Epoch Deep Ball Evolution
エポックディープボールエボリューション

■ 標準切削条件表 Recommended cutting conditions EPDBE-PN EPDBE-ATH

高能率切削条件 High efficiency cuttiing condition

高精度切削条件 High accuracy cuttiing condition

高精度切削条件はA75 ページを参照してください。
Please refer to P.A75 about high accuracy cutting conditions

推奨領域 Recommended range				PNシリーズ PN series / ATHシリーズ ATH series											
被削材 Work material				1		2		3		4		5		6	
				銅 Copper		炭素鋼・合金鋼 Carbon Steels, Alloy Steels (180~250HB)		ステンレス鋼・工具鋼 Stainless Steels, Tool Steels (25~35HRC)		プリハードン鋼 Pre-hardened Steels (35~45HRC)		焼入れ鋼 Hardened Steels (45~55HRC)		焼入れ鋼 Hardened Steels (55~65HRC)	
切込み比率 Ratio to standard depth of cut				120%		100%		90%		80%		65%		60%	
ボール半径R Ball Radius (mm)	外径 Tool Dia. (mm)	首下長 Under neck Length (mm)	ap (mm)	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min
0.05	0.1	0.2	0.008	50,000	300	50,000	250	50,000	250	50,000	225	50,000	200	50,000	188
		0.3	0.006	50,000	300	50,000	250	50,000	250	50,000	225	50,000	200	50,000	188
		0.5	0.004	50,000	300	50,000	250	50,000	250	50,000	225	50,000	200	50,000	188
0.1	0.2	0.5	0.02	50,000	420	50,000	350	50,000	350	50,000	325	45,500	273	42,000	210
		0.75	0.017	50,000	420	50,000	350	50,000	350	50,000	325	45,500	273	42,000	210
		1	0.014	50,000	420	50,000	350	50,000	350	50,000	325	45,500	273	42,000	210
		1.25	0.011	50,000	378	50,000	315	48,600	306	45,900	269	40,500	219	37,800	170
		1.5	0.008	50,000	378	50,000	315	48,600	306	45,900	269	40,500	219	37,800	170
		2	0.008	50,000	378	50,000	315	48,600	306	45,900	269	40,500	219	37,800	170
		2.5	0.006	48,000	323	48,000	269	43,200	242	40,800	212	36,000	173	33,600	134
		3	0.004	48,000	323	48,000	269	43,200	242	40,800	212	36,000	173	33,600	134
0.15	0.3	0.5	0.027	50,000	600	50,000	500	50,000	500	50,000	450	45,000	383	42,000	336
		0.75	0.024	50,000	600	50,000	500	50,000	500	50,000	450	45,000	383	42,000	336
		1	0.021	50,000	600	50,000	500	50,000	500	50,000	450	45,000	383	42,000	336
		1.25	0.019	50,000	600	50,000	500	50,000	500	50,000	450	45,000	383	42,000	336
		1.5	0.016	50,000	600	50,000	500	50,000	500	50,000	450	45,000	383	42,000	336
		2	0.012	50,000	540	50,000	450	48,600	437	45,900	372	40,500	310	37,800	272
		2.5	0.01	50,000	540	50,000	450	48,600	437	45,900	372	40,500	310	37,800	272
		3	0.008	50,000	540	50,000	450	48,600	437	45,900	372	40,500	310	37,800	272
0.2	0.4	0.75	0.043	50,000	967	50,000	840	50,000	839	50,000	770	46,800	655	43,680	612
		1	0.04	50,000	967	50,000	840	50,000	839	50,000	770	46,800	655	43,680	612
		1.5	0.034	50,000	829	50,000	720	50,000	719	50,000	660	46,800	468	43,680	437
		2	0.028	50,000	691	50,000	600	50,000	600	50,000	550	46,800	468	43,680	437
		2.5	0.022	50,000	560	43,200	467	38,880	420	36,720	364	32,400	292	36,288	272
		3	0.016	50,000	560	43,200	467	38,880	420	36,720	364	32,400	292	36,288	272
		3.5	0.012	50,000	560	43,200	467	38,880	420	36,720	364	32,400	292	36,288	272
		4	0.01	50,000	560	43,200	467	38,880	420	36,720	364	32,400	292	36,288	272
		4.5	0.008	46,080	470	38,400	392	34,560	353	32,640	305	28,800	245	26,880	228
0.25	0.5	1	0.045	50,000	1,500	50,000	1,500	46,800	1,404	44,200	1,193	39,000	1,053	36,400	743
		1.5	0.04	50,000	1,500	50,000	1,500	46,800	1,404	44,200	1,193	39,000	1,053	36,400	681
		2	0.035	50,000	1,200	50,000	1,200	46,800	1,123	44,200	955	39,000	842	36,400	681
		2.5	0.033	50,000	1,081	50,000	1,000	42,120	758	39,780	645	35,100	568	32,760	502
		3	0.03	50,000	900	46,800	842	42,120	758	39,780	645	35,100	568	25,200	386
		4	0.02	43,200	778	36,000	648	32,400	583	30,600	496	32,400	524	25,200	386
		5	0.018	43,200	778	36,000	648	32,400	583	30,600	496	32,400	524	25,200	386
		5.5	0.015	38,400	653	32,000	544	28,800	490	27,200	416	24,000	367	22,400	324
		6	0.013	38,400	653	32,000	544	28,800	490	27,200	416	24,000	367	22,400	324
		8	0.008	38,400	653	32,000	544	28,800	490	27,200	416	24,000	367	22,400	324
0.3	0.6	1	0.075	50,000	2,250	50,000	2,250	50,000	2,250	50,000	1,950	48,000	1,728	44,800	1,344
		2	0.063	50,000	2,250	50,000	2,250	50,000	2,250	50,000	1,950	48,000	1,728	44,800	1,344
		2.5	0.046	50,000	1,800	50,000	1,800	50,000	1,800	50,000	1,560	48,000	1,382	44,800	986
		3	0.041	50,000	1,800	50,000	1,800	50,000	1,800	50,000	1,560	48,000	1,382	44,800	986
		3.5	0.035	50,000	1,710	50,000	1,710	50,000	1,709	48,960	1,452	43,200	1,183	40,320	843
		4	0.026	50,000	1,710	50,000	1,710	50,000	1,709	48,960	1,452	43,200	1,183	40,320	766
		4.5	0.022	50,000	1,350	50,000	1,350	48,600	1,313	45,900	1,074	40,500	875	37,800	681
		5	0.02	50,000	1,350	46,800	1,264	42,120	1,138	39,780	931	35,100	758	32,760	590
		5.5	0.017	50,000	1,350	46,800	1,264	42,120	1,138	39,780	931	35,100	758	32,760	590
		6	0.015	50,000	1,350	46,800	1,264	42,120	1,138	39,780	931	35,100	758	32,760	590
		7	0.015	38,400	979	32,000	816	28,800	881	27,200	601	24,000	490	22,400	495
		8	0.015	38,400	979	32,000	816	28,800	734	27,200	601	24,000	490	22,400	381
		9	0.012	38,400	979	32,000	816	28,800	734	27,200	601	24,000	490	22,400	381
		10	0.009	33,600	857	28,000	714	25,200	643	23,800	526	21,000	428	19,600	333
		12	0.007	28,800	691	24,000	576	21,600	518	20,400	424	18,000	346	16,800	269
0.35	0.7	2	0.092	50,000	2,475	50,000	2,475	50,000	2,475	50,000	2,155	48,000	1,932	42,000	1,188
		4	0.041	50,000	1,880	50,000	1,880	50,000	1,880	48,960	1,603	43,200	1,321	37,800	846
		6	0.027	50,000	1,485	46,800	1,390	42,120	1,251	39,780	1,028	35,100	848	30,240	641
		8	0.02	38,400	1,013	32,000	844	28,800	760	27,200	625	24,000	515	22,400	422

推奨領域 Recommended range				PNシリーズ PN series / ATHシリーズ ATH series											
被削材 Work				1 銅 Copper		2 炭素鋼・合金鋼 Carbon Steels, Alloy Steels (180~250HB)		3 ステンレス鋼・工具鋼 Stainless Steels, Tool Steels (25~35HRC)		4 プリハードン鋼 Pre-hardened Steels (35~45HRC)		5 焼入れ鋼 Hardened Steels (45~55HRC)		6 焼入れ鋼 Hardened Steels (55~65HRC)	
切込み比率 Ratio to standard depth of cut				120%		100%		90%		80%		65%		60%	
ボール半径 R (mm)	外径 Mill Dia. (mm)	首下長 Under neck Length (mm)	ap (mm)	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min
0.4	0.8	2	0.12	50,000	2,700	50,000	2,700	50,000	2,700	50,000	2,400	48,000	2,592	44,800	1,882
		4	0.078	50,000	2,700	50,000	2,700	50,000	2,700	50,000	2,400	48,000	2,592	44,800	1,882
		5	0.059	50,000	2,431	50,000	2,429	50,000	2,431	48,960	2,114	43,200	2,123	40,320	1,524
		6	0.042	50,000	2,269	50,000	2,267	45,360	2,058	42,840	1,727	37,800	1,429	35,280	1,245
		8	0.02	49,920	1,617	41,600	1,348	37,440	1,213	35,360	1,018	31,200	842	29,120	733
		10	0.02	38,400	1,175	32,000	979	28,800	881	27,200	740	24,000	612	22,400	533
0.45	0.9	2	0.135	50,000	3,197	50,000	3,197	50,000	3,197	50,000	2,821	45,600	2,411	42,560	2,138
		4	0.081	50,000	2,771	50,000	2,771	50,000	2,771	48,450	2,369	42,750	1,959	39,900	1,737
		6	0.05	50,000	2,302	47,880	2,020	43,092	1,818	40,698	1,515	35,910	1,253	33,516	1,111
		8	0.036	43,776	1,679	36,480	1,399	32,832	1,259	31,008	1,049	27,360	868	25,536	770
0.5	1	2	0.2	50,000	3,750	50,000	3,750	48,600	3,645	45,900	3,098	43,200	2,722	37,800	2,268
		3	0.2	50,000	3,750	50,000	3,750	48,600	3,645	45,900	3,098	43,200	2,722	37,800	2,268
		4	0.14	50,000	3,750	50,000	3,750	48,600	3,645	45,900	3,098	43,200	2,722	37,800	2,268
		5	0.09	50,000	3,500	46,800	3,276	42,120	2,948	39,780	2,596	43,200	2,540	32,760	1,835
		6	0.06	50,000	3,151	42,120	2,654	40,824	2,558	38,556	2,319	38,880	2,353	29,484	1,379
		7	0.06	46,656	2,100	38,880	1,750	34,992	1,574	33,048	1,338	31,590	1,323	27,216	1,061
		8	0.06	46,656	2,100	38,880	1,750	34,992	1,574	33,048	1,338	31,590	1,323	27,216	979
		9	0.045	46,656	2,100	38,880	1,750	34,992	1,574	33,048	1,338	31,590	1,323	27,216	979
		10	0.038	46,656	2,100	38,880	1,750	34,992	1,574	33,048	1,338	31,590	1,323	27,216	979
		12	0.025	34,560	1,469	28,800	1,224	25,920	1,102	24,480	936	21,600	771	20,160	685
		13	0.023	34,560	1,469	28,800	1,224	25,920	1,102	24,480	936	21,600	771	20,160	685
		14	0.02	34,560	1,469	28,800	1,224	25,920	1,102	24,480	936	21,600	771	20,160	685
		16	0.015	34,560	1,469	28,800	1,224	25,920	1,102	24,480	936	21,600	771	20,160	685
		18	0.012	30,240	1,210	25,200	1,008	22,680	907	21,420	771	18,900	635	17,640	564
		20	0.01	25,920	1,037	21,600	864	19,440	778	18,360	661	16,200	544	15,120	484
0.55	1.1	2	0.2	50,000	3,924	50,000	3,924	45,360	3,560	42,840	2,927	37,800	2,452	35,280	2,176
		4	0.14	50,000	3,924	50,000	3,924	45,360	3,560	42,840	2,927	37,800	2,452	35,280	2,176
		6	0.06	47,736	2,767	39,780	2,306	35,802	2,075	33,813	1,706	29,835	1,430	27,846	1,268
		8	0.06	47,736	2,306	39,780	2,306	35,802	1,729	31,212	1,312	27,540	1,100	25,704	975
		10	0.038	47,736	2,306	39,780	1,774	35,802	1,729	31,212	1,312	27,540	1,100	25,704	975
0.6	1.2	4	0.16	50,000	3,924	46,154	3,743	41,538	3,260	39,230	2,717	36,923	2,555	32,307	1,860
		6	0.11	44,928	2,570	37,440	2,142	33,696	2,103	31,824	2,069	30,240	2,062	26,208	1,048
		8	0.06	44,928	2,570	37,440	2,142	33,696	2,103	31,824	2,069	30,240	2,062	26,208	1,048
		10	0.053	41,472	1,940	34,560	1,708	31,104	1,456	29,376	1,322	27,000	1,069	24,192	871
		12	0.045	41,472	1,940	34,560	1,618	31,104	1,456	29,376	1,322	25,920	1,026	24,192	871
0.7	1.4	8	0.11	39,312	2,830	32,760	2,359	29,484	2,123	27,846	1,805	24,570	1,533	22,932	1,376
		12	0.053	36,288	1,960	30,240	1,633	27,216	1,470	25,704	1,249	22,680	1,062	21,168	953
		16	0.035	26,880	1,371	22,400	1,142	20,160	1,028	19,040	874	16,800	743	15,680	666
0.75	1.5	4	0.2	50,000	4,951	42,000	4,158	37,800	3,742	35,700	3,213	31,500	2,552	29,400	2,205
		6	0.2	50,000	4,951	42,000	4,158	37,800	3,742	35,700	3,213	31,500	2,552	29,400	2,205
		8	0.09	39,312	2,802	32,760	2,627	29,484	2,101	27,846	1,805	24,570	1,434	22,932	1,239
		10	0.09	36,288	2,586	30,240	2,156	27,216	1,940	25,704	1,666	22,680	1,323	21,168	1,143
		12	0.09	36,288	2,155	30,240	1,796	27,216	1,616	25,704	1,388	22,680	1,103	21,168	953
		14	0.075	32,256	1,810	30,240	1,796	24,192	1,357	22,848	1,165	20,160	925	18,816	799
		16	0.038	26,880	1,508	22,400	1,257	20,160	1,131	19,040	971	16,800	771	15,680	666
		18	0.038	26,880	1,508	22,400	1,257	20,160	1,131	19,040	971	16,800	771	15,680	666
		20	0.038	26,880	1,508	22,400	1,257	20,160	1,131	19,040	971	16,800	771	15,680	666
0.8	1.6	8	0.22	43,680	3,669	36,400	3,058	32,760	2,752	30,940	2,493	27,300	2,129	23,660	1,590
		12	0.098	39,312	3,467	32,760	2,889	29,484	2,601	27,846	2,176	24,570	1,858	21,294	1,289
		16	0.06	33,696	2,123	28,080	1,769	25,272	1,592	23,868	1,332	21,060	1,138	19,656	991
		20	0.04	24,960	1,485	20,800	1,238	18,720	1,114	17,680	932	15,600	796	14,560	693
0.9	1.8	8	0.26	40,560	3,894	33,800	3,245	30,420	2,920	28,730	2,413	25,350	2,008	23,660	1,704
		12	0.105	33,696	2,426	28,080	2,022	25,272	1,819	23,868	1,504	21,060	1,250	19,656	1,062
		16	0.068	33,696	2,426	28,080	2,022	25,272	1,819	23,868	1,504	21,060	1,250	19,656	1,062
		20	0.045	24,960	1,697	20,800	1,414	18,720	1,273	17,680	1,052	15,600	875	14,560	743
1	2	3	0.4	37,800	5,670	31,500	4,725	28,350	4,253	26,775	3,616	23,625	3,049	22,050	2,646
		4	0.4	37,800	5,670	31,500	4,725	28,350	4,253	26,775	3,616	23,625	3,049	22,050	2,646
		6	0.4	37,800	5,103	31,500	4,253	28,350	3,827	26,775	3,213	23,625	2,693	22,050	2,381
		8	0.28	37,800	5,103	31,500	4,253	28,350	3,827	26,775	3,213	23,625	2,693	22,050	2,381
		10	0.21	35,280	4,234	29,400	3,528	26,460	3,175	24,990	2,699	22,050	2,249	19,110	1,468

【注意】ご使用にあたっては、A74ページの表下の項目と注意を参照してください。【Note】Upon usage, please refer to comments and notes below table on page A74.

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エポックディープボールエボリューション

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高精度切削条件 High accuracy cuttiing condition

高精度切削条件はA75ページを参照してください。
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推奨領域 Recommended range				PNシリーズ PN series / ATHシリーズ ATH series											
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				銅 Copper		炭素鋼・合金鋼 Carbon Steels, Alloy Steels (180～250HB)		ステンレス鋼・工具鋼 Stainless Steels, Tool Steels (25～35HRC)		プリハードン鋼 Pre-hardened Steels (35～45HRC)		焼入れ鋼 Hardened Steels (45～55HRC)		焼入れ鋼 Hardened Steels (55～65HRC)	
切込み比率 Ratio to standard depth of cut				120%		100%		90%		80%		65%		60%	
ボール半径R Ball Radius (mm)	外径 Tool Dia. (mm)	首下長 Under neck Length (mm)	ap (mm)	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min
1	2	12	0.12	31,752	3,809	26,460	3,175	23,814	2,858	22,491	2,430	19,845	2,051	17,199	1,321
		13	0.12	31,752	3,809	26,460	3,175	23,814	2,858	22,491	2,430	19,845	2,024	15,876	1,016
		14	0.12	31,752	3,301	26,460	2,752	23,814	2,477	22,491	2,106	18,428	1,629	15,876	1,016
		16	0.12	29,484	2,123	24,570	1,769	22,113	1,593	20,885	1,353	18,428	1,467	15,876	914
		18	0.09	27,216	1,960	22,680	1,633	20,412	1,470	19,278	1,249	18,428	1,354	15,876	914
		20	0.075	27,216	1,960	22,680	1,633	20,412	1,470	19,278	1,249	18,428	1,128	15,876	914
		22	0.05	21,420	1,457	17,850	1,214	16,065	1,092	15,173	929	13,388	774	14,994	816
		25	0.05	20,160	1,371	16,800	1,142	15,120	1,028	14,280	874	12,600	728	14,112	768
		30	0.03	20,160	1,371	16,800	1,142	15,120	1,028	14,280	874	12,600	728	14,112	768
		35	0.025	17,640	1,129	14,700	941	13,230	847	12,495	720	11,025	600	10,290	527
		40	0.022	15,120	968	12,600	806	11,340	726	10,710	617	9,450	514	8,820	452
1.25	2.5	6	0.5	33,300	6,075	27,750	5,063	24,975	4,556	23,588	3,797	20,813	3,088	19,425	2,531
		10	0.34	33,300	6,075	27,750	5,063	24,975	4,556	23,588	3,797	20,813	3,088	19,425	2,531
		15	0.15	25,974	3,411	21,645	2,842	19,481	2,558	18,398	2,132	16,234	2,023	15,152	1,421
		20	0.12	23,976	2,624	19,980	2,186	17,982	1,968	16,983	1,640	16,234	1,445	13,986	1,093
		25	0.098	23,976	2,360	19,980	1,967	17,982	1,770	16,983	1,475	14,985	1,200	13,986	983
		30	0.055	17,760	1,836	14,800	1,530	13,320	1,377	12,580	1,148	11,100	933	10,360	765
1.5	3	8	0.6	28,800	6,480	24,000	5,400	21,600	4,860	20,400	4,100	18,000	3,402	16,800	3,024
		10	0.42	28,800	6,480	24,000	5,400	21,600	4,860	20,400	4,100	18,000	3,402	16,800	3,024
		13	0.315	26,880	4,838	22,400	4,032	20,160	3,629	19,040	3,061	16,800	2,540	15,680	2,258
		16	0.315	26,880	4,355	22,400	3,629	20,160	3,266	19,040	2,755	16,800	2,286	14,560	1,888
		20	0.18	22,464	3,033	18,720	2,527	16,848	2,275	15,912	1,919	14,040	1,593	12,096	1,307
		25	0.12	22,464	3,033	18,720	2,527	16,848	2,275	15,912	1,919	14,040	1,593	12,096	1,307
		30	0.12	20,736	2,800	17,280	2,333	15,552	2,100	14,688	1,771	12,960	1,470	12,096	1,307
		35	0.08	15,360	1,958	12,800	1,632	11,520	1,469	10,880	1,239	9,600	1,028	10,752	1,097
1.75	3.5	15	0.36	21,450	4,399	17,875	3,666	16,088	3,299	15,194	2,750	13,406	2,236	12,513	1,833
		25	0.21	17,820	2,736	14,850	2,280	13,365	2,052	12,623	1,710	11,138	1,391	10,395	1,140
		35	0.09	17,820	2,736	14,850	2,280	13,365	2,052	12,623	1,710	11,138	1,391	10,395	1,140
		45	0.09	13,200	1,918	11,000	1,598	9,900	1,438	9,350	1,199	8,250	975	7,700	799
2	4	10	0.6	20,700	6,210	17,250	5,175	15,525	4,658	14,663	3,960	12,938	3,299	12,075	2,898
		13	0.48	20,700	6,210	17,250	5,175	15,525	4,658	14,663	3,960	12,938	3,299	12,075	2,898
		16	0.42	20,700	6,210	17,250	5,175	15,525	4,658	14,663	3,960	12,938	3,299	12,075	2,898
		20	0.42	17,940	4,306	14,950	3,588	13,455	3,229	12,708	2,746	11,213	2,287	10,465	2,009
		25	0.24	16,146	3,488	13,455	2,906	12,110	2,616	11,437	2,223	10,092	2,162	9,419	1,627
		30	0.16	14,904	2,683	12,420	2,236	11,178	2,012	10,558	1,710	9,316	1,426	8,694	1,252
		35	0.1	14,904	2,683	12,420	2,236	11,178	2,012	10,558	1,710	9,316	1,426	8,694	1,252
		40	0.1	14,904	2,683	12,420	2,236	11,178	2,012	10,558	1,710	9,316	1,426	8,694	1,252
		45	0.1	11,040	1,877	9,200	1,564	8,280	1,408	7,820	1,196	6,900	997	6,440	876
		50	0.1	11,040	1,877	9,200	1,564	8,280	1,408	7,820	1,196	6,900	997	6,440	876
2.5	5	20	0.525	15,120	5,443	12,600	4,536	11,340	4,082	10,710	3,213	9,450	2,835	8,820	2,381
		25	0.525	14,040	5,054	11,700	3,650	10,530	3,791	9,945	2,984	8,775	2,633	8,190	2,211
		30	0.3	12,636	4,549	10,530	2,780	9,477	3,413	8,951	2,685	7,898	2,369	7,371	1,991
		40	0.2	11,664	2,520	9,720	2,100	8,748	1,890	8,262	1,487	7,290	1,313	6,804	1,103
3	6	12	0.6	16,200	6,804	13,500	5,670	12,150	5,103	11,475	4,253	10,125	3,459	9,450	2,835
		20	0.5	15,300	5,967	12,750	4,973	11,475	4,475	10,838	3,729	9,563	3,033	8,925	2,486
		30	0.42	12,480	3,594	10,400	2,995	9,360	2,696	8,840	2,122	7,800	2,028	7,280	1,572
		50	0.15	10,368	2,687	8,640	2,239	7,776	2,016	7,344	1,587	6,480	1,400	6,048	1,175

※(1)a_pは被削材グループ2での目安を示しています。その他のグループの場合は、上表の切込み比率を目安に調整してください。
※(2)リブ加工や止まり溝など、切りくずがつまりやすい切削の場合、切込み設定は基本切込みに切込み比率をかけて算出した切込み量を、さらにその80%まで小さくして使用してください。
※(3)a_eの設定はa_p×切込み比率×3～5倍を目安に調整してください。仕上げ加工を行う場合、理論カスプハイトを計算し設定してください。

※(1) a_p is shown as the criteria for Group 2 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.

【切込み設定例】 EPDBE2020-10-ATHの工具で焼き入れ鋼(50HRC)をリブ溝等高線切削する場合、
切込み=0.21(a_p)×0.65(焼入れ鋼グループ5の切込み比率)×0.8(閉鎖域の切削)=0.11mm

Cutting depth setting example: When cutting rib groove contours in hardened steel (50HRC) using an EPDBE2020-10-ATH tool:
Cutting depth = 0.21 (a_p) × 0.65 (cutting depth factor for Group 5 hardened steel) × 0.8 (for closed-area cutting) = 0.11mm

【注意】①PNコーティングはその性質上、通電性が微小です。従って、通電方式の工具長測定装置をご使用の際にはご注意ください。
②被削材、加工形状に合わせて、適切なクーラントを使用してください。
③この標準切削条件表は切削条件の目安を示すものです。実際の加工では加工形状、目的、使用機械等により条件を調整してください。
④機械の回転数が足りない場合は、回転数と送り速度を同じ比率で下げてください。

【Note】① PN coating is less electro conductive. Therefore, electric transmitted measuring systems may not work.
② Use the appropriate coolant for the work material and machining shape.
③ 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.
④ If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

■ 標準切削条件表 Recommended cutting conditions EPDBE-PN EPDBE-ATH

高能率切削条件 High efficiency cutting condition

高精度切削条件 High accuracy cuttiing condition

高能率切削条件はA72ページを参照してください。
Please refer to P.A72 about high efficiency cutting conditions

推奨領域 Recommended range				PNシリーズ PN series / ATHシリーズ ATH series											
被削材 Work material				1 銅 Copper		2 炭素鋼・合金鋼 Carbon Steels, Alloy Steels (180~250HB)		3 ステンレス鋼・工具鋼 Stainless Steels, Tool Steels (25~35HRC)		4 プリハードン鋼 Pre-hardened Steels (35~45HRC)		5 焼入れ鋼 Hardened Steels (45~55HRC)		6 焼入れ鋼 Hardened Steels (55~65HRC)	
切込み比率 Ratio to standard depth of cut				120%		100%		90%		80%		65%		60%	
ボール半径R Ball Radius (mm)	外径 Tool Dia. (mm)	首下長 Under neck Length (mm)	ap (mm)	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min
0.05	0.1	0.2	0.004	50,000	300	50,000	250	50,000	250	50,000	225	50,000	200	50,000	188
		0.3	0.003	50,000	300	50,000	250	50,000	250	50,000	225	50,000	200	50,000	188
		0.5	0.002	50,000	300	50,000	250	50,000	250	50,000	225	50,000	200	50,000	188
0.1	0.2	0.5	0.015	50,000	420	50,000	350	50,000	350	50,000	325	45,500	273	42,000	210
		0.75	0.013	50,000	420	50,000	350	50,000	350	50,000	325	45,500	273	42,000	210
		1	0.011	50,000	420	50,000	350	50,000	350	50,000	325	45,500	273	42,000	210
		1.25	0.008	50,000	378	50,000	315	48,600	306	45,900	269	40,500	219	37,800	170
		1.5	0.007	50,000	378	50,000	315	48,600	306	45,900	269	40,500	219	37,800	170
		2	0.006	50,000	378	50,000	315	48,600	306	45,900	269	40,500	219	37,800	170
		2.5	0.005	48,000	323	48,000	269	43,200	242	40,800	212	36,000	173	33,600	134
		3	0.003	48,000	323	48,000	269	43,200	242	40,800	212	36,000	173	33,600	134
0.15	0.3	0.5	0.02	50,000	600	50,000	500	50,000	500	50,000	450	45,000	383	42,000	336
		0.75	0.018	50,000	600	50,000	500	50,000	500	50,000	450	45,000	383	42,000	336
		1	0.016	50,000	600	50,000	500	50,000	500	50,000	450	45,000	383	42,000	336
		1.25	0.014	50,000	600	50,000	500	50,000	500	50,000	450	45,000	383	42,000	336
		1.5	0.012	50,000	600	50,000	500	50,000	500	50,000	450	45,000	383	42,000	336
		2	0.009	50,000	540	50,000	450	48,600	437	45,900	372	40,500	310	37,800	272
		2.5	0.008	50,000	540	50,000	450	48,600	437	45,900	372	40,500	310	37,800	272
		3	0.006	50,000	540	50,000	450	48,600	437	45,900	372	40,500	310	37,800	272
0.2	0.4	0.75	0.043	50,000	691	48,000	576	43,200	518	40,800	449	36,000	360	33,600	336
		1	0.04	50,000	691	48,000	576	43,200	518	40,800	449	36,000	360	33,600	336
		1.5	0.034	50,000	691	48,000	576	43,200	518	40,800	449	36,000	360	33,600	336
		2	0.028	50,000	691	48,000	576	43,200	518	40,800	449	36,000	360	33,600	336
		2.5	0.016	50,000	560	43,200	467	38,880	420	36,720	364	32,400	292	30,240	272
		3	0.011	50,000	560	43,200	467	38,880	420	36,720	364	32,400	292	30,240	272
		3.5	0.008	50,000	560	43,200	467	38,880	420	36,720	364	32,400	292	30,240	272
		4	0.005	50,000	560	43,200	467	38,880	420	36,720	364	32,400	292	30,240	272
		4.5	0.004	46,080	470	38,400	392	34,560	353	32,640	305	28,800	245	26,880	228
0.25	0.5	1	0.045	48,000	960	40,000	800	36,000	720	34,000	612	30,000	540	28,000	476
		1.5	0.04	48,000	960	40,000	800	36,000	720	34,000	612	30,000	540	28,000	476
		2	0.035	48,000	960	40,000	800	36,000	720	34,000	612	30,000	540	28,000	476
		2.5	0.033	43,200	778	40,000	800	32,400	583	30,600	496	27,000	437	25,200	386
		3	0.03	43,200	778	36,000	648	32,400	583	30,600	496	27,000	437	25,200	386
		4	0.02	43,200	778	36,000	648	32,400	583	30,600	496	27,000	437	25,200	386
		5	0.018	43,200	778	36,000	648	32,400	583	30,600	496	27,000	437	25,200	386
		5.5	0.008	38,400	653	32,000	544	28,800	490	27,200	416	24,000	367	22,400	324
		6	0.007	38,400	653	32,000	544	28,800	490	27,200	416	24,000	367	22,400	324
		8	0.004	38,400	653	32,000	544	28,800	490	27,200	416	24,000	367	22,400	324
0.3	0.6	1	0.05	48,000	1,440	40,000	1,200	36,000	1,080	34,000	884	30,000	720	28,000	560
		2	0.042	48,000	1,440	40,000	1,200	36,000	1,080	34,000	884	30,000	720	28,000	560
		2.5	0.038	48,000	1,440	40,000	1,200	36,000	1,080	34,000	884	30,000	720	28,000	560
		3	0.034	48,000	1,440	40,000	1,200	36,000	1,080	34,000	884	30,000	720	28,000	560
		3.5	0.029	43,200	1,231	36,000	1,026	32,400	923	30,600	756	27,000	616	25,200	479
		4	0.024	43,200	1,231	36,000	1,026	32,400	923	30,600	756	27,000	616	25,200	479
		4.5	0.022	43,200	1,166	36,000	972	32,400	875	30,600	716	27,000	583	25,200	454
		5	0.02	43,200	1,166	36,000	972	32,400	875	30,600	716	27,000	583	25,200	454
		5.5	0.017	43,200	1,166	36,000	972	32,400	875	30,600	716	27,000	583	25,200	454
		6	0.015	43,200	1,166	36,000	972	32,400	875	30,600	716	27,000	583	25,200	454
		7	0.008	38,400	979	32,000	816	28,800	734	27,200	601	24,000	490	22,400	381
		8	0.008	38,400	979	32,000	816	28,800	734	27,200	601	24,000	490	22,400	381
		9	0.006	38,400	979	32,000	816	28,800	734	27,200	601	24,000	490	22,400	381
		10	0.005	33,600	857	28,000	714	25,200	643	23,800	526	21,000	428	19,600	333
		12	0.004	28,800	691	24,000	576	21,600	518	20,400	424	18,000	346	16,800	269
0.35	0.7	2	0.061	48,000	1,584	40,000	1,320	36,000	1,188	34,000	977	30,000	805	28,000	660
		4	0.034	43,200	1,354	36,000	1,128	32,400	1,015	30,600	835	27,000	688	25,200	564
		6	0.027	43,200	1,283	36,000	1,069	32,400	962	30,600	791	27,000	652	25,200	535
		8	0.01	38,400	1,013	32,000	844	28,800	760	27,200	625	24,000	515	22,400	422

【注意】ご使用にあたっては、A77ページの表下の項目と注意を参照してください。【Note】Upon usage, please refer to comments and notes below table on page A77.

Epoch Deep Ball Evolution

エポックディープボールエボリューション

標準切削条件表 Recommended cutting conditions EPDBE-PN EPDBE-ATH

高能率切削条件 High efficiency cuttiing condition

高精度切削条件 High accuracy cuttiing condition

高能率切削条件はA72ページを参照してください。
Please refer to P.A72 about high efficiency cutting conditions

推奨領域 Recommended range				PNシリーズ PN series / ATHシリーズ ATH series											
被削材 Work				1 銅 Copper		2 炭素鋼・合金鋼 Carbon Steels, Alloy Steels (180~250HB)		3 ステンレス鋼・工具鋼 Stainless Steels, Tool Steels (25~35HRC)		4 プリハードン鋼 Pre-hardened Steels (35~45HRC)		5 焼入れ鋼 Hardened Steels (45~55HRC)		6 焼入れ鋼 Hardened Steels (55~65HRC)	
切込み比率 Ratio to standard depth of cut				120%		100%		90%		80%		65%		60%	
ボール半径 R (mm)	外径 Mill Dia. (mm)	首下長 Under neck Length (mm)	ap (mm)	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min	回転数 n min-1	送り速度 vf mm/min
0.4	0.8	2	0.08	48,000	1,728	40,000	1,440	36,000	1,296	34,000	1,088	30,000	900	28,000	784
		4	0.056	48,000	1,728	40,000	1,440	36,000	1,296	34,000	1,088	30,000	900	28,000	784
		5	0.045	43,200	1,400	36,000	1,166	32,400	1,050	30,600	881	27,000	729	25,200	635
		6	0.032	43,200	1,400	36,000	1,166	32,400	1,050	30,600	881	27,000	729	25,200	635
		8	0.02	38,400	1,244	32,000	1,037	28,800	933	27,200	783	24,000	648	22,400	564
		10	0.01	38,400	1,175	32,000	979	28,800	881	27,200	740	24,000	612	22,400	533
0.45	0.9	2	0.09	45,600	1,944	38,000	1,620	34,200	1,458	32,300	1,215	28,500	1,004	26,600	891
		4	0.058	45,600	1,944	38,000	1,620	34,200	1,458	32,300	1,215	28,500	1,004	26,600	891
		6	0.042	41,040	1,574	34,200	1,312	30,780	1,181	29,070	984	25,650	813	23,940	722
		8	0.03	36,480	1,399	30,400	1,166	27,360	1,049	25,840	875	22,800	723	21,280	641
0.5	1	2	0.1	43,200	2,160	36,000	1,800	32,400	1,620	30,600	1,377	27,000	1,134	25,200	1,008
		3	0.1	43,200	2,160	36,000	1,800	32,400	1,620	30,600	1,377	27,000	1,134	25,200	1,008
		4	0.07	43,200	2,160	36,000	1,800	32,400	1,620	30,600	1,377	27,000	1,134	25,200	1,008
		5	0.06	43,200	2,160	36,000	1,800	32,400	1,620	30,600	1,377	27,000	1,134	25,200	1,008
		6	0.04	38,880	1,750	32,400	1,458	29,160	1,312	27,540	1,115	24,300	919	22,680	816
		7	0.04	38,880	1,750	32,400	1,458	29,160	1,312	27,540	1,115	24,300	919	22,680	816
		8	0.04	38,880	1,750	32,400	1,458	29,160	1,312	27,540	1,115	24,300	919	22,680	816
		9	0.03	38,880	1,750	32,400	1,458	29,160	1,312	27,540	1,115	24,300	919	22,680	816
		10	0.025	38,880	1,750	32,400	1,458	29,160	1,312	27,540	1,115	24,300	919	22,680	816
		12	0.013	34,560	1,469	28,800	1,224	25,920	1,102	24,480	936	21,600	771	20,160	685
		13	0.011	34,560	1,469	28,800	1,224	25,920	1,102	24,480	936	21,600	771	20,160	685
		14	0.01	34,560	1,469	28,800	1,224	25,920	1,102	24,480	936	21,600	771	20,160	685
		16	0.008	34,560	1,469	28,800	1,224	25,920	1,102	24,480	936	21,600	771	20,160	685
		18	0.006	30,240	1,210	25,200	1,008	22,680	907	21,420	771	18,900	635	17,640	564
		20	0.005	25,920	1,037	21,600	864	19,440	778	18,360	661	16,200	544	15,120	484
0.55	1.1	2	0.1	40,320	2,110	33,600	1,758	30,240	1,582	28,560	1,301	25,200	1,090	23,520	967
		4	0.07	40,320	2,110	33,600	1,758	30,240	1,582	28,560	1,301	25,200	1,090	23,520	967
		6	0.04	36,720	1,774	30,600	1,478	27,540	1,330	26,010	1,094	22,950	916	21,420	813
		8	0.04	36,720	1,774	30,600	1,478	27,540	1,330	26,010	1,094	22,950	916	21,420	813
		10	0.025	36,720	1,774	30,600	1,478	27,540	1,330	26,010	1,094	22,950	916	21,420	813
0.6	1.2	4	0.08	36,923	1,932	30,769	1,610	27,692	1,449	26,154	1,208	23,077	998	21,538	886
		6	0.06	34,560	1,797	28,800	1,498	25,920	1,348	24,480	1,102	21,600	950	20,160	806
		8	0.04	34,560	1,797	28,800	1,498	25,920	1,348	24,480	1,102	21,600	950	20,160	806
		10	0.035	34,560	1,617	28,800	1,423	25,920	1,213	24,480	1,102	21,600	855	20,160	726
		12	0.03	34,560	1,617	28,800	1,348	25,920	1,213	24,480	1,102	21,600	855	20,160	726
0.7	1.4	8	0.055	30,240	1,814	25,200	1,512	22,680	1,361	21,420	1,157	18,900	983	17,640	882
		12	0.035	30,240	1,633	25,200	1,361	22,680	1,225	21,420	1,041	18,900	885	17,640	794
		16	0.017	26,880	1,371	22,400	1,142	20,160	1,028	19,040	874	16,800	743	15,680	666
0.75	1.5	4	0.1	33,600	2,218	28,000	1,848	25,200	1,663	23,800	1,428	21,000	1,134	19,600	980
		6	0.1	33,600	2,218	28,000	1,848	25,200	1,663	23,800	1,428	21,000	1,134	19,600	980
		8	0.06	30,240	1,796	25,200	1,497	22,680	1,347	21,420	1,157	18,900	919	17,640	794
		10	0.06	30,240	1,796	25,200	1,497	22,680	1,347	21,420	1,157	18,900	919	17,640	794
		12	0.06	30,240	1,796	25,200	1,497	22,680	1,347	21,420	1,157	18,900	919	17,640	794
		14	0.05	26,880	1,508	25,200	1,497	20,160	1,131	19,040	971	16,800	771	15,680	666
		16	0.019	26,880	1,508	22,400	1,257	20,160	1,131	19,040	971	16,800	771	15,680	666
		18	0.019	26,880	1,508	22,400	1,257	20,160	1,131	19,040	971	16,800	771	15,680	666
		20	0.019	26,880	1,508	22,400	1,257	20,160	1,131	19,040	971	16,800	771	15,680	666
0.8	1.6	8	0.11	31,200	2,184	26,000	1,820	23,400	1,638	22,100	1,370	19,500	1,170	18,200	1,019
		12	0.065	28,080	1,769	23,400	1,474	21,060	1,327	19,890	1,110	17,550	948	16,380	826
		16	0.04	28,080	1,769	23,400	1,474	21,060	1,327	19,890	1,110	17,550	948	16,380	826
		20	0.02	24,960	1,485	20,800	1,238	18,720	1,114	17,680	932	15,600	796	14,560	693
0.9	1.8	8	0.13	31,200	2,496	26,000	2,080	23,400	1,872	22,100	1,547	19,500	1,287	18,200	1,092
		12	0.07	28,080	2,022	23,400	1,685	21,060	1,516	19,890	1,253	17,550	1,042	16,380	885
		16	0.045	28,080	2,022	23,400	1,685	21,060	1,516	19,890	1,253	17,550	1,042	16,380	885
		20	0.022	24,960	1,697	20,800	1,414	18,720	1,273	17,680	1,052	15,600	875	14,560	743
1	2	3	0.2	25,200	2,520	21,000	2,100	18,900	1,890	17,850	1,607	15,750	1,355	14,700	1,176
		4	0.2	25,200	2,520	21,000	2,100	18,900	1,890	17,850	1,607	15,750	1,355	14,700	1,176
		6	0.2	25,200	2,268	21,000	1,890	18,900	1,701	17,850	1,428	15,750	1,197	14,700	1,058
		8	0.14	25,200	2,268	21,000	1,890	18,900	1,701	17,850	1,428	15,750	1,197	14,700	1,058
		10	0.14	25,200	2,016	21,000	1,680	18,900	1,512	17,850	1,285	15,750	1,071	14,700	941