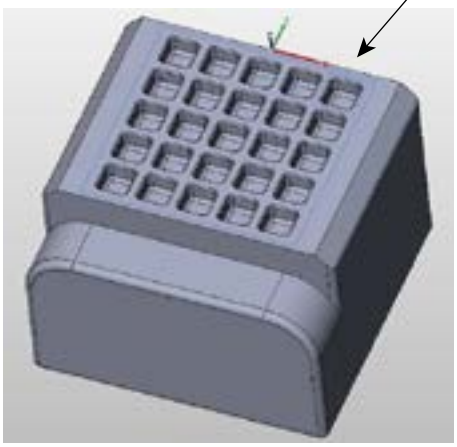


Figure Work after machining

Processed total 100 of pockets

Machine : 5-axsis MC(HSK-A63)　Work material : Equivalent to 420 Stainless Steel (52HRC)
Coolant : Dry(air)

Process	Item code	Tool dia. (mm)	Revolution (min^{-1})	Cutting speed (m/min)	Feed rate (mm/min)	Feed per tooth (mm/t)	a_p (mm)	a_e (mm)	Removal stock (mm)	Cutting time
Contour roughing	EPDBEH2030-8-TH3	ϕ3.0	11,200	105	1,344	0.06	0.3	0.7	0.05	47 min
Contour semi finishing	EPDBEH2020-6-TH3	ϕ2.0	14,700	92	1,058	0.035	0.2	–	0.02	25 min
Contour finishing	EPDBEH2020-6-TH3	ϕ2.0	14,700	92	1,058	0.035	0.1	0.02	0	37 min
Contour bottom finishing	EPDBEH2020-6-TH3	ϕ2.0	14,700	92	1,058	0.035	–	0.02	0	49 min

※Cutting time per work (25 pockets)

■ Tool wear condition

EPDBEH2020-6-TH3

Flank wear width : 0.023mm

■ Amount of cutting remain

Measures pocket width

Cutting remain per one side :
0.0035 ㎜～ 0.012 ㎜
(variation in 100 pockets: 0.0085 ㎜)

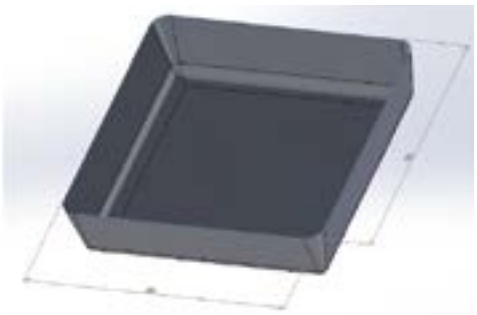
Finalized semi-finishing and finishing by 1 tool.
Machining time is 7 hours and 24 minutes!

Cutting remain is very small, only 0.012mm and achieved very precise machining.

Pocketing of powder high-speed steel

Machine : Vertical MC (HSK-E32)
Work material : Powdered high-speed steel (65HRC)
Coolant : Mist-blow

Figure Work shape

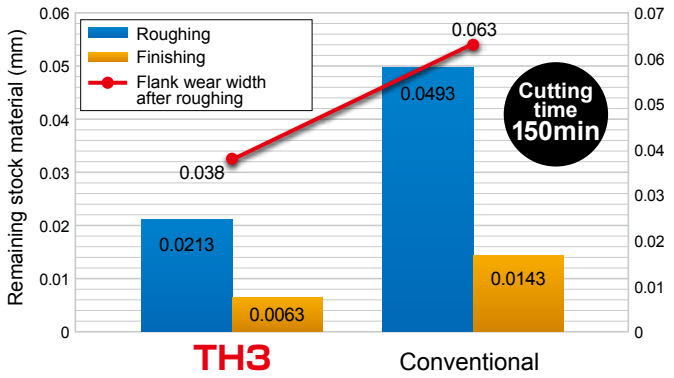


Pocket size : 20×20×5mm (Incline angle 10°)

Process	Item code	Tool dia. (mm)	Revolution (min^{-1})	Cutting speed (m/min)	Feed rate (mm/min)	Feed per tooth (mm/t)	a_p (mm)	a_e (mm)	Removal stock (mm)	Cutting time
Contour roughing	EPDBEH2030-8-TH3	ϕ3.0	11,200	106	1,344	0.06	0.18	0.18	0.05	39 min
Contour finishing	EPDBEH2020-6-TH3	ϕ2.0	22,680	143	816	0.018	0.02	0.02	0	20 min
Parallel finishing	EPDBEH2020-6-TH3	ϕ2.0	22,680	143	816	0.018	0.02	0.02	0	16 min
									Total	**75 min**

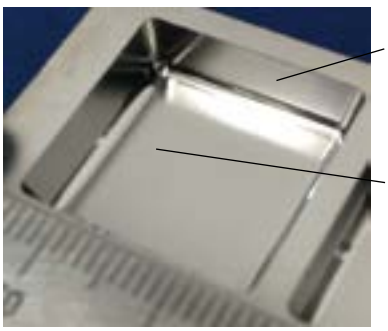
■ Comparison of cutting remain

Figure Correlation chart of cutting remain and tool wear after 2 pockets processing



■ Machined surface roughness

Figure Work after 2 pocketing



Hi-Pre² The synergy of the superior wear resistance of TH3 coating and high-rigidity cutting edge geometry reduces the cutting remain on direct cutting of powder high-speed steel and realizes good machined surface roughness

Hi-Pre² = "**Hi**gh **Pre**cision **Pre**-finishing"

⚠ Safety notes

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) 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 thelocal laws and regulations regarding prevention of hazards due to specified chemical substances.

MITSUBISHI MATERIALS U.S.A.

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DIA EDGE MOLDINO The Edge To Innovation

California Office [Headquarters]

3535 Hyland Avenue, Suite 200
Costa Mesa, CA 92626
Customer Service: 800.523.0800
Technical Service: 800.486.2341

Detroit Office [MOLDINO Products Customer Service]

41700 Gardenbrook Road, Suite 120
Novi, MI 48375
Main: 248.308.2620
Fax: 248.308.2627
Email: rfqHTdiv@mmus.com (MOLDINO Product & Techinical Inquiry)

Toronto Office [Canada Branch]

3535 Laird Road
Units 15 & 16
Mississauga, Ontario, Canada L5L 5Y7
Main: 905.814.0240
Fax: 905.814.0245

MMC Metal de Mexico, S.A. DE C.V.

Av. La Cañada No.16,
Parque Industrial Bernardo
Quintana, El Marques,
Queretaro C.P. 76246 MEXICO
Main: +52.442.221.61.36
Fax: +52.442.221.61.34

Chicago Office [Engineering]

1314B North Plum Grove Road
Schaumburg, IL 60173
Main: 847.252.6300
Fax: 847.519.1732

North Carolina-MTEC [Marketing & Technical Center]

105 Corporate Center Drive, Suite A
Mooresville, NC 28117
Main: 980.312.3100
Fax: 704.746.9292

MOLDINO Tool Engineering, Ltd.
www.moldino.com/en-US/

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