金型用 超硬エンドミルキャンペーン

2023.7.10(月)▶8.31(木)

高硬度鋼用超硬エンドミル 対象製品一覧

ロングネックラジアスタイプ
高能率仕上げ用4刃
AE-CPR4-H

ロングネックボールタイプ
高精度仕上げ用2刃
AE-LNBD-H

The A Brand

高硬度鋼用超硬エンドミル
ロングネックボールタイプ
高精度仕上げ用2刃
2-flute high-finishing long neck carbide ball end mill for high-hardness steel

AE-LNBD-H

1 中心部の厚み
Thickness at the center

- 中心部を厚くすることでボール先端のつぶれやチッピングを抑制
- Thickening of the center core to prevent deformation of the ball tip and improve control of chipping

2 優れたボールR精度
Superior ball R precision

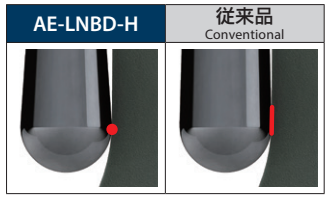
- 180° 間安定したR精度を確保
- Secures stable R accuracy across 180°

R ± 0.003	R ± 0.005
RE≦0.25	0.25<RE

3 外周部ティアドロップ形状
Teardrop-shaped outer periphery

- 強バックテーパにより点での切削となりびびりが抑制され、欠け防止、加工面精度が向上
- Strong back taper geometry enables milling by point, which prevents chattering and chipping, resulting in improvement of surface accuracy

注1：R2以上はティアドロップ形状ではありません
Note: Teardrop-shaped specification does not apply to items above R2



4 優れたシャンク精度
Superior shank accuracy

- h4公差（0/-0.004）に対応
- Supports h4 tolerance (0/-0.004)

5 平滑化処理
Smooth Surface Treatment

- コーティング表面の平滑化処理により、加工面精度が向上（R0.3以上）
- Improves surface accuracy by smoothening the coating surface (R0.3 or above)

6 豊富なバリエーション
Abundant variations

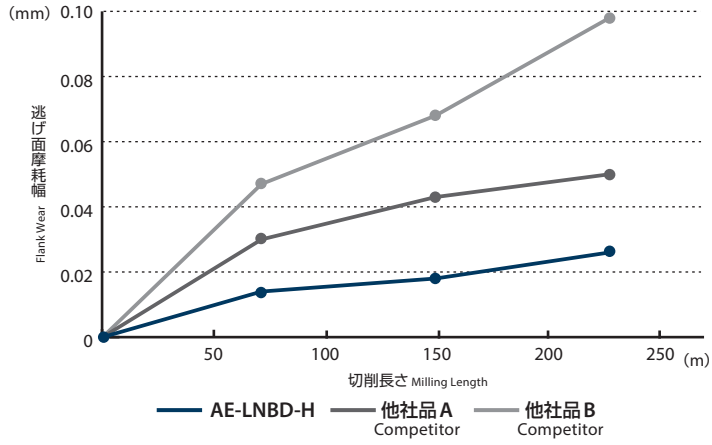
- 261アイテム（R0.05 ～ R3）で幅広い加工に対応可能
- 261 items (R0.05 to R3) are available to accommodate a wide range of applications

加工データ Cutting Data

安定加工 Stable Performance

SKD11（60HRC）において、安定した摩耗推移
Stable wear transition in SKD11 (60 HRC)

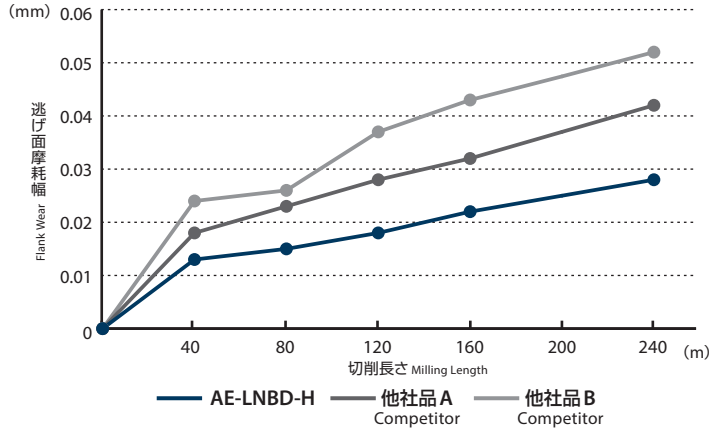
使用工具 Tool	AE-LNBD-H R1×10×4	他社品 Competitor
被削材 Work Material	SKD11（60HRC）	
切削方法 Milling Method	走査線加工 Scanning Line Cutting	
切削速度 Cutting Speed	107m/min（17,000min^{-1}）	
送り速度 Feed	1,400mm/min（0.041mm/t）	
切込深さ Depth of Cut	ap=0.05mm Pf=0.1mm	
切削油剤 Coolant	エアブロー Air Blow	
使用機械 Machine	立形マシニングセンタ（HSK32） Vertical Machining Center	



長寿命 Long Tool Life

熱間ダイス鋼DH31-Sにおいて、優れた耐久性を実現
Enables superior durability in hot die steel DH31-S

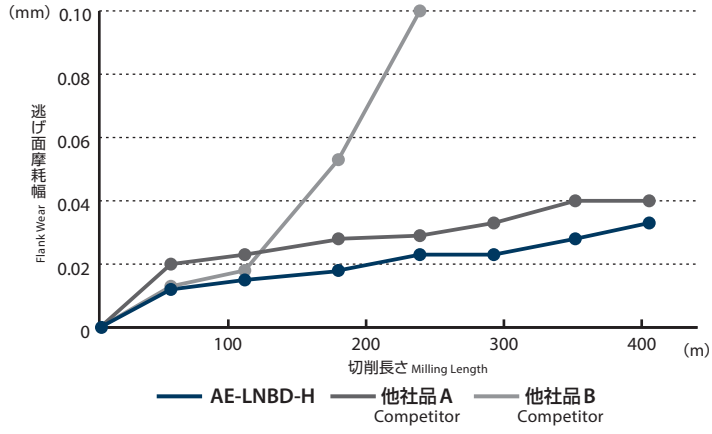
使用工具 Tool	AE-LNBD-H R1×10×4	他社品 Competitor
被削材 Work Material	DH31-S（43HRC）	
切削方法 Milling Method	ポケット加工 Pocket Milling	
切削速度 Cutting Speed	88m/min（14,000min^{-1}）	
送り速度 Feed	1,000mm/min（0.036mm/t）	
切込深さ Depth of Cut	ap=0.05mm Pf=0.1mm	
切削油剤 Coolant	エアブロー Air Blow	
使用機械 Machine	横形マシニングセンタ（HSK63） Horizontal Machining Center	

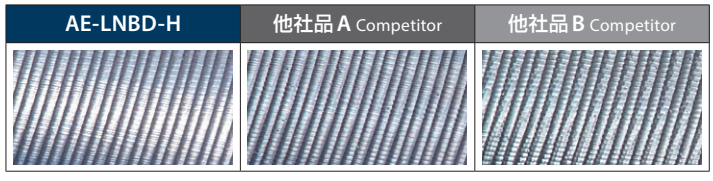


仕上げ加工 Finishing

STAVAX（53HRC）において、良好な耐久性と加工面を実現
Enables excellent durability and surface finish in STAVAX (53 HRC)

使用工具 Tool	AE-LNBD-H R1×10×4	他社品 Competitor
被削材 Work Material	STAVAX（53HRC）	
切削方法 Milling Method	走査線加工 Scanning Line Cutting	
切削速度 Cutting Speed	150m/min（24,000min^{-1}）	
送り速度 Feed	2,400mm/min（0.05mm/t）	
切込深さ Depth of Cut	ap=0.05mm Pf=0.1mm	
切削油剤 Coolant	エアブロー Air Blow	
使用機械 Machine	立形マシニングセンタ（HSK32） Vertical Machining Center	

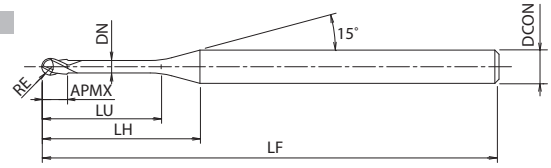




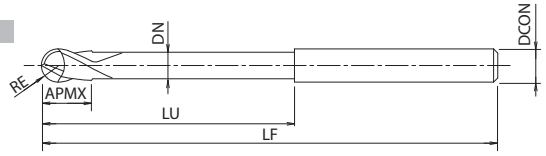
AE-LNBD-H

CARBIDE | DURO REY | R ±0.003 (RE≦0.25) | R ±0.005 (0.25<RE) | SHANK h4 | SHRINK FIT | 30° | SPEED FEED P9~P16

Type1



Type2

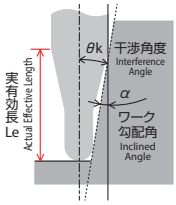


単位:mm Unit:mm

ツールNo. EDP No.	ボール半径×首下長×シャンク径 RE×LU×DCON	全長 LF	刃長 APMX	LH	首径 DN	干渉角度 θk	ワーク勾配角αに対する実有効長Le 注1 Effective length by inclined angles 0.5°	1°	1.5°	2°	3°	形状 Type	在庫 Stock		標準価格 (Yen)
3056100	R0.05 × 0.2 ×4	45	0.08	7.5	0.09	14.7°	0.2	0.21	0.21	0.22	0.23	1	A	●	9,530
3056101	R0.05 × 0.3 ×4			7.6		14.52°	0.3	0.31	0.32	0.33	0.35			●	8,390
3056102	R0.05 × 0.5 ×4			7.8		14.07°	0.53	0.56	0.59	0.62	0.67			●	9,100
3056103	R0.1 × 0.3 ×4	45	0.16	7.4	0.19	14.59°	0.3	0.31	0.32	0.32	0.34	1	A	●	5,800
3056104	R0.1 × 0.5 ×4			7.6		14.12°	0.53	0.56	0.58	0.61	0.65			●	5,800
3056105	R0.1 × 0.75 ×4			7.9		13.74°	0.79	0.83	0.87	0.9	0.96			●	5,800
3056106	R0.1 × 1 ×4			8.1		13.33°	1.06	1.11	1.15	1.19	1.27			●	5,800
3056107	R0.1 × 1 ×6			11.9		13.86°								●	8,290
3056108	R0.1 × 1.25 ×4			8.4		12.94°	1.32	1.38	1.43	1.47	1.59			●	6,340
3056109	R0.1 × 1.5 ×4			8.6		12.58°	1.58	1.65	1.7	1.76	1.9			●	6,340
3056110	R0.1 × 1.75 ×4			8.9		12.23°	1.85	1.91	1.98	2.05	2.21			●	7,030
3056111	R0.1 × 2 ×4			9.1		11.9°	2.11	2.18	2.26	2.34	2.52			●	7,030
3056112	R0.1 × 2.5 ×4			9.6		11.29°	2.63	2.72	2.81	2.91	3.14			●	7,710
3056113	R0.1 × 3 ×4			10.1		10.74°	3.14	3.25	3.36	3.49	3.76			●	8,290
3056114	R0.15 × 0.5 ×4	45	0.24	7.4	0.285	14.22°	0.52	0.54	0.56	0.59	0.63	1	A	●	5,800
3056115	R0.15 × 0.6 ×4			7.5		14.04°	0.63	0.65	0.68	0.7	0.75			●	5,800
3056116	R0.15 × 0.75 ×4			7.7		13.77°	0.78	0.82	0.85	0.88	0.93			●	5,800
3056117	R0.15 × 1 ×4			7.9		13.35°	1.05	1.09	1.13	1.16	1.25			●	5,800
3056118	R0.15 × 1.25 ×4			8.2		12.95°	1.31	1.36	1.4	1.45	1.56			●	6,210
3056119	R0.15 × 1.5 ×4			8.4		12.57°	1.57	1.63	1.68	1.74	1.87			●	6,210
3056120	R0.15 × 1.5 ×6			12.2		13.33°								●	8,690
3056121	R0.15 × 1.75 ×4			8.7		12.22°	1.83	1.9	1.96	2.03	2.18			●	6,210
3056122	R0.15 × 2 ×4			8.9		11.88°	2.09	2.16	2.24	2.31	2.49			●	6,210
3056123	R0.15 × 2.25 ×4			9.2		11.56°	2.35	2.43	2.51	2.6	2.8			●	6,340
3056124	R0.15 × 2.5 ×4			9.4		11.26°	2.61	2.7	2.79	2.89	3.11			●	6,340
3056125	R0.15 × 3 ×4			9.9		10.7°	3.13	3.23	3.34	3.46	3.73			●	6,340
3056126	R0.15 × 3.5 ×4			10.4		10.19°	3.65	3.77	3.9	4.04	4.35			●	6,520
3056127	R0.15 × 4 ×4			10.9		9.73°	4.16	4.3	4.45	4.61	4.97			●	6,520
3056128	R0.15 × 4.5 ×4			11.4		9.31°	4.68	4.84	5.01	5.19	5.6			●	7,030
3056129	R0.15 × 5 ×4			11.9		8.92°	5.2	5.37	5.56	5.76	6.22			●	7,030

●＝標準在庫品 ●=Standard stock item

注 1：ワーク勾配角αに対する実有効長 Le 欄に数値がないものは干渉無しを表します。
Note：If there is no value in the actual effective length (Le column) for the work gradient angle α, it indicates no interference.



NEXT

FROM

単位:mm　Unit:mm

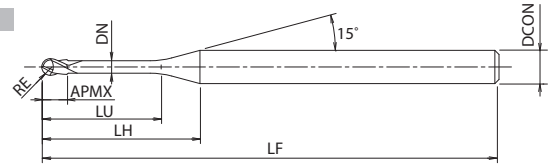
ツールNo. EDP No.	ボール半径×首下長×シャンク径 RE × LU × DCON	全長 LF	刃長 APMX	LH	首径 DN	干渉角度 θk	ワーク勾配角αに対する実有効長Le 注1 Effective length by inclined angles 0.5°	1°	1.5°	2°	3°	形状 Type	在庫 Stock		標準価格 (Yen)
3056130	R0.2 × 0.5 ×4	45	0.3	7.2	0.38	14.27°	0.51	0.53	0.55	0.57	0.6	1	A	●	4,010
3056131	R0.2 × 0.75 ×4			7.5		13.8°	0.78	0.81	0.83	0.86	0.91			●	4,010
3056132	R0.2 × 0.8 ×4			7.5		13.71°	0.83	0.86	0.89	0.92	0.97			●	4,010
3056133	R0.2 × 1 ×4			7.7		13.37°	1.04	1.08	1.11	1.15	1.22			●	4,010
3056134	R0.2 × 1 ×6			11.5		13.91°								●	5,860
3056135	R0.2 × 1.5 ×4			8.2		12.57°	1.56	1.62	1.67	1.72	1.84			●	4,060
3056136	R0.2 × 2 ×4			8.7		11.86°	2.08	2.15	2.22	2.3	2.46			●	4,110
3056137	R0.2 × 2 ×6			12.5		12.82°								●	6,100
3056138	R0.2 × 2.5 ×4			9.2		11.22°	2.6	2.68	2.77	2.87	3.09			●	4,310
3056139	R0.2 × 3 ×4			9.7		10.65°	3.12	3.22	3.33	3.45	3.71			●	4,550
3056140	R0.2 × 3.5 ×4			10.2		10.14°	3.63	3.75	3.88	4.02	4.33			●	4,970
3056141	R0.2 × 4 ×4			10.7		9.67°	4.15	4.29	4.44	4.59	4.95			●	4,970
3056142	R0.2 × 4.5 ×4			11.2		9.24°	4.67	4.82	4.99	5.17	5.57			●	5,180
3056143	R0.2 × 5 ×4			11.7		8.85°	5.19	5.36	5.54	5.74	6.19			●	5,180
3056144	R0.2 × 5.5 ×4			12.2		8.49°	5.7	5.89	6.1	6.32	6.81			●	5,800
3056145	R0.2 × 6 ×4			12.7		8.15°	6.22	6.43	6.65	6.89	7.44			●	6,020
3056146	R0.25 × 0.75 ×4	45	0.4	7.3	0.475	13.84°	0.77	0.8	0.82	0.84	0.89	1	A	●	3,930
3056147	R0.25 × 1 ×4			7.6		13.39°	1.03	1.07	1.1	1.13	1.2			●	3,930
3056148	R0.25 × 1.5 ×4			8.1		12.56°	1.55	1.6	1.65	1.7	1.82			●	3,930
3056149	R0.25 × 2 ×4			8.6		11.84°	2.07	2.14	2.21	2.28	2.44			●	3,930
3056150	R0.25 × 2.5 ×4			9.1		11.19°	2.59	2.67	2.76	2.85	3.06			●	3,930
3056151	R0.25 × 3 ×4			9.6		10.61°	3.11	3.21	3.31	3.43	3.68			●	3,930
3056152	R0.25 × 3.5 ×4			10.1		10.08°	3.63	3.74	3.87	4	4.31			●	3,930
3056153	R0.25 × 4 ×4			10.6		9.6°	4.14	4.28	4.42	4.58	4.93			●	3,930
3056154	R0.25 × 4.5 ×4			11.1		9.17°	4.66	4.81	4.98	5.15	5.55			●	4,060
3056155	R0.25 × 5 ×4			11.6		8.77°	5.18	5.35	5.53	5.73	6.17			●	4,060
3056156	R0.25 × 5.5 ×4			12.1		8.41°	5.69	5.88	6.09	6.3	6.79			●	4,150
3056157	R0.25 × 6 ×4			12.6		8.07°	6.21	6.42	6.64	6.88	7.41			●	4,150
3056158	R0.25 × 7 ×4			13.6		7.48°	7.24	7.49	7.75	8.03	8.66			●	4,490
3056159	R0.25 × 8 ×4			14.6		6.96°	8.28	8.56	8.86	9.18	9.9			●	4,520
3056160	R0.25 × 9 ×4			15.6		6.51°	9.31	9.63	9.96	10.33	11.14			●	5,380
3056161	R0.25 × 10 ×4			16.6		6.12°	10.34	10.7	11.07	11.48	12.39			●	6,020
3056162	R0.3 × 0.75 ×4	45	0.5	7.1	0.55	13.8°	0.76	0.78	0.8	0.81	0.85	1	A	●	3,360
3056163	R0.3 × 1 ×4			7.3		13.34°	1.02	1.05	1.07	1.1	1.16			●	3,360
3056164	R0.3 × 1.2 ×4			7.5		12.99°	1.23	1.26	1.29	1.33	1.41			●	3,110
3056165	R0.3 × 1.5 ×4			7.8		12.5°	1.54	1.58	1.63	1.68	1.78			●	3,020
3056166	R0.3 × 2 ×4			8.3		11.76°	2.05	2.12	2.18	2.25	2.41			●	3,020
3056167	R0.3 × 2 ×6			12.1		12.78°								●	4,660
3056168	R0.3 × 2.5 ×4			8.8		11.1°	2.57	2.65	2.74	2.83	3.03			●	3,110
3056169	R0.3 × 3 ×4			9.3		10.51°	3.09	3.19	3.29	3.4	3.65			●	3,110
3056170	R0.3 × 3 ×6			13.1		11.83°								●	4,770
3056171	R0.3 × 3.5 ×4			9.8		9.98°	3.61	3.72	3.84	3.98	4.27			●	3,210
3056172	R0.3 × 4 ×4			10.3		9.5°	4.12	4.26	4.4	4.55	4.89			●	3,210
3056173	R0.3 × 4 ×6			14.1		11°								●	4,930
3056174	R0.3 × 4.5 ×4			10.8		9.06°	4.64	4.79	4.95	5.13	5.51			●	3,210
3056175	R0.3 × 5 ×4			11.3		8.67°	5.16	5.32	5.51	5.7	6.14			●	3,210
3056176	R0.3 × 5.5 ×4			11.8		8.3°	5.67	5.86	6.06	6.28	6.76			●	3,210
3056177	R0.3 × 6 ×4			12.3		7.96°	6.19	6.39	6.61	6.85	7.38			●	3,210
3056178	R0.3 × 6.5 ×4			12.8		7.65°	6.71	6.93	7.17	7.42	8			●	3,210
3056179	R0.3 × 7 ×4			13.3		7.37°	7.22	7.46	7.72	8	8.62			●	3,640
3056180	R0.3 × 7.5 ×4			13.8		7.1°	7.74	8	8.28	8.57	9.24			●	3,640
3056181	R0.3 × 8 ×4			14.3		6.85°	8.26	8.53	8.83	9.15	9.86			●	4,310
3056182	R0.3 × 8.5 ×4			14.8		6.62°	8.77	9.07	9.38	9.72	10.49			●	4,360
3056183	R0.3 × 9 ×4			15.3		6.41°	9.29	9.6	9.94	10.3	11.11			●	4,470
3056184	R0.3 × 9.5 ×4			15.8		6.2°	9.81	10.14	10.49	10.87	11.73			●	4,470
3056185	R0.3 × 10 ×4			16.3		6.01°	10.32	10.67	11.05	11.45	12.35			●	4,470
3056186	R0.3 × 11 ×4	50		17.3		5.67°	11.36	11.74	12.16	12.6	13.59			●	4,770
3056187	R0.3 × 12 ×4			18.3		5.36°	12.39	12.81	13.26	13.75	14.84			●	4,950

●＝標準在庫品 ●=Standard stock item

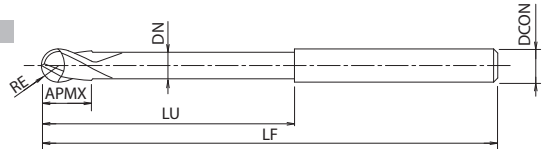
AE-LNBD-H

CARBIDE | DUROREY | R ±0.003 (RE≦0.25) | R ±0.005 (0.25<RE) | SHANK h4 | SHRINK FIT | 30° | SPEED FEED P9~P16

Type1



Type2



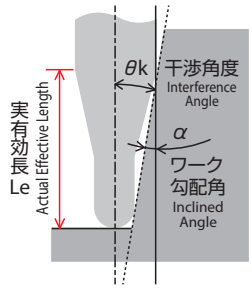
FROM

単位:mm Unit:mm

ツールNo. EDP No.	ボール半径×首下長×シャンク径 RE × LU × DCON	全長 LF	刃長 APMX	LH	首径 DN	干渉角度 θk	ワーク勾配角αに対する実有効長Le 注1 Effective length by inclined angles 0.5°	1°	1.5°	2°	3°	形状 Type	在庫 Stock		標準価格 (Yen)
3056188	R0.4 × 1 ×4	45	0.6	7	0.75	13.41°	1.02	1.04	1.06	1.08	1.14	1	A	●	3,270
3056189	R0.4 × 1.5 ×4			7.5		12.52°	1.53	1.57	1.62	1.66	1.76			●	3,270
3056190	R0.4 × 2 ×4			8		11.74°	2.05	2.11	2.17	2.23	2.38			●	3,020
3056191	R0.4 × 2 ×6			11.7		12.81°								●	4,660
3056192	R0.4 × 2.5 ×4			8.5		11.04°	2.57	2.64	2.72	2.81	3			●	3,270
3056193	R0.4 × 3 ×4			9		10.42°	3.09	3.18	3.28	3.38	3.62			●	3,270
3056194	R0.4 × 4 ×4			10		9.37°	4.12	4.25	4.39	4.53	4.87			●	3,270
3056195	R0.4 × 5 ×4			11		8.51°	5.15	5.32	5.49	5.68	6.11			●	3,270
3056196	R0.4 × 6 ×4			12		7.8°	6.19	6.39	6.6	6.83	7.35			●	3,270
3056197	R0.4 × 7 ×4			13		7.19°	7.22	7.46	7.71	7.98	8.6			●	3,270
3056198	R0.4 × 8 ×4			14		6.67°	8.25	8.53	8.82	9.13	9.84			●	3,270
3056199	R0.4 × 9 ×4			15		6.22°	9.29	9.6	9.93	10.28	11.08			●	3,740
3056200	R0.4 × 10 ×4			16		5.83°	10.32	10.67	11.04	11.43	12.32			●	4,310
3056201	R0.4 × 12 ×4	50		18		5.18°	12.39	12.81	13.25	13.73	14.81			●	4,310
3056202	R0.5 × 1.5 ×4	45	0.8	7.1	0.95	12.54°	1.53	1.57	1.6	1.64	1.73	1	A	●	2,590
3056203	R0.5 × 2 ×4			7.6		11.71°	2.05	2.1	2.16	2.22	2.35			●	2,590
3056204	R0.5 × 2 ×6			11.3		12.83°								●	4,150
3056205	R0.5 × 2.5 ×4			8.1		10.97°	2.56	2.64	2.71	2.79	2.98			●	2,590
3056206	R0.5 × 3 ×4			8.6		10.33°	3.08	3.17	3.27	3.37	3.6			●	2,590
3056207	R0.5 × 3 ×6			12.3		11.8°								●	4,150
3056208	R0.5 × 4 ×4			9.6		9.23°	4.12	4.24	4.38	4.52	4.84			●	2,880
3056209	R0.5 × 4 ×6			13.3		10.91°								●	4,550
3056210	R0.5 × 5 ×4			10.6		8.35°	5.15	5.31	5.48	5.67	6.08			●	2,880
3056211	R0.5 × 5 ×6			14.3		10.15°								●	4,550
3056212	R0.5 × 6 ×4			11.6		7.62°	6.18	6.38	6.59	6.82	7.33			●	3,110
3056213	R0.5 × 6 ×6			15.3		9.49°								●	4,770
3056214	R0.5 × 7 ×4			12.6		7°	7.22	7.45	7.7	7.97	8.57			●	3,110
3056215	R0.5 × 7 ×6			16.3		8.91°								●	4,770
3056216	R0.5 × 8 ×4			13.6		6.48°	8.25	8.52	8.81	9.12	9.81			●	3,110
3056217	R0.5 × 8 ×6			17.3		8.39°								●	4,770
3056218	R0.5 × 9 ×4			14.6		6.03°	9.28	9.59	9.92	10.27	11.06			●	3,110
3056219	R0.5 × 10 ×4			15.6		5.64°	10.32	10.66	11.02	11.42	12.3			●	3,110
3056220	R0.5 × 10 ×6	50		19.3		7.52°								●	4,770
3056221	R0.5 × 12 ×4	45		17.6		4.99°	12.38	12.8	13.24	13.72	14.79			●	3,110
3056222	R0.5 × 13 ×4	50		18.6		4.71°	13.42	13.87	14.35	14.87	16.03			●	3,640
3056223	R0.5 × 14 ×4			19.6		4.47°	14.45	14.94	15.46	16.02	17.27			●	3,640
3056224	R0.5 × 16 ×4			21.6		4.05°	16.52	17.08	17.67	18.32	19.76			●	4,310
3056225	R0.5 × 18 ×4	55		23.6		3.7°	18.59	19.22	19.89	20.62	22.24			●	4,310
3056226	R0.5 × 20 ×4			25.6		3.41°	20.65	21.36	22.11	22.92	24.73			●	5,250
3056227	R0.5 × 22 ×4	60		27.6		3.16°	22.72	23.5	24.32	25.22	27.22			●	5,250
3056228	R0.5 × 22 ×6			31.3		4.62°								●	7,860

●＝標準在庫品 ●=Standard stock item

NEXT



注 1：ワーク勾配角αに対する実有効長 Le 欄に数値がないものは干渉無しを表します。
Note：If there is no value in the actual effective length (Le column) for the work gradient angle α , it indicates no interference.

FROM

単位:mm　Unit:mm

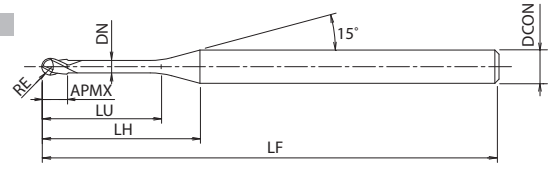
ツールNo. EDP No.	ボール半径×首下長×シャンク径 RE × LU × DCON	全長 LF	刃長 APMX	LH	首径 DN	干渉角度 θk	ワーク勾配角αに対する実有効長 Le 注1 Effective length by inclined angles 0.5°	1°	1.5°	2°	3°	形状 Type	在庫 Stock		標準価格 (Yen)
3056229	R0.6 × 2 ×4	45	1	7.3	1.15	11.67°	2.08	2.17	2.24	2.32	2.45	1	A	●	3,900
3056230	R0.6 × 2 ×6			11.1		12.86°								●	5,800
3056231	R0.6 × 2.4 ×4			7.7		11.04°	2.51	2.61	2.7	2.78	2.95			●	3,900
3056232	R0.6 × 2.5 ×4			7.8		10.9°	2.61	2.71	2.81	2.89	3.07			●	3,900
3056233	R0.6 × 3 ×4			8.3		10.22°	3.14	3.26	3.37	3.47	3.69			●	3,900
3056234	R0.6 × 4 ×4			9.3		9.08°	4.19	4.34	4.47	4.62	4.94			●	3,900
3056235	R0.6 × 4 ×6			13.1		10.87°								●	5,800
3056236	R0.6 × 6 ×4			11.3		7.42°	6.27	6.48	6.69	6.92	7.42			●	4,230
3056237	R0.6 × 8 ×4			13.3		6.27°	8.35	8.62	8.91	9.22	9.91			●	4,230
3056238	R0.6 × 10 ×4			15.3		5.43°	10.42	10.76	11.12	11.52	12.4			●	4,230
3056239	R0.6 × 12 ×4			17.3		4.78°	12.48	12.9	13.34	13.82	14.88			●	4,230
3056240	R0.6 × 14 ×4	50		19.3		4.28°	14.55	15.04	15.56	16.12	17.37			●	4,230
3056241	R0.6 × 16 ×4			21.3		3.87°	16.62	17.18	17.77	18.42	19.85			●	4,970
3056242	R0.6 × 18 ×4	55		23.3		3.53°	18.69	19.32	19.99	20.71	22.34			●	5,480
3056243	R0.6 × 20 ×4			25.3		3.24°	20.75	21.45	22.21	23.01	24.83			●	6,100
3056244	R0.75 × 2 ×4	45	1.2	6.8	1.45	11.61°	2.08	2.15	2.22	2.29	2.41	1	A	●	3,000
3056245	R0.75 × 2.5 ×4			7.3		10.76°	2.6	2.7	2.79	2.87	3.03			●	3,000
3056246	R0.75 × 3 ×4			7.8		10.03°	3.13	3.25	3.35	3.44	3.65			●	3,000
3056247	R0.75 × 3 ×6			11.5		11.75°								●	4,870
3056248	R0.75 × 4 ×4			8.8		8.81°	4.18	4.33	4.46	4.59	4.9			●	3,000
3056249	R0.75 × 5 ×4			9.8		7.86°	5.22	5.4	5.56	5.74	6.14			●	3,000
3056250	R0.75 × 5 ×6			13.5		9.97°								●	4,870
3056251	R0.75 × 6 ×4			10.8		7.09°	6.27	6.47	6.67	6.89	7.38			●	3,000
3056252	R0.75 × 6 ×6			14.5		9.26°								●	4,870
3056253	R0.75 × 8 ×4			12.8		5.93°	8.34	8.61	8.89	9.19	9.87			●	3,110
3056254	R0.75 × 8 ×6			16.5		8.11°								●	4,870
3056255	R0.75 × 10 ×4			14.8		5.09°	10.41	10.75	11.11	11.49	12.36			●	3,380
3056256	R0.75 × 12 ×4			16.8		4.46°	12.48	12.89	13.32	13.79	14.84			●	3,640
3056257	R0.75 × 14 ×4	50		18.8		3.97°	14.55	15.03	15.54	16.09	17.33			●	3,640
3056258	R0.75 × 16 ×4			20.8		3.58°	16.61	17.17	17.76	18.39	19.82			●	3,640
3056259	R0.75 × 18 ×4	55		22.8		3.25°	18.68	19.3	19.97	20.69	22.3			●	3,640
3056260	R0.75 × 20 ×4			24.8		2.98°	20.75	21.44	22.19	22.99				●	3,640
3056261	R0.75 × 22 ×4	60		26.8		2.75°	22.82	23.58	24.41	25.29	—			●	3,640
3056262	R0.75 × 25 ×4	65		29.8		2.47°	25.92	26.79	27.73	28.74				●	3,640
3056263	R0.75 × 30 ×4	70		34.8		2.11°	31.08	32.14	33.27	34.49				●	3,640
3056264	R0.8 × 4 ×4	45	1.3	8.6	1.55	8.72°	4.18	4.32	4.45	4.59	4.88	1	A	●	4,230
3056265	R0.8 × 8 ×4			12.6		5.81°	8.34	8.6	8.88	9.18	9.86			●	4,230
3056266	R0.8 × 12 ×4			16.6		4.35°	12.48	12.88	13.32	13.78	14.83			●	4,230
3056267	R0.8 × 16 ×4	50		20.6		3.47°	16.61	17.16	17.75	18.38	19.8			●	4,230
3056268	R0.8 × 20 ×4	55		24.6		2.89°	20.75	21.44	22.18	22.98	—			●	4,230

●＝標準在庫品 ●=Standard stock item

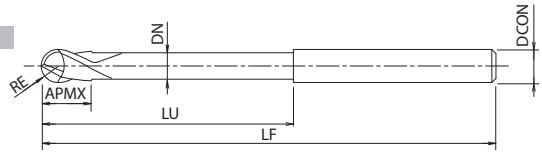
AE-LNBD-H

CARBIDE | DUROREY | R ±0.003 (RE≦0.25) | R ±0.005 (0.25<RE) | SHANK h4 | SHRINK FIT | 30° | SPEED FEED P9~P16

Type1



Type2



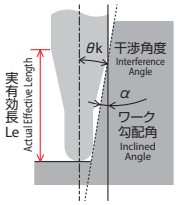
FROM

単位:mm Unit:mm

ツールNo. EDP No.	ボール半径×首下長×シャンク径 RE×LU×DCON	全長 LF	刃長 APMX	LH	首径 DN	干渉角度 θk	ワーク勾配角αに対する実有効長Le 注1 Effective length by inclined angles 0.5°	1°	1.5°	2°	3°	形状 Type	在庫 Stock		標準価格 (Yen)
3056269	R1 × 2.5 ×4	45	1.6	6.7	1.95	10.46°	2.61	2.74	2.87	3	3.28	1	A	●	2,590
3056270	R1 × 3 ×4			7.2		9.61°	3.15	3.31	3.47	3.63	3.95			●	2,590
3056271	R1 × 3 ×6			10.9		11.7°								●	3,930
3056272	R1 × 4 ×4			8.2		8.25°	4.22	4.44	4.65	4.85	5.25			●	2,590
3056273	R1 × 4 ×6			11.9		10.64°								●	3,930
3056274	R1 × 5 ×4			9.2		7.23°	5.29	5.56	5.81	6.05	6.48			●	2,920
3056275	R1 × 6 ×4			10.2		6.43°	6.35	6.67	6.96	7.23	7.73			●	2,920
3056276	R1 × 6 ×6			13.9		9°								●	4,470
3056277	R1 × 8 ×4			12.2		5.26°	8.47	8.87	9.22	9.53	10.21			●	3,110
3056278	R1 × 8 ×6			15.9		7.79°								●	4,770
3056279	R1 × 10 ×4			14.2		4.45°	10.58	11.04	11.45	11.83	12.7			●	3,110
3056280	R1 × 10 ×6	50		17.9		6.87°								●	4,770
3056281	R1 × 12 ×4	45		16.2		3.86°	12.68	13.21	13.66	14.13	15.19			●	3,110
3056282	R1 × 12 ×6	50		19.9		6.14°								●	4,770
3056283	R1 × 13 ×4			17.2		3.61°	13.73	14.28	14.77	15.28	16.43			●	3,110
3056284	R1 × 14 ×4			18.2		3.4°	14.78	15.36	15.88	16.43	17.67			●	3,110
3056285	R1 × 16 ×4			20.2		3.04°	16.87	17.5	18.09	18.73	20.16			●	3,110
3056286	R1 × 16 ×6	55		23.9		5.06°								●	4,770
3056287	R1 × 18 ×4			22.2		2.75°	18.96	19.64	20.31	21.03	—			●	3,110
3056288	R1 × 20 ×4			24.2		2.51°	21.04	21.78	22.53	23.33				●	3,110
3056289	R1 × 20 ×6	60		27.9		4.31°					25.13			●	4,770
3056290	R1 × 22 ×4			26.2		2.31°	23.12	23.92	24.74	25.63	—			●	4,310
3056291	R1 × 25 ×4	65		29.2		2.06°	26.24	27.13	28.07	29.08				●	4,360
3056292	R1 × 25 ×6			32.9		3.63°					31.35			●	4,470
3056293	R1 × 30 ×4	70		34.2		1.75°	31.42	32.47	33.61	—	—			●	4,970
3056294	R1 × 35 ×4			39.2		1.52°	36.58	37.82	39.15					●	6,840
3056295	R1 × 40 ×4	80		44.2		1.34°	41.75	43.17	—					●	6,840
3056296	R1.25 × 6 ×4	45	2	9	2.35	5.44°	6.26	6.51	6.75	6.98	7.42	1	A	●	3,850
3056297	R1.25 × 8 ×4			11		4.35°	8.36	8.69	8.99	9.27	9.91			●	3,420
3056298	R1.25 × 10 ×4			13		3.62°	10.45	10.85	11.2	11.57	12.4			●	4,060
3056299	R1.25 × 15 ×4	50		18		2.55°	15.67	16.21	16.74	17.32				●	4,230
3056300	R1.25 × 20 ×4	55		23		1.97°	20.86	21.55	22.29					●	4,930
3056301	R1.25 × 25 ×4	65		28		1.61°	26.04	26.9	27.83	—	—			●	5,300
3056302	R1.25 × 30 ×4	70		33		1.35°	31.21	32.25	—					●	6,070
3056303	R1.25 × 35 ×4			38		1.17°	36.38	37.6						●	7,440

●＝標準在庫品 ●=Standard stock item

注1：ワーク勾配角αに対する実有効長 Le 欄に数値がないものは干渉無しを表します。
Note：If there is no value in the actual effective length (Le column) for the work gradient angle α, it indicates no interference.



FROM

単位:mm　Unit:mm

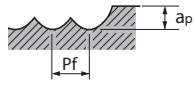
ツールNo. EDP No.	ボール半径×首下長×シャンク径 RE×LU×DCON	全長 LF	刃長 APMX	LH	首径 DN	干渉角度 θk	ワーク勾配角αに対する実有効長Le 注1 Effective length by inclined angles 0.5°	1°	1.5°	2°	3°	形状 Type	在庫 Stock		標準価格 (Yen)
3056304	R1.5 × 6 ×6	50	2.4	11.8	2.85	8.15°	6.25	6.49	6.72	6.94	7.36	1	A	●	3,180
3056305	R1.5 × 8 ×6			13.8		6.87°	8.35	8.66	8.96	9.23	9.84			●	3,180
3056306	R1.5 × 10 ×6			15.8		5.93°	10.44	10.83	11.17	11.53	12.33			●	3,610
3056307	R1.5 × 12 ×6	55		17.8		5.22°	12.53	12.98	13.39	13.83	14.82			●	3,610
3056308	R1.5 × 13 ×6			18.8		4.92°	13.57	14.05	14.5	14.98	16.06			●	4,230
3056309	R1.5 × 14 ×6			19.8		4.66°	14.62	15.12	15.61	16.13	17.3			●	4,230
3056310	R1.5 × 15 ×6			20.8		4.42°	15.66	16.19	16.72	17.28	18.55			●	4,230
3056311	R1.5 × 16 ×6			21.8		4.2°	16.7	17.26	17.82	18.43	19.79			●	4,230
3056312	R1.5 × 20 ×6	60		25.8		3.52°	20.85	21.54	22.26	23.03	24.76			●	4,110
3056313	R1.5 × 25 ×6	65		30.8		2.92°	26.03	26.89	27.8	28.78				●	4,110
3056314	R1.5 × 30 ×6	70		35.8		2.5°	31.2	32.23	33.34	34.53	—			●	4,630
3056315	R1.5 × 35 ×6	80		40.8		2.18°	36.37	37.58	38.88	40.28				●	5,890
3056316	R1.5 × 40 ×6	90		45.8		1.94°	41.54	42.93	44.42	—				●	7,330
3056317	R1.75 × 10 ×6	50	2.8	14.9	3.35	5.38°	10.43	10.81	11.15	11.49	12.26	1	A	●	5,380
3056318	R1.75 × 15 ×6	55		19.9		3.92°	15.65	16.17	16.69	17.24	18.48			●	5,380
3056319	R1.75 × 16 ×6			20.9		3.72°	16.69	17.24	17.8	18.39	19.72			●	5,380
3056320	R1.75 × 20 ×6	60		24.9		3.08°	20.84	21.52	22.23	22.99	24.7			●	5,380
3056321	R1.75 × 25 ×6	65		29.9		2.54°	26.02	26.87	27.77	28.74				●	5,610
3056322	R1.75 × 30 ×6	70		34.9		2.16°	31.19	32.22	33.31	34.49				●	5,610
3056323	R1.75 × 35 ×6	80		39.9		1.88°	36.36	37.56	38.85		—			●	7,250
3056324	R1.75 × 40 ×6	90		44.9		1.66°	41.53	42.91	44.4	—				●	7,250
3056325	R1.75 × 45 ×6			49.9		1.49°	46.7	48.26	—					●	8,690
3056326	R2 × 8 ×4	55	3.2	—	3.85	—	—	—	—	—	—	2	A	●	3,110
3056327	R2 × 8 ×6			12		5.65°	8.32	8.62	8.9	9.15	9.71	1		●	3,270
3056328	R2 × 10 ×6	60		14		4.73°	10.42	10.79	11.12	11.45	12.2			●	3,270
3056329	R2 × 12 ×6			16		4.07°	12.51	12.94	13.33	13.75	14.69			●	4,250
3056330	R2 × 13 ×6			17		3.8°	13.55	14.02	14.44	14.9	15.93			●	4,250
3056331	R2 × 14 ×6			18		3.56°	14.59	15.09	15.55	16.05	17.17			●	4,250
3056332	R2 × 15 ×6			19		3.36°	15.64	16.15	16.66	17.2	18.41			●	4,250
3056333	R2 × 16 ×6			20		3.17°	16.68	17.22	17.77	18.35	19.66			●	4,250
3056334	R2 × 20 ×6	65		24		2.6°	20.83	21.5	22.2	22.95				●	4,250
3056335	R2 × 25 ×6	70		29		2.12°	26.01	26.85	27.74	28.7				●	4,250
3056336	R2 × 30 ×6	80		34		1.79°	31.18	32.2	33.28		—			●	4,250
3056337	R2 × 35 ×6			39		1.55°	36.35	37.55	38.83					●	4,890
3056338	R2 × 40 ×6	90		44		1.37°	41.52	42.89		—				●	5,500
3056339	R2 × 45 ×6			49		1.22°	46.69	48.24	—					●	7,070
3056340	R2 × 50 ×6	100		54		1.11°	51.86	53.59						●	7,660
3056341	R2.5 × 10 ×6	60	4	12.1	4.85	2.95°	10.39	10.75	11.07	11.37		1	A	●	4,970
3056342	R2.5 × 15 ×6			17.1		1.95°	15.62	16.12	16.6					●	6,930
3056343	R2.5 × 20 ×6	70		22.1		1.46°	20.81	21.47						●	7,060
3056344	R2.5 × 25 ×6			27.1		1.17°	26	26.81						●	7,060
3056345	R2.5 × 30 ×6	80		32.1		0.97°	31.17			—	—			●	7,590
3056346	R2.5 × 35 ×6			37.1		0.83°	36.34		—					●	8,480
3056347	R2.5 × 40 ×6	90		42.1		0.73°	41.5	—						●	9,100
3056348	R2.5 × 45 ×6	100		47.1		0.65°	46.67							●	9,530
3056349	R2.5 × 50 ×6			52.1		0.58°	51.84							●	9,950
3056350	R3 × 10 ×6	60	4.8	—	5.85	—	—	—	—	—	—	2	A	●	5,300
3056351	R3 × 12 ×6													●	5,300
3056352	R3 × 15 ×6	65												●	5,300
3056353	R3 × 20 ×6	70												●	5,300
3056354	R3 × 25 ×6													●	5,300
3056355	R3 × 30 ×6	80												●	5,450
3056356	R3 × 35 ×6													●	5,450
3056357	R3 × 40 ×6	90												●	6,020
3056358	R3 × 45 ×6	100												●	6,210
3056359	R3 × 50 ×6	120												●	6,420
3056360	R3 × 60 ×6													●	6,930

●＝標準在庫品　●=Standard stock item

AE-LNBD-H 切削条件基準表 Cutting Condition

加工パスは等高線加工を前提としています。 The machining path is on condition of contouring line operation

被削材 Work Material		工具鋼・調質鋼・プリハードン鋼 Tool Steel・Hardened Steel Prehardened Steel SKD11・SKD61・NAK80 (～45HRC)				調質鋼 Hardened Steel															
						～55HRC				～62HRC				～66HRC				～70HRC			
RE	首下長 LU (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)
R0.05	0.2	50,000	80	0.003	0.003	50,000	70	0.003	0.003	50,000	70	0.003	0.003	50,000	60	0.003	0.003	50,000	50	0.003	0.003
	0.3	50,000	70	0.003	0.003	50,000	60	0.003	0.003	50,000	60	0.003	0.003	50,000	50	0.003	0.003	50,000	40	0.003	0.003
	0.5	50,000	50	0.003	0.003	50,000	40	0.003	0.003	50,000	40	0.003	0.003	50,000	30	0.003	0.003	50,000	20	0.003	0.003
R0.1	0.3	50,000	400	0.005	0.005	50,000	280	0.005	0.005	50,000	220	0.004	0.005	50,000	190	0.004	0.005	50,000	140	0.004	0.005
	0.5	50,000	380	0.005	0.005	50,000	260	0.005	0.005	50,000	200	0.004	0.005	50,000	170	0.004	0.005	50,000	130	0.004	0.005
	0.75	50,000	340	0.005	0.005	50,000	230	0.005	0.005	50,000	180	0.004	0.005	50,000	150	0.004	0.005	50,000	110	0.004	0.005
	1	50,000	340	0.005	0.005	50,000	230	0.005	0.005	50,000	180	0.004	0.005	50,000	150	0.004	0.005	45,000	110	0.004	0.005
	1.25	50,000	300	0.005	0.005	50,000	210	0.005	0.005	50,000	150	0.004	0.005	46,500	130	0.004	0.005	37,200	100	0.004	0.005
	1.5	50,000	280	0.005	0.005	50,000	190	0.005	0.005	49,200	130	0.004	0.005	44,300	110	0.004	0.005	35,500	80	0.004	0.005
	1.75	50,000	240	0.005	0.005	50,000	170	0.005	0.005	45,600	120	0.004	0.005	41,100	100	0.004	0.005	32,900	80	0.004	0.005
	2	45,600	210	0.005	0.005	44,500	140	0.005	0.005	39,600	100	0.004	0.005	35,700	90	0.004	0.005	28,600	70	0.004	0.005
	2.5	38,400	160	0.004	0.005	37,200	100	0.004	0.005	37,200	80	0.004	0.005	33,500	70	0.004	0.005	26,800	50	0.004	0.005
	3	38,400	140	0.004	0.005	37,200	90	0.004	0.005	37,200	70	0.004	0.005	33,500	60	0.004	0.005	26,800	50	0.004	0.005
R0.15	0.5	50,000	600	0.005	0.1	50,000	400	0.005	0.01	50,000	300	0.005	0.01	50,000	260	0.005	0.01	50,000	200	0.01	0.01
	0.6	50,000	570	0.005	0.1	50,000	390	0.005	0.01	50,000	300	0.005	0.01	50,000	260	0.005	0.01	50,000	200	0.01	0.01
	0.75	50,000	570	0.005	0.1	50,000	390	0.05	0.01	50,000	300	0.005	0.01	50,000	260	0.005	0.01	50,000	200	0.01	0.01
	1	50,000	570	0.005	0.01	50,000	390	0.005	0.01	50,000	300	0.005	0.01	50,000	260	0.005	0.01	50,000	200	0.01	0.01
	1.25	50,000	570	0.005	0.01	50,000	380	0.005	0.01	50,000	300	0.005	0.01	50,000	260	0.005	0.01	50,000	200	0.01	0.01
	1.5	50,000	570	0.005	0.01	50,000	370	0.005	0.01	50,000	290	0.005	0.01	50,000	250	0.005	0.01	46,500	190	0.01	0.01
	1.75	50,000	480	0.005	0.01	50,000	310	0.005	0.01	50,000	220	0.005	0.01	46,500	190	0.005	0.01	37,200	140	0.01	0.01
	2	50,000	450	0.005	0.005	50,000	290	0.005	0.005	49,200	210	0.004	0.005	44,300	180	0.004	0.005	35,500	140	0.004	0.005
	2.25	50,000	380	0.005	0.005	50,000	250	0.005	0.005	49,200	180	0.004	0.005	44,300	150	0.004	0.005	35,500	110	0.004	0.005
	2.5	48,000	280	0.005	0.005	48,000	190	0.005	0.005	43,200	130	0.004	0.005	38,900	110	0.004	0.005	31,200	80	0.004	0.005
	3	45,600	230	0.005	0.005	44,400	150	0.005	0.005	39,600	100	0.004	0.005	35,700	90	0.004	0.005	28,600	70	0.004	0.005
	3.5	40,800	190	0.004	0.005	39,600	120	0.004	0.005	39,600	95	0.004	0.005	35,700	80	0.004	0.005	28,600	60	0.004	0.005
	4	38,400	140	0.004	0.005	37,200	90	0.004	0.005	37,200	70	0.004	0.005	33,500	60	0.004	0.005	26,800	50	0.004	0.005
	4.5	38,400	120	0.004	0.005	37,200	80	0.004	0.005	37,200	60	0.004	0.005	33,500	50	0.004	0.005	26,800	40	0.004	0.005
	5	34,800	95	0.004	0.005	33,600	60	0.004	0.005	33,600	50	0.004	0.005	30,300	40	0.004	0.005	24,200	30	0.004	0.005



1. 機械、ホルダは剛性のある精度の高いものをご使用下さい。
2. 炭素鋼や焼入れ鋼の切削では、MQL（オイルミストクーラント）またはエアブローを推奨いたします。
3. 切削油剤は被削材に応じてエアブローまたは発煙性の少ない切削油剤をご使用下さい。
4. 上表は等高線加工における負荷の少ない安定した状況を基準としたものです。値は目安ですので実際の加工における切削条件は上表を参考に状況に応じて設定下さい。
5. 加工精度、加工形状、加工パスによって条件の調整を行って下さい。
6. φ0.5（R0.25）未満あるいはL/D（アスペクト比）が10以上では、わずかな負荷の増大で折損することがありますので、切削状況を見て切削条件の調整を行って下さい。
7. 回転速度が不足する場合は、回転速度と送り速度を上表に対して同じ比率で下げて下さい。

NEXT

FROM

被削材 Work Material		工具鋼・調質鋼・プリハードン鋼 Tool Steel・Hardened Steel Prehardened Steel SKD11・SKD61・NAK80 (～45HRC)				調質鋼 Hardened Steel															
		～55HRC				～62HRC				～66HRC				～70HRC							
RE	首下長 LU (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)
R0.2	0.5	50,000	900	0.01	0.02	50,000	630	0.01	0.02	50,000	500	0.008	0.015	50,000	430	0.008	0.015	50,000	320	0.008	0.015
	0.75	50,000	850	0.01	0.02	50,000	590	0.01	0.02	50,000	470	0.008	0.015	50,000	400	0.008	0.015	50,000	300	0.008	0.015
	0.8	50,000	850	0.01	0.02	50,000	590	0.01	0.02	50,000	470	0.008	0.015	50,000	400	0.008	0.015	50,000	300	0.008	0.015
	1	50,000	850	0.01	0.02	50,000	550	0.01	0.02	50,000	440	0.008	0.015	50,000	370	0.008	0.015	50,000	280	0.008	0.015
	1.5	50,000	760	0.01	0.02	50,000	520	0.01	0.02	50,000	410	0.008	0.015	50,000	350	0.008	0.015	46,500	260	0.008	0.015
	2	50,000	660	0.01	0.02	50,000	460	0.01	0.02	50,000	330	0.008	0.015	48,600	280	0.008	0.015	38,900	210	0.008	0.015
	2.5	50,000	520	0.008	0.015	50,000	360	0.008	0.015	49,200	260	0.008	0.015	44,300	220	0.008	0.015	35,500	170	0.008	0.015
	3	50,000	470	0.005	0.01	50,000	320	0.005	0.01	45,600	220	0.005	0.01	41,100	190	0.005	0.01	32,900	140	0.005	0.01
	3.5	48,000	400	0.005	0.01	48,000	280	0.005	0.01	43,200	200	0.005	0.01	38,900	170	0.005	0.01	31,200	130	0.005	0.01
	4	43,200	350	0.005	0.005	42,000	230	0.005	0.005	37,200	160	0.005	0.005	33,500	140	0.005	0.005	26,800	110	0.005	0.005
	4.5	38,400	270	0.004	0.005	37,200	180	0.004	0.005	33,600	130	0.004	0.005	30,300	110	0.004	0.005	24,200	80	0.004	0.005
	5	38,400	260	0.004	0.005	37,200	170	0.004	0.005	33,600	120	0.004	0.005	30,300	100	0.004	0.005	24,200	80	0.004	0.005
	5.5	36,000	210	0.004	0.005	34,800	140	0.004	0.005	31,200	100	0.004	0.005	28,100	90	0.004	0.005	22,500	70	0.004	0.005
	6	36,000	190	0.004	0.005	34,800	120	0.004	0.005	31,200	100	0.004	0.005	28,100	90	0.004	0.005	22,500	70	0.004	0.005
R0.25	0.75	50,000	1,100	0.015	0.03	50,000	750	0.015	0.03	50,000	590	0.01	0.02	50,000	500	0.01	0.02	50,000	380	0.01	0.02
	1	50,000	1,050	0.015	0.03	50,000	730	0.015	0.03	50,000	580	0.01	0.02	50,000	490	0.01	0.02	50,000	370	0.01	0.02
	1.5	50,000	1,050	0.015	0.03	50,000	700	0.015	0.03	50,000	560	0.01	0.02	50,000	480	0.01	0.02	48,000	360	0.01	0.02
	2	50,000	950	0.015	0.03	50,000	650	0.015	0.03	50,000	520	0.01	0.02	48,600	440	0.01	0.02	38,900	330	0.01	0.02
	2.5	50,000	950	0.015	0.03	50,000	600	0.015	0.03	50,000	430	0.01	0.02	46,500	370	0.01	0.02	37,200	280	0.01	0.02
	3	50,000	850	0.01	0.02	50,000	550	0.01	0.02	48,000	390	0.01	0.02	43,200	330	0.01	0.02	34,600	250	0.01	0.02
	3.5	50,000	650	0.01	0.02	50,000	450	0.01	0.02	45,600	320	0.01	0.02	41,100	270	0.01	0.02	32,900	200	0.01	0.02
	4	50,000	570	0.01	0.01	50,000	390	0.01	0.01	40,800	270	0.01	0.01	36,800	230	0.01	0.01	29,400	170	0.01	0.01
	4.5	45,600	470	0.01	0.01	45,600	320	0.01	0.01	31,200	220	0.01	0.01	28,100	190	0.01	0.01	22,500	140	0.01	0.01
	5	36,000	380	0.005	0.01	34,800	250	0.005	0.01	28,800	170	0.005	0.01	26,000	140	0.005	0.01	20,800	110	0.005	0.01
	5.5	33,600	280	0.004	0.005	32,400	180	0.004	0.005	26,400	120	0.004	0.005	23,800	100	0.004	0.005	19,100	80	0.004	0.005
	6	31,200	230	0.004	0.005	30,000	150	0.004	0.005	24,000	100	0.004	0.005	21,600	90	0.004	0.005	17,300	70	0.004	0.005
	7	28,800	190	0.004	0.005	27,600	130	0.004	0.005	24,000	100	0.004	0.005	21,600	90	0.004	0.005	17,300	70	0.004	0.005
	8	26,400	150	0.004	0.005	25,200	110	0.004	0.005	24,000	100	0.004	0.005	21,600	90	0.004	0.005	17,300	70	0.004	0.005
	9	24,000	110	0.004	0.005	25,200	100	0.004	0.005	24,000	90	0.004	0.005	21,600	80	0.004	0.005	17,300	60	0.004	0.005
	10	24,000	95	0.004	0.005	25,200	100	0.004	0.005	24,000	90	0.004	0.005	21,600	80	0.004	0.005	17,300	60	0.004	0.005

1. Use a rigid and precise machine and holder.
2. When machining carbon steels or hardened steels, using MQL (Minimum Quantity Lubrication / oil mist coolant) or air blow is recommended.
3. Use an air blow or a suitable cutting fluid with high smoke retardant properties.
4. The above cutting conditions are for contouring operation with low-load and stable condition. Refer to the table above to set the milling conditions in accordance with the actual situation.
5. Please adjust conditions based on machining accuracy, machining shape and machining path.
6. When using a tool with a diameter of ϕ 0.5 (R0.25) or less, or L/D (aspect ratio) is greater than 10, high loads can cause tool breakage. Therefore, adjust the cutting conditions based on the machining situation.
7. When RPM are insufficient, please reduce the RPM and feed rates at same ratio as listed above.

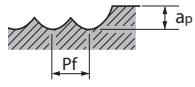
NEXT

AE-LNBD-H 切削条件基準表 Cutting Condition

FROM

加工パスは等高線加工を前提としています。 The machining path is on condition of contouring line operation

被削材 Work Material		工具鋼・調質鋼・プリハードン鋼 Tool Steel・Hardened Steel Prehardened Steel SKD11・SKD61・NAK80 (～45HRC)				調質鋼 Hardened Steel															
						～55HRC				～62HRC				～66HRC				～70HRC			
RE	首下長 LU (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)
R0.3	0.75	50,000	1,250	0.03	0.05	50,000	880	0.03	0.05	50,000	700	0.01	0.02	50,000	600	0.01	0.02	50,000	450	0.01	0.02
	1	50,000	1,200	0.03	0.05	50,000	840	0.03	0.05	50,000	670	0.01	0.02	50,000	570	0.01	0.02	50,000	430	0.01	0.02
	1.2	50,000	1,200	0.03	0.05	50,000	840	0.03	0.05	50,000	670	0.01	0.02	50,000	570	0.01	0.02	50,000	430	0.01	0.02
	1.5	50,000	1,200	0.03	0.05	50,000	830	0.03	0.05	50,000	660	0.01	0.02	50,000	560	0.01	0.02	50,000	420	0.01	0.02
	2	50,000	1,200	0.03	0.05	50,000	820	0.03	0.05	50,000	650	0.01	0.02	50,000	550	0.01	0.02	50,000	410	0.01	0.02
	2.5	50,000	1,100	0.03	0.05	50,000	770	0.03	0.05	50,000	610	0.01	0.02	50,000	520	0.01	0.02	48,000	390	0.01	0.02
	3	50,000	1,100	0.02	0.03	50,000	750	0.02	0.03	50,000	540	0.01	0.02	48,600	460	0.01	0.02	38,900	350	0.01	0.02
	3.5	50,000	950	0.02	0.03	50,000	660	0.02	0.03	49,200	480	0.01	0.02	44,300	410	0.01	0.02	35,500	310	0.01	0.02
	4	48,000	850	0.01	0.02	48,000	590	0.01	0.02	43,200	420	0.01	0.02	38,900	360	0.01	0.02	31,200	270	0.01	0.02
	4.5	40,800	740	0.01	0.02	40,800	510	0.01	0.02	37,200	370	0.01	0.02	33,500	310	0.01	0.02	26,800	230	0.01	0.02
	5	36,000	640	0.01	0.02	36,000	440	0.01	0.02	32,400	310	0.01	0.02	29,200	260	0.01	0.02	23,400	200	0.01	0.02
	5.5	33,600	610	0.01	0.02	33,600	420	0.01	0.02	30,000	300	0.01	0.02	27,000	260	0.01	0.02	21,600	200	0.01	0.02
	6	31,200	570	0.01	0.02	30,000	380	0.01	0.02	26,400	260	0.01	0.02	23,800	220	0.01	0.02	19,100	170	0.01	0.02
	6.5	28,800	520	0.01	0.01	27,600	340	0.01	0.01	24,000	230	0.01	0.01	21,600	200	0.01	0.01	17,300	150	0.01	0.01
	7	27,600	420	0.01	0.01	26,400	280	0.01	0.01	22,800	190	0.01	0.01	20,600	160	0.01	0.01	16,500	120	0.01	0.01
	7.5	27,600	380	0.01	0.01	26,400	250	0.01	0.01	22,800	170	0.01	0.01	20,600	140	0.01	0.01	16,500	110	0.01	0.01
	8	24,000	300	0.005	0.01	22,800	200	0.005	0.01	20,400	140	0.005	0.01	18,400	120	0.005	0.01	14,700	90	0.005	0.01
	8.5	24,000	280	0.005	0.01	22,800	180	0.005	0.01	20,400	130	0.005	0.01	18,400	110	0.005	0.01	14,700	80	0.005	0.01
	9	24,000	260	0.005	0.01	22,800	170	0.005	0.01	20,400	120	0.005	0.01	18,400	100	0.005	0.01	14,700	80	0.005	0.01
	9.5	24,000	220	0.005	0.008	22,800	140	0.005	0.008	20,400	110	0.005	0.008	18,400	90	0.005	0.008	14,700	70	0.005	0.008
	10	24,000	190	0.005	0.008	22,800	120	0.005	0.008	20,400	100	0.005	0.008	18,400	90	0.005	0.008	14,700	70	0.005	0.008
	11	21,600	140	0.005	0.008	20,400	90	0.005	0.008	20,400	80	0.005	0.008	18,400	70	0.005	0.008	14,700	50	0.005	0.008
	12	21,600	110	0.005	0.005	20,400	80	0.005	0.005	20,400	70	0.004	0.005	18,400	60	0.004	0.005	14,700	50	0.004	0.005



1. 機械、ホルダは剛性のある精度の高いものをご使用下さい。
2. 炭素鋼や焼入れ鋼の切削では、MQL（オイルミストクーラント）またはエアブローを推奨いたします。
3. 切削油剤は被削材に応じてエアブローまたは発煙性の少ない切削油剤をご使用下さい。
4. 上表は等高線加工における負荷の少ない安定した状況を基準としたものです。値は目安ですので実際の加工における切削条件は上表を参考に状況に応じて設定下さい。
5. 加工精度、加工形状、加工パスによって条件の調整を行って下さい。
6. φ0.5（R0.25）未満あるいはL/D（アスペクト比）が10以上では、わずかな負荷の増大で折損することがありますので、切削状況を見て切削条件の調整を行って下さい。
7. 回転速度が不足する場合は、回転速度と送り速度を上表に対して同じ比率で下げて下さい。

NEXT

FROM

被削材 Work Material		工具鋼・調質鋼・プリハードン鋼 Tool Steel・Hardened Steel Prehardened Steel SKD11・SKD61・NAK80 (～45HRC)				調質鋼 Hardened Steel															
		～55HRC				～62HRC				～66HRC				～70HRC							
RE	首下長 LU (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)
R0.4	1	50,000	2,200	0.04	0.08	50,000	1,800	0.04	0.08	50,000	1,400	0.04	0.08	50,000	1,190	0.04	0.08	50,000	890	0.04	0.08
	1.5	50,000	2,000	0.04	0.08	50,000	1,700	0.04	0.08	50,000	1,300	0.04	0.08	50,000	1,110	0.04	0.08	50,000	830	0.04	0.08
	2	50,000	1,900	0.04	0.08	50,000	1,600	0.04	0.08	50,000	1,200	0.015	0.03	50,000	1,020	0.015	0.03	50,000	770	0.015	0.03
	2.5	50,000	1,700	0.04	0.08	50,000	1,400	0.04	0.08	50,000	1,000	0.015	0.03	50,000	850	0.015	0.03	41,500	640	0.015	0.03
	3	50,000	1,500	0.04	0.08	50,000	1,100	0.04	0.08	50,000	820	0.015	0.03	48,600	700	0.015	0.03	38,900	530	0.015	0.03
	4	48,000	1,100	0.04	0.08	48,000	1,000	0.04	0.08	45,600	760	0.015	0.03	41,100	650	0.015	0.03	32,900	490	0.015	0.03
	5	40,800	900	0.03	0.05	40,800	800	0.03	0.05	37,200	580	0.015	0.03	33,500	490	0.015	0.03	26,800	370	0.015	0.03
	6	36,000	760	0.03	0.05	36,000	650	0.03	0.05	32,400	460	0.015	0.03	29,200	390	0.015	0.03	23,400	290	0.015	0.03
	7	30,000	570	0.01	0.02	30,000	450	0.01	0.02	26,400	310	0.01	0.02	23,800	260	0.01	0.02	19,100	200	0.01	0.02
	8	27,600	420	0.005	0.01	27,600	300	0.005	0.01	24,000	200	0.005	0.01	21,600	170	0.005	0.01	17,300	130	0.005	0.01
	9	25,200	360	0.005	0.009	24,000	250	0.005	0.009	22,200	190	0.005	0.009	20,000	160	0.005	0.009	16,000	120	0.005	0.009
	10	21,600	300	0.005	0.008	20,400	200	0.005	0.008	20,400	170	0.005	0.008	18,400	140	0.005	0.008	14,700	110	0.005	0.008
	12	20,400	230	0.005	0.005	19,200	160	0.005	0.005	19,200	110	0.005	0.005	17,300	90	0.005	0.005	13,900	70	0.005	0.005
R0.5	1.5	50,000	3,900	0.05	0.1	50,000	3,900	0.05	0.1	50,000	3,100	0.02	0.05	50,000	2,640	0.02	0.05	50,000	1,980	0.02	0.05
	2	50,000	3,700	0.05	0.1	50,000	3,700	0.05	0.1	50,000	3,000	0.02	0.05	50,000	2,550	0.02	0.05	50,000	1,910	0.02	0.05
	2.5	50,000	3,350	0.05	0.1	50,000	3,100	0.05	0.1	50,000	2,500	0.02	0.05	50,000	2,130	0.02	0.05	48,000	1,600	0.02	0.05
	3	50,000	3,000	0.05	0.1	50,000	2,400	0.05	0.1	50,000	1,900	0.02	0.05	48,600	1,620	0.02	0.05	38,900	1,220	0.02	0.05
	4	48,000	2,850	0.05	0.1	48,000	2,200	0.05	0.1	48,000	1,700	0.02	0.05	43,200	1,450	0.02	0.05	34,600	1,090	0.02	0.05
	5	43,200	2,100	0.05	0.1	43,200	1,600	0.05	0.1	43,200	1,200	0.02	0.05	38,900	1,020	0.02	0.05	31,200	770	0.02	0.05
	6	36,000	1,900	0.05	0.1	36,000	1,500	0.05	0.1	36,000	1,200	0.02	0.05	32,400	1,020	0.02	0.05	26,000	770	0.02	0.05
	7	32,400	1,600	0.05	0.1	32,400	1,300	0.05	0.1	32,400	1,000	0.02	0.05	29,200	850	0.02	0.05	23,400	640	0.02	0.05
	8	31,200	1,500	0.05	0.1	31,200	1,200	0.05	0.1	31,200	960	0.02	0.05	28,100	820	0.02	0.05	22,500	620	0.02	0.05
	9	28,800	1,100	0.03	0.05	28,800	880	0.03	0.05	28,800	700	0.02	0.05	26,000	600	0.02	0.05	20,800	450	0.02	0.05
	10	26,400	1,000	0.01	0.02	25,200	760	0.01	0.02	21,600	520	0.01	0.02	19,500	440	0.01	0.02	15,600	330	0.01	0.02
	12	24,000	760	0.01	0.01	22,800	570	0.01	0.01	20,400	400	0.01	0.01	18,400	340	0.01	0.01	14,700	260	0.01	0.01
	13	22,800	670	0.005	0.01	21,600	500	0.005	0.01	19,200	350	0.005	0.01	17,300	300	0.005	0.01	13,900	230	0.005	0.01
	14	21,600	570	0.005	0.01	20,400	430	0.005	0.01	18,000	300	0.005	0.01	16,200	260	0.005	0.01	13,000	200	0.005	0.01
	16	19,200	400	0.005	0.01	18,000	300	0.005	0.01	15,600	200	0.005	0.01	14,100	170	0.005	0.01	11,300	130	0.005	0.01
	18	16,800	300	0.005	0.005	15,600	220	0.005	0.005	14,400	160	0.004	0.005	13,000	140	0.004	0.005	10,400	110	0.004	0.005
	20	15,600	285	0.005	0.005	14,400	180	0.005	0.005	14,400	140	0.004	0.005	13,000	120	0.004	0.005	10,400	90	0.004	0.005
	22	14,400	190	0.005	0.005	14,400	110	0.005	0.005	14,400	100	0.004	0.005	13,000	90	0.004	0.005	10,400	70	0.004	0.005

1. Use a rigid and precise machine and holder.
2. When machining carbon steels or hardened steels, using MQL (Minimum Quantity Lubrication / oil mist coolant) or air blow is recommended.
3. Use an air blow or a suitable cutting fluid with high smoke retardant properties.
4. The above cutting conditions are for contouring operation with low-load and stable condition. Refer to the table above to set the milling conditions in accordance with the actual situation.
5. Please adjust conditions based on machining accuracy, machining shape and machining path.
6. When using a tool with a diameter of ϕ 0.5 (R0.25) or less, or L/D (aspect ratio) is greater than 10, high loads can cause tool breakage. Therefore, adjust the cutting conditions based on the machining situation.
7. When RPM are insufficient, please reduce the RPM and feed rates at same ratio as listed above.

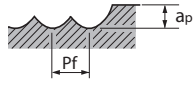
NEXT

AE-LNBD-H 切削条件基準表 Cutting Condition

FROM

加工パスは等高線加工を前提としています。 The machining path is on condition of contouring line operation

被削材 Work Material		工具鋼・調質鋼・プリハードン鋼 Tool Steel・Hardened Steel Prehardened Steel SKD11・SKD61・NAK80 (～45HRC)				調質鋼 Hardened Steel															
						～55HRC				～62HRC				～66HRC				～70HRC			
RE	首下長 LU (mm)	回転速度 Speed (min⁻¹)	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min⁻¹)	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min⁻¹)	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min⁻¹)	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min⁻¹)	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)
R0.6	2	50,000	3,800	0.06	0.12	50,000	3,800	0.06	0.12	50,000	3,200	0.02	0.05	50,000	2,720	0.02	0.05	50,000	2,040	0.02	0.05
	2.4	50,000	3,600	0.06	0.12	50,000	3,600	0.06	0.12	50,000	3,000	0.02	0.05	50,000	2,550	0.02	0.05	50,000	1,910	0.02	0.05
	2.5	50,000	3,600	0.06	0.12	50,000	3,600	0.06	0.12	50,000	3,000	0.02	0.05	50,000	2,550	0.02	0.05	48,000	1,910	0.02	0.05
	3	50,000	3,200	0.06	0.12	50,000	3,200	0.06	0.12	50,000	2,600	0.02	0.05	46,500	2,210	0.02	0.05	37,200	1,660	0.02	0.05
	4	48,000	2,850	0.06	0.12	48,000	2,300	0.06	0.12	45,600	1,750	0.02	0.05	41,100	1,490	0.02	0.05	32,900	1,120	0.02	0.05
	6	38,400	2,000	0.06	0.12	38,400	1,600	0.06	0.12	36,000	1,200	0.02	0.05	32,400	1,020	0.02	0.05	26,000	770	0.02	0.05
	8	30,000	1,600	0.06	0.12	30,000	1,200	0.06	0.12	30,000	960	0.02	0.05	27,000	820	0.02	0.05	21,600	620	0.02	0.05
	10	24,000	1,100	0.05	0.1	21,600	800	0.05	0.1	19,200	560	0.02	0.05	17,300	480	0.02	0.05	13,900	360	0.02	0.05
	12	20,400	850	0.03	0.05	19,200	640	0.03	0.05	16,800	440	0.02	0.05	15,200	370	0.02	0.05	12,100	280	0.02	0.05
	14	19,200	610	0.03	0.05	18,000	450	0.03	0.05	15,600	310	0.02	0.05	14,100	260	0.02	0.05	11,300	200	0.02	0.05
	16	18,000	420	0.02	0.05	16,800	300	0.02	0.05	14,400	200	0.02	0.05	13,000	170	0.02	0.05	10,400	130	0.02	0.05
	18	18,000	330	0.005	0.005	16,800	200	0.005	0.005	14,400	130	0.004	0.005	13,000	110	0.004	0.005	10,400	80	0.004	0.005
	20	15,600	300	0.005	0.005	14,400	180	0.005	0.005	12,000	120	0.004	0.005	10,800	100	0.004	0.005	8,700	80	0.004	0.005
R0.75	2	50,000	5,200	0.075	0.15	50,000	5,200	0.075	0.15	50,000	4,200	0.03	0.06	50,000	3,570	0.03	0.06	50,000	2,680	0.03	0.06
	2.5	50,000	5,000	0.075	0.15	50,000	5,000	0.075	0.15	50,000	4,000	0.03	0.06	50,000	3,400	0.03	0.06	50,000	2,550	0.03	0.06
	3	50,000	4,800	0.075	0.15	50,000	4,800	0.075	0.15	50,000	3,900	0.03	0.06	50,000	3,320	0.03	0.06	48,000	2,490	0.03	0.06
	4	48,000	3,700	0.075	0.15	48,000	2,900	0.075	0.15	45,600	2,200	0.03	0.06	41,100	1,870	0.03	0.06	32,900	1,400	0.03	0.06
	5	42,000	3,200	0.075	0.15	42,000	2,600	0.075	0.15	39,600	1,900	0.03	0.06	35,700	1,620	0.03	0.06	28,600	1,220	0.03	0.06
	6	36,000	2,700	0.075	0.15	36,000	2,200	0.075	0.15	32,400	1,500	0.03	0.06	29,200	1,280	0.03	0.06	23,400	960	0.03	0.06
	8	28,800	2,100	0.075	0.15	28,800	1,700	0.075	0.15	25,200	1,100	0.03	0.06	22,700	940	0.03	0.06	18,200	710	0.03	0.06
	10	28,800	1,900	0.075	0.15	28,800	1,500	0.075	0.15	25,200	1,000	0.03	0.06	22,700	850	0.03	0.06	18,200	640	0.03	0.06
	12	25,200	1,300	0.075	0.1	25,200	1,000	0.075	0.1	21,600	680	0.03	0.06	19,500	580	0.03	0.06	15,600	440	0.03	0.06
	14	20,400	1,100	0.05	0.1	20,400	900	0.05	0.1	18,000	630	0.03	0.06	16,200	540	0.03	0.06	13,000	410	0.03	0.06
	16	16,800	760	0.05	0.1	15,600	560	0.05	0.1	12,000	340	0.03	0.05	10,800	290	0.03	0.05	8,700	220	0.03	0.05
	18	15,600	470	0.03	0.05	14,400	350	0.03	0.05	12,000	230	0.03	0.05	10,800	200	0.03	0.05	8,700	150	0.03	0.05
	20	14,400	340	0.02	0.05	13,200	240	0.02	0.05	10,800	150	0.02	0.05	9,800	130	0.02	0.05	7,800	100	0.02	0.05
	22	14,400	300	0.02	0.05	13,200	220	0.02	0.05	10,800	140	0.02	0.05	9,800	120	0.02	0.05	7,800	90	0.02	0.05
	25	13,800	250	0.02	0.05	12,600	180	0.02	0.05	10,800	120	0.02	0.05	9,800	100	0.02	0.05	7,800	80	0.02	0.05
	30	13,200	190	0.005	0.01	12,000	120	0.005	0.01	10,800	90	0.005	0.01	9,800	80	0.005	0.01	7,800	60	0.01	0.01



1. 機械、ホルダは剛性のある精度の高いものをご使用下さい。
2. 炭素鋼や焼入れ鋼の切削では、MQL（オイルミストクーラント）またはエアブローを推奨いたします。
3. 切削油剤は被削材に応じてエアブローまたは発煙性の少ない切削油剤をご使用下さい。
4. 上表は等高線加工における負荷の少ない安定した状況を基準としたものです。値は目安ですので実際の加工における切削条件は上表を参考に状況に応じて設定下さい。
5. 加工精度、加工形状、加工パスによって条件の調整を行って下さい。
6. φ0.5（R0.25）未満あるいはL/D（アスペクト比）が10以上では、わずかな負荷の増大で折損することがありますので、切削状況を見て切削条件の調整を行って下さい。
7. 回転速度が不足する場合は、回転速度と送り速度を上表に対して同じ比率で下げて下さい。

NEXT

FROM

被削材 Work Material		工具鋼・調質鋼・プリハードン鋼 Tool Steel・Hardened Steel Prehardened Steel SKD11・SKD61・NAK80 (～45HRC)				調質鋼 Hardened Steel															
		～55HRC				～62HRC				～66HRC				～70HRC							
RE	首下長 LU (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)
R0.8	4	36,000	3,500	0.08	0.16	34,800	2,700	0.08	0.16	31,200	2,000	0.03	0.08	28,100	1,700	0.03	0.08	22,500	1,280	0.03	0.08
	8	28,800	2,800	0.08	0.16	27,600	2,100	0.08	0.16	24,000	1,400	0.03	0.08	21,600	1,190	0.03	0.08	17,300	890	0.03	0.08
	12	25,200	1,700	0.05	0.1	24,000	1,380	0.05	0.1	21,600	990	0.03	0.08	19,500	840	0.03	0.08	15,600	630	0.03	0.08
	16	16,800	760	0.05	0.1	15,600	600	0.05	0.1	13,200	400	0.03	0.08	11,900	340	0.03	0.08	9,600	260	0.03	0.08
	20	14,400	360	0.03	0.05	13,200	280	0.03	0.05	12,000	200	0.03	0.05	10,800	170	0.03	0.05	8,700	130	0.03	0.05
R1	2.5	50,000	6,400	0.1	0.2	50,000	6,000	0.1	0.2	50,000	4,400	0.05	0.1	50,000	3,740	0.05	0.1	43,200	2,810	0.05	0.1
	3	50,000	6,000	0.1	0.2	50,000	5,700	0.1	0.2	50,000	4,000	0.05	0.1	48,600	3,400	0.05	0.1	38,900	2,550	0.05	0.1
	4	50,000	5,600	0.1	0.2	50,000	5,300	0.1	0.2	48,000	3,600	0.05	0.1	43,200	3,060	0.05	0.1	34,600	2,300	0.05	0.1
	5	48,000	4,500	0.1	0.2	46,800	4,300	0.1	0.2	40,800	2,700	0.05	0.1	36,800	2,300	0.05	0.1	29,400	1,730	0.05	0.1
	6	43,200	2,800	0.1	0.2	42,000	2,700	0.1	0.2	36,000	1,800	0.05	0.1	32,400	1,530	0.05	0.1	26,000	1,150	0.05	0.1
	8	30,000	2,400	0.1	0.2	28,800	2,300	0.1	0.2	24,000	1,500	0.05	0.1	21,600	1,280	0.05	0.1	17,300	960	0.05	0.1
	10	24,000	2,200	0.1	0.2	22,800	2,000	0.1	0.2	20,400	1,400	0.05	0.1	18,400	1,190	0.05	0.1	14,700	890	0.05	0.1
	12	19,200	1,900	0.1	0.2	18,000	1,700	0.1	0.2	15,600	1,100	0.05	0.1	14,100	940	0.05	0.1	11,300	710	0.05	0.1
	13	19,200	1,800	0.1	0.2	18,000	1,600	0.1	0.2	15,600	1,050	0.05	0.1	14,100	890	0.05	0.1	11,300	670	0.05	0.1
	14	18,000	1,700	0.1	0.2	16,800	1,500	0.1	0.2	14,400	1,000	0.05	0.1	13,000	850	0.05	0.1	10,400	640	0.05	0.1
	16	16,800	1,600	0.1	0.1	15,600	1,400	0.1	0.1	13,200	950	0.05	0.1	11,900	810	0.05	0.1	9,600	610	0.05	0.1
	18	15,600	1,500	0.1	0.1	14,400	1,200	0.1	0.1	12,000	800	0.05	0.1	10,800	680	0.05	0.1	8,700	510	0.05	0.1
	20	13,200	1,100	0.05	0.1	12,000	890	0.05	0.1	10,800	640	0.05	0.1	9,800	540	0.05	0.1	7,800	410	0.05	0.1
	22	10,800	950	0.05	0.1	10,800	860	0.05	0.1	9,000	570	0.05	0.1	8,100	480	0.05	0.1	6,500	360	0.05	0.1
	25	10,800	760	0.03	0.05	10,800	680	0.03	0.05	9,000	450	0.03	0.05	8,100	380	0.03	0.05	6,500	290	0.03	0.05
	30	10,800	470	0.02	0.05	10,800	360	0.02	0.05	9,000	240	0.02	0.05	8,100	200	0.02	0.05	6,500	150	0.02	0.05
	35	9,000	230	0.02	0.03	8,400	130	0.02	0.03	7,200	100	0.02	0.03	6,500	90	0.02	0.03	5,200	70	0.02	0.03
	40	7,200	140	0.02	0.03	7,200	100	0.02	0.03	7,200	90	0.02	0.03	6,500	80	0.02	0.03	5,200	60	0.02	0.03
R1.25	6	28,800	3,600	0.1	0.2	27,600	3,400	0.1	0.2	24,000	2,400	0.05	0.1	21,600	2,040	0.05	0.1	17,300	1,530	0.05	0.1
	8	26,400	3,350	0.1	0.2	25,200	3,150	0.1	0.2	21,600	2,150	0.05	0.1	19,500	1,830	0.05	0.1	15,600	1,370	0.05	0.1
	10	24,000	3,100	0.1	0.2	22,800	2,900	0.1	0.2	19,200	1,900	0.05	0.1	17,300	1,620	0.05	0.1	13,900	1,220	0.05	0.1
	15	20,400	2,600	0.1	0.2	19,200	2,400	0.1	0.2	16,800	1,600	0.05	0.1	15,200	1,360	0.05	0.1	12,100	1,020	0.05	0.1
	20	18,000	1,700	0.1	0.2	16,800	1,600	0.1	0.2	14,400	1,000	0.05	0.1	13,000	850	0.05	0.1	10,400	640	0.05	0.1
	25	13,200	950	0.03	0.05	12,000	830	0.03	0.05	10,800	590	0.03	0.05	9,800	500	0.03	0.05	7,800	380	0.03	0.05
	30	10,800	760	0.03	0.05	9,600	650	0.03	0.05	8,400	450	0.03	0.05	7,600	380	0.03	0.05	6,100	290	0.03	0.05
	35	9,000	470	0.02	0.03	8,400	430	0.02	0.03	7,200	290	0.02	0.03	6,500	250	0.02	0.03	5,200	190	0.02	0.03

1. Use a rigid and precise machine and holder.
2. When machining carbon steels or hardened steels, using MQL (Minimum Quantity Lubrication / oil mist coolant) or air blow is recommended.
3. Use an air blow or a suitable cutting fluid with high smoke retardant properties.
4. The above cutting conditions are for contouring operation with low-load and stable condition. Refer to the table above to set the milling conditions in accordance with the actual situation.
5. Please adjust conditions based on machining accuracy, machining shape and machining path.
6. When using a tool with a diameter of ϕ 0.5 (R0.25) or less, or L/D (aspect ratio) is greater than 10, high loads can cause tool breakage. Therefore, adjust the cutting conditions based on the machining situation.
7. When RPM are insufficient, please reduce the RPM and feed rates at same ratio as listed above.

NEXT

AE-LNBD-H 切削条件基準表 Cutting Condition

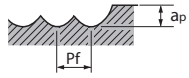
FROM

加工パスは等高線加工を前提としています。 The machining path is on condition of contouring line operation

被削材 Work Material		工具鋼・調質鋼・プリハードン鋼 Tool Steel・Hardened Steel Prehardened Steel SKD11・SKD61・NAK80 (～45HRC)				調質鋼 Hardened Steel															
		～55HRC				～62HRC				～66HRC				～70HRC							
RE	首下長 LU (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)
R1.5	6	49,800	6,200	0.15	0.3	38,400	4,800	0.15	0.3	31,800	3,300	0.06	0.15	28,700	2,810	0.06	0.15	22,900	2,110	0.06	0.15
	8	36,000	4,200	0.15	0.3	30,000	3,500	0.15	0.3	26,400	2,400	0.06	0.15	23,800	2,040	0.06	0.15	19,100	1,530	0.06	0.15
	10	30,000	3,600	0.15	0.3	24,000	2,800	0.15	0.3	21,600	2,000	0.06	0.15	19,500	1,700	0.06	0.15	15,600	1,280	0.06	0.15
	12	24,000	2,800	0.15	0.3	21,600	2,500	0.15	0.3	19,200	1,700	0.06	0.15	17,300	1,450	0.06	0.15	13,900	1,090	0.06	0.15
	13	22,800	2,650	0.15	0.3	19,800	2,250	0.15	0.3	17,400	1,500	0.06	0.15	15,700	1,280	0.06	0.15	12,600	960	0.06	0.15
	14	21,600	2,500	0.15	0.3	18,000	2,000	0.15	0.3	15,600	1,300	0.06	0.15	14,100	1,110	0.06	0.15	11,300	830	0.06	0.15
	15	19,200	2,200	0.1	0.3	15,600	1,800	0.1	0.3	13,200	1,200	0.06	0.15	11,900	1,020	0.06	0.15	9,600	770	0.06	0.15
	16	19,200	1,900	0.1	0.2	15,600	1,500	0.1	0.2	13,200	1,100	0.06	0.15	11,900	940	0.06	0.15	9,600	710	0.06	0.15
	20	16,800	1,700	0.1	0.2	13,200	1,600	0.1	0.2	12,000	1,000	0.06	0.15	10,800	850	0.06	0.15	8,700	640	0.06	0.15
	25	14,400	1,100	0.05	0.1	10,800	820	0.05	0.1	9,600	580	0.05	0.1	8,700	490	0.05	0.1	7,000	370	0.05	0.1
	30	10,800	760	0.03	0.05	8,400	590	0.03	0.05	7,200	400	0.03	0.05	6,500	340	0.03	0.05	5,200	260	0.03	0.05
	35	9,000	570	0.02	0.05	7,200	460	0.02	0.05	6,000	300	0.02	0.05	5,400	260	0.02	0.05	4,400	200	0.02	0.05
	40	7,800	470	0.02	0.03	6,000	360	0.02	0.03	4,800	230	0.02	0.03	4,400	200	0.02	0.03	3,500	150	0.02	0.03
R1.75	10	24,000	3,100	0.1	0.3	19,200	2,200	0.1	0.3	16,800	1,500	0.07	0.15	15,200	1,280	0.07	0.15	12,100	960	0.07	0.15
	15	21,600	2,800	0.1	0.3	16,800	2,000	0.1	0.3	14,400	1,300	0.07	0.15	13,000	1,110	0.07	0.15	10,400	830	0.07	0.15
	16	20,400	2,700	0.1	0.3	15,600	1,900	0.1	0.2	13,200	1,250	0.07	0.15	11,900	1,060	0.07	0.15	9,600	800	0.07	0.15
	20	19,200	2,500	0.1	0.2	14,400	1,800	0.1	0.2	12,000	1,200	0.07	0.15	10,800	1,020	0.07	0.15	8,700	770	0.07	0.15
	25	14,400	1,900	0.1	0.1	10,800	1,300	0.1	0.1	9,600	920	0.07	0.15	8,700	780	0.07	0.15	7,000	590	0.07	0.15
	30	12,000	1,500	0.05	0.1	9,600	1,100	0.05	0.1	8,400	770	0.05	0.1	7,600	650	0.05	0.1	6,100	490	0.05	0.1
	35	10,800	950	0.05	0.05	8,400	700	0.05	0.05	6,000	400	0.05	0.05	5,400	340	0.05	0.05	4,400	260	0.05	0.05
	40	9,000	760	0.05	0.05	7,200	580	0.05	0.05	4,800	300	0.05	0.05	4,400	260	0.05	0.05	3,500	200	0.05	0.05
	45	7,800	570	0.03	0.03	6,000	420	0.03	0.03	4,800	260	0.03	0.03	4,400	220	0.03	0.03	3,500	170	0.03	0.03
R2	8	37,200	5,700	0.2	0.5	28,800	4,400	0.2	0.5	24,000	3,200	0.08	0.2	21,600	2,720	0.08	0.2	17,300	2,040	0.08	0.2
	10	30,000	4,200	0.2	0.5	24,000	3,300	0.2	0.5	21,600	2,300	0.08	0.2	19,500	1,960	0.08	0.2	15,600	1,470	0.08	0.2
	12	24,000	3,400	0.2	0.5	20,400	2,900	0.2	0.5	16,800	1,900	0.08	0.2	15,200	1,620	0.08	0.2	12,100	1,220	0.08	0.2
	13	24,000	3,400	0.2	0.5	19,800	2,800	0.2	0.5	15,600	1,750	0.08	0.2	14,100	1,490	0.08	0.2	11,300	1,120	0.08	0.2
	14	24,000	3,400	0.2	0.5	19,800	2,800	0.2	0.5	15,600	1,750	0.08	0.2	14,100	1,490	0.08	0.2	11,300	1,120	0.08	0.2
	15	24,000	3,400	0.2	0.5	19,200	2,700	0.2	0.5	14,400	1,600	0.08	0.2	13,000	1,360	0.08	0.2	10,400	1,020	0.08	0.2
	16	21,600	3,000	0.2	0.5	18,000	2,500	0.2	0.5	12,000	1,300	0.08	0.2	10,800	1,110	0.08	0.2	8,700	830	0.08	0.2
	20	19,200	2,600	0.2	0.4	16,800	2,300	0.2	0.4	9,600	1,000	0.08	0.2	8,700	850	0.08	0.2	7,000	640	0.08	0.2
	25	19,200	2,600	0.1	0.3	15,600	2,200	0.1	0.3	7,200	810	0.08	0.2	6,500	690	0.08	0.2	5,200	520	0.08	0.2
	30	16,800	2,200	0.1	0.2	14,400	1,900	0.1	0.2	6,000	630	0.08	0.2	5,400	540	0.08	0.2	4,400	410	0.08	0.2
	35	14,400	1,700	0.1	0.2	10,800	1,200	0.1	0.2	4,800	420	0.08	0.2	4,400	360	0.08	0.2	3,500	270	0.08	0.2
	40	10,800	1,200	0.05	0.1	9,600	1,000	0.05	0.1	4,800	400	0.05	0.1	4,400	340	0.05	0.1	3,500	260	0.05	0.1
	45	9,000	950	0.05	0.05	8,400	890	0.05	0.05	4,400	360	0.05	0.05	3,900	310	0.05	0.05	3,200	230	0.05	0.05
	50	7,800	660	0.02	0.05	7,200	600	0.02	0.05	4,400	280	0.02	0.05	3,900	240	0.02	0.05	3,200	180	0.02	0.05

NEXT

FROM

被削材 Work Material		工具鋼・調質鋼・プリハードン鋼 Tool Steel・Hardened Steel Prehardened Steel SKD11・SKD61・NAK80 (～45HRC)				調質鋼 Hardened Steel													
						～55HRC				～62HRC				～66HRC				～70HRC			
RE	首下長 LU (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	Pf (mm)
R2.5	10	30,000	5,400	0.25	0.5	22,800	4,000	0.25	0.5	19,200	2,800	0.1	0.25	17,300	2,380	0.1	0.25	13,900	1,790	0.1	0.25
	15	24,000	3,900	0.25	0.5	20,400	3,300	0.25	0.5	15,600	2,000	0.1	0.25	14,100	1,700	0.1	0.25	11,300	1,280	0.1	0.25
	20	19,200	3,300	0.25	0.5	15,600	2,700	0.25	0.5	9,600	1,300	0.1	0.25	8,700	1,110	0.1	0.25	7,000	830	0.1	0.25
	25	18,000	3,000	0.2	0.3	14,400	2,400	0.2	0.3	7,200	960	0.1	0.25	6,500	820	0.1	0.25	5,200	620	0.1	0.25
	30	16,800	2,300	0.1	0.3	13,200	1,800	0.1	0.3	4,800	520	0.1	0.25	4,400	440	0.1	0.25	3,500	330	0.1	0.25
	35	14,400	1,500	0.1	0.3	12,000	1,100	0.1	0.3	3,900	280	0.1	0.25	3,500	240	0.1	0.25	2,800	180	0.1	0.25
	40	12,000	1,100	0.1	0.2	10,800	990	0.1	0.2	3,600	260	0.1	0.2	3,300	220	0.1	0.2	2,600	170	0.1	0.2
	45	10,800	850	0.1	0.1	9,600	660	0.1	0.1	3,600	200	0.1	0.1	3,300	170	0.1	0.1	2,600	130	0.1	0.1
	50	9,000	760	0.1	0.1	8,400	610	0.1	0.1	3,400	190	0.1	0.1	3,100	160	0.1	0.1	2,500	120	0.1	0.1
R3	10	26,400	5,600	0.3	0.5	21,600	3,800	0.3	0.5	18,600	2,800	0.1	0.2	16,800	2,380	0.1	0.2	13,400	1,790	0.1	0.2
	12	24,000	5,200	0.3	0.5	19,200	3,400	0.3	0.5	16,200	2,500	0.1	0.2	14,600	2,130	0.1	0.2	11,700	1,600	0.1	0.2
	15	22,200	4,800	0.3	0.5	17,400	3,250	0.3	0.5	14,400	1,850	0.1	0.2	13,000	1,570	0.1	0.2	10,400	1,180	0.1	0.2
	20	19,200	3,900	0.3	0.5	14,400	3,000	0.3	0.5	9,600	1,600	0.1	0.2	8,700	1,360	0.1	0.2	7,000	1,020	0.1	0.2
	25	14,400	3,000	0.3	0.5	12,000	2,500	0.3	0.5	7,200	1,200	0.1	0.2	6,500	1,020	0.1	0.2	5,200	770	0.1	0.2
	30	12,000	2,400	0.3	0.5	10,800	2,100	0.3	0.5	4,800	740	0.1	0.2	4,400	630	0.1	0.2	3,500	470	0.1	0.2
	35	10,800	2,100	0.2	0.4	10,800	2,000	0.2	0.4	4,200	620	0.1	0.2	3,800	530	0.1	0.2	3,100	400	0.1	0.2
	40	10,800	1,900	0.2	0.3	10,800	1,800	0.2	0.3	3,600	480	0.1	0.2	3,300	410	0.1	0.2	2,600	310	0.1	0.2
	45	9,600	1,700	0.2	0.3	9,600	1,600	0.2	0.3	3,400	440	0.1	0.2	3,100	370	0.1	0.2	2,500	280	0.1	0.2
	50	8,400	1,500	0.2	0.3	8,400	1,400	0.2	0.3	3,000	400	0.1	0.2	2,700	340	0.1	0.2	2,200	260	0.1	0.2
	60	7,200	1,250	0.2	0.3	7,200	1,150	0.2	0.3	2,800	350	0.1	0.2	2,500	300	0.1	0.2	2,000	230	0.1	0.2
切込深さ Depth of Cut																					

1. 機械、ホルダは剛性のある精度の高いものをご使用下さい。
2. 炭素鋼や焼入れ鋼の切削では、MQL（オイルミストクーラント）またはエアブローを推奨いたします。
3. 切削油剤は被削材に応じてエアブローまたは発煙性の少ない切削油剤をご使用下さい。
4. 上表は等高線加工における負荷の少ない安定した状況を基準としたものです。値は目安ですので実際の加工における切削条件は上表を参考に状況に応じて設定下さい。
5. 加工精度、加工形状、加工パスによって条件の調整を行って下さい。
6. φ0.5（R0.25）未満あるいはL/D（アスペクト比）が10以上では、わずかな負荷の増大で折損することがありますので、切削状況を見て切削条件の調整を行って下さい。
7. 回転速度が不足する場合は、回転速度と送り速度を上表に対して同じ比率で下げて下さい。

1. Use a rigid and precise machine and holder.
2. When machining carbon steels or hardened steels, using MQL (Minimum Quantity Lubrication / oil mist coolant) or air blow is recommended.
3. Use an air blow or a suitable cutting fluid with high smoke retardant properties.
4. The above cutting conditions are for contouring operation with low-load and stable condition. Refer to the table above to set the milling conditions in accordance with the actual situation.
5. Please adjust conditions based on machining accuracy, machining shape and machining path.
6. When using a tool with a diameter of φ 0.5 (R0.25) or less, or L/D (aspect ratio) is greater than 10, high loads can cause tool breakage. Therefore, adjust the cutting conditions based on the machining situation.
7. When RPM are insufficient, please reduce the RPM and feed rates at same ratio as listed above.

高硬度鋼用超硬エンドミル
ロングネックラジアスタイプ
高能率仕上げ用4刃

4-flute high-efficiency finishing long neck carbide radius end mill for high-hardness steel

AE-CPR4-H

1 4枚刃仕様で高能率加工を実現

Achieves high efficiency milling with 4-flute specification

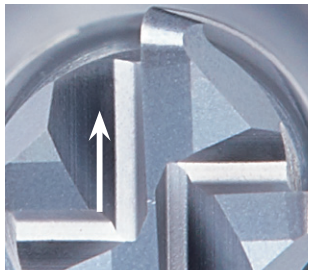
- **全サイズ4枚刃設定**
  - 4-flute configuration for all sizes

2 スパイラル形状の新ギャッシュ仕様

New spiral-shaped gash specification

- **中心部からコーナR部へスパイラル形状にした新ギャッシュ仕様により切りくず排出性の向上と切りくずの噛み込みを防止**
  - The new gash specification with a spiral shape from the center to the corner R improves chip evacuation and prevents chips from getting caught

AE-CPR4-H



従来品
Conventional

※外径φ1以上、かつコーナRがR0.1を超えるサイズに適用
*Applicable to sizes with an outer diameter of φ1 or more and a corner R exceeding R0.1

3 優れたコーナR精度

Superior R precision

- **高精度なコーナR部**
  - High precision corner R

RE ≦0.02

0.02＜ RE

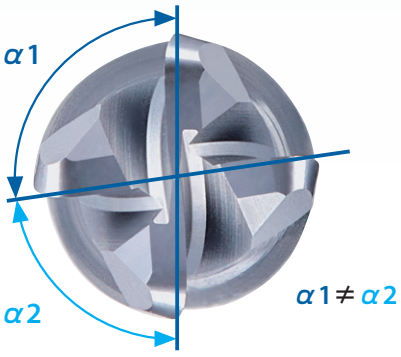
4 優れたシャンク精度

Superior shank accuracy

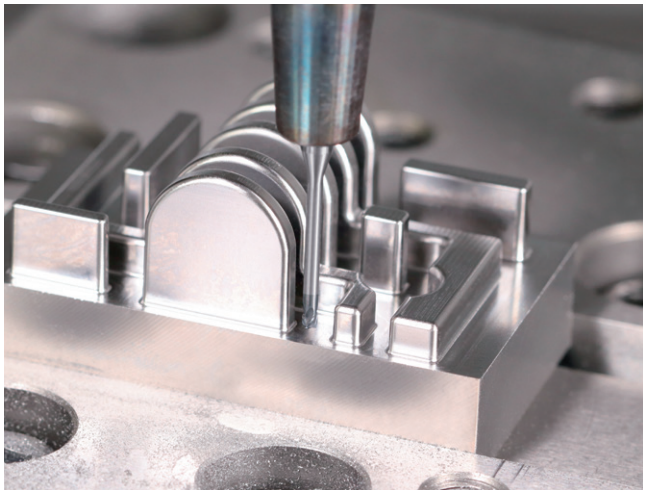
- **h4公差（0/-0.004）に対応**
  - Supports h4 tolerance (0/-0.004)

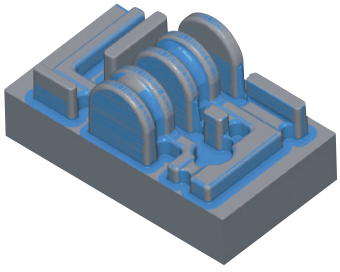
5 不等分割刃がびびりを抑制
Unequal spacing teeth suppresses chattering

• L/D＝14の深掘り加工でも「びびり振動」を抑制し、高能率な加工を実現
・Achieves highly efficient machining by the suppression of chattering even in deep milling of L/D = 14



加工形状
Processed shape

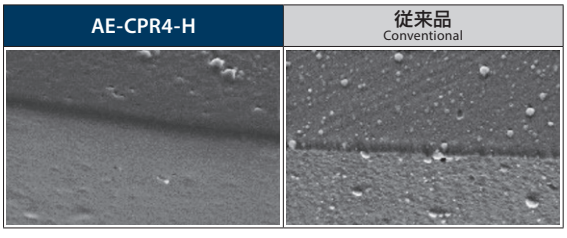




使用工具 Tool	AE-CPR4-H　φ2×R0.3×20
被削材 Work Material	SKD61（50HRC）
加工方法 Milling Method	等高線加工 Contour Milling
切削速度 Cutting Speed	58m/min（9,300min^{-1}）
送り速度 Feed	1,300mm/min（0.035mm/t）
切込深さ Depth of Cut	ap=0.05mm　Pf=0.36mm
突出し長さ Overhang Length	28mm（L/D=14）
切削油剤 Coolant	エアブロー Air Blow
使用機械 Machine	立形マシニングセンタ（HSK-A63） Vertical Machining Center

6 平滑処理
Smooth Surface Treatment

• コーティング表面の平滑化処理により、加工面精度が向上
・Improves surface accuracy by smoothening the coating surface



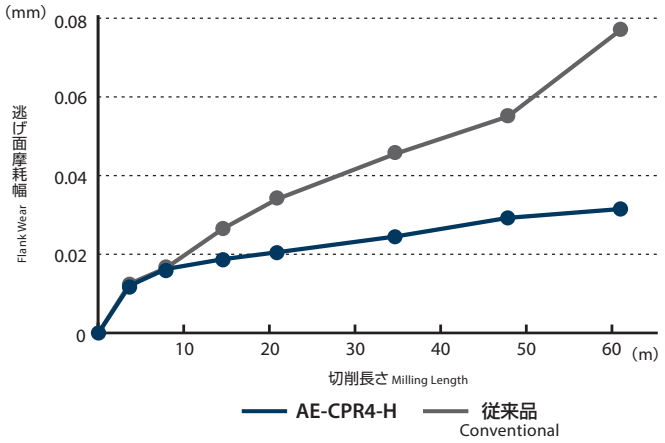
7 豊富なバリエーション
Abundant variations

• 176アイテム（φ0.2 ～φ4）で幅広い加工に対応可能
・176 items (φ 0.2 to φ 4) are available to accommodate a wide range of applications

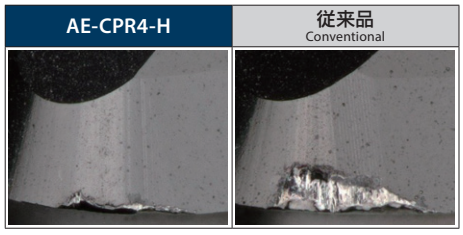
安定加工 Stable Performance

高硬度鋼加工において、高能率かつ優れた耐久性を発揮
Highly efficient and excellent durability in high hardness steel

使用工具 Tool	AE-CPR4-H φ2× R0.3×8	従来品 2枚刃 Conventional 2FL
被削材 Work Material	SKD11(60HRC)	
加工方法 Milling Method	正面切削 Frontal milling	
切削速度 Cutting Speed	72m/min(11,500min^{-1})	
送り速度 Feed	2,000mm/min (0.043mm/t)	1,000mm/min (0.043mm/t)
切込深さ Depth of Cut	ap=0.036mm ae=0.48mm	
切削油剤 Coolant	エアブロー Air Blow	
使用機械 Machine	立形マシニングセンタ(BT40) Vertical Machining Center	



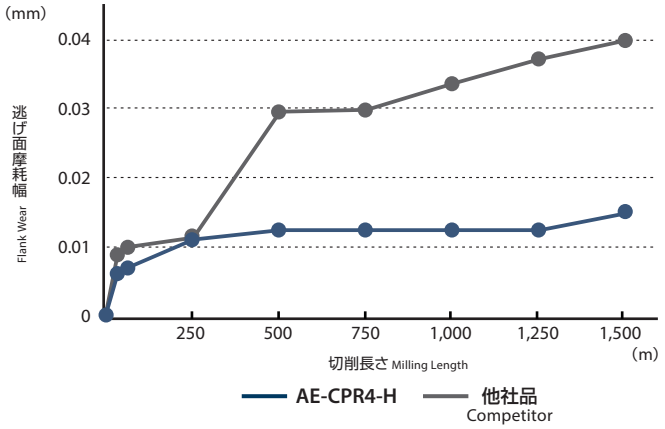
61.2m 加工後の刃先の損傷状態
Wear comparison of the cutting edge after milling 61.2 m



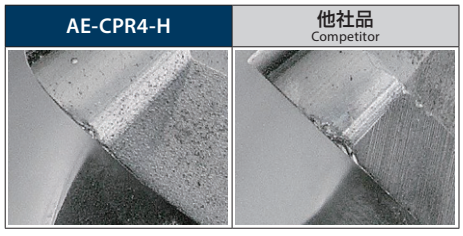
長寿命 Long Tool Life

プリハードン鋼NAK80(40HRC)において、安定した摩耗推移
Stable wear transition in pre-hardened steel NAK80 (40 HRC)

使用工具 Tool	AE-CPR4-H φ3× R0.5× 20
被削材 Work Material	NAK80(40HRC)
加工方法 Milling Method	正面切削 Frontal milling
切削速度 Cutting Speed	120m/min(12,730min^{-1})
送り速度 Feed	1,782mm/min(0.035mm/t)
切込深さ Depth of Cut	ap=0.04mm ae=0.734mm
切削油剤 Coolant	エアブロー Air Blow
使用機械 Machine	立形マシニングセンタ(BT40) Vertical Machining Center



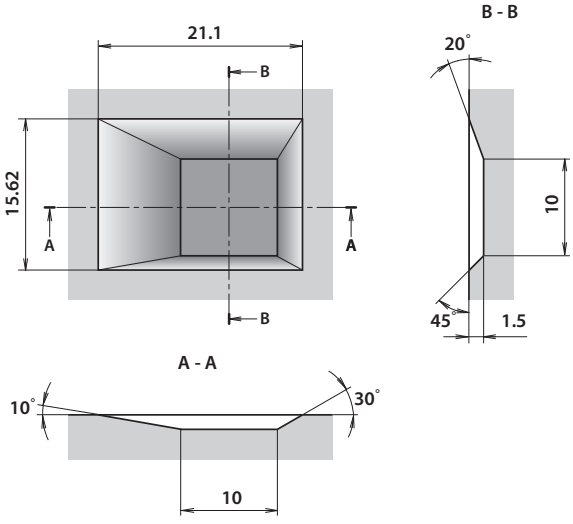
1,512m 加工後の刃先の損傷状態
Wear comparison of the cutting edge after milling 1,512 m



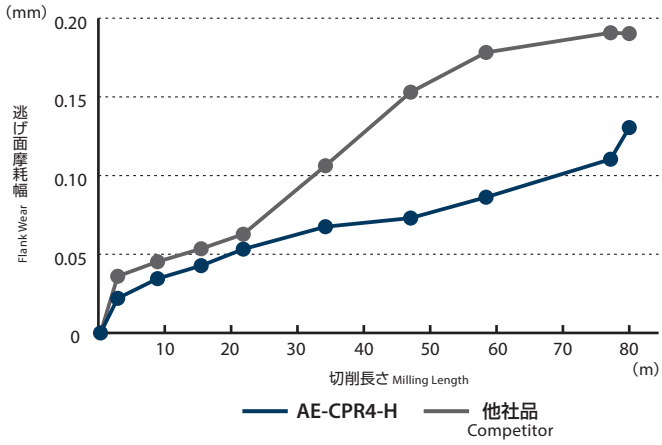
安定加工
Stable Performance

高硬度鋼の形状加工において、優れた耐久性と加工面精度を実現
Achieves excellent durability and machined surface accuracy in profiling of high-hardness steel

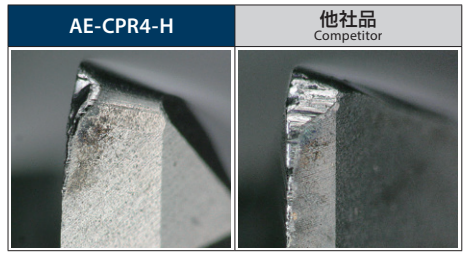
使用工具 Tool	AE-CPR4-H　φ3× R0.2×8
被削材 Work Material	SKD11（60HRC）
加工方法 Milling Method	ポケット加工 Pocket Milling
切削速度 Cutting Speed	79m/min（8,400min^{-1}）
送り速度 Feed	540mm/min（0.016mm/t）
切込深さ Depth of Cut	ap=0.04mm　ae=1mm
切削油剤 Coolant	エアブロー Air Blow
使用機械 Machine	立形マシニングセンタ（BT40） Vertical Machining Center



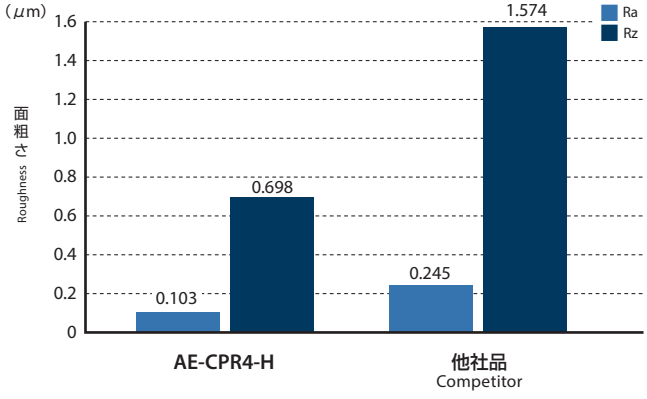
ポケット形状
Pocket Shape



80.2m（ポケット14個）加工後の刃先の損傷状態
Wear condition of outer peripheral cutting edge after milling 80.2m



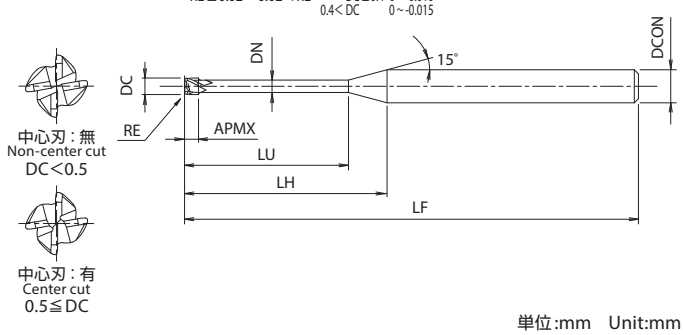
80.2m（ポケット14個）加工時点の底面粗さ
Bottom surface roughness after milling 80.2m



切削距離が長くなっても良好な加工面粗さ
Good machined surface roughness even when milling long distance

AE-CPR4-H

CARBIDE | DURO REY | R ±0.002 (RE≦0.02) | R ±0.005 (0.02<RE) | DC≦0.4 0~-0.010, 0.4<DC 0~-0.015 | SHRINK h4 | SHRINK FIT | 30° | SPEED FEED P25~P32

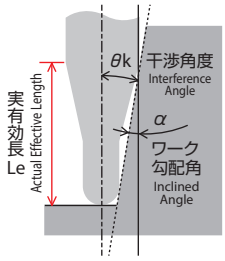


単位:mm　Unit:mm

ツールNo. EDP No.	外径×コーナ半径×首下長 DC × RE × LU	全長 LF	刃長 APMX	LH	首径 DN	干渉角度 θk	シャンク径 DCON	ワーク勾配角αに対する実有効長Le 注1 Effective length by inclined angles 0.5°	1°	1.5°	2°	3°	在庫 Stock		標準価格 (Yen)
8557470	0.2 × R0.02 × 0.5	45	0.15	7.7	0.18	13.88°	4	0.53	0.57	0.61	0.65	0.73		●	9,950
8557471	0.2 × R0.02 × 1	45	0.15	8.2	0.18	13.07°	4	1.06	1.13	1.2	1.26	1.38		●	9,950
8557472	0.2 × R0.02 × 1.5	45	0.15	8.7	0.18	12.34°	4	1.6	1.69	1.77	1.85	2		●	11,800
8557473	0.2 × R0.02 × 2	45	0.15	9.2	0.18	11.69°	4	2.12	2.24	2.33	2.43	2.62		●	12,900
8557474	0.2 × R0.05 × 0.5	45	0.15	7.7	0.18	13.93°	4	0.53	0.56	0.6	0.64	0.72	A	●	9,950
8557475	0.2 × R0.05 × 1	45	0.15	8.2	0.18	13.11°	4	1.06	1.13	1.19	1.25	1.37		●	9,950
8557476	0.2 × R0.05 × 1.5	45	0.15	8.7	0.18	12.37°	4	1.59	1.68	1.77	1.84	1.99		●	11,800
8557477	0.2 × R0.05 × 2	45	0.15	9.2	0.18	11.72°	4	2.12	2.23	2.33	2.42	2.61		●	12,900
8557478	0.3 × R0.02 × 1	45	0.25	8	0.28	13.02°	4	1.06	1.13	1.2	1.26	1.38		●	9,630
8557479	0.3 × R0.02 × 1.5	45	0.25	8.5	0.28	12.28°	4	1.6	1.69	1.77	1.85	2		●	9,630
8557480	0.3 × R0.02 × 2	45	0.25	9	0.28	11.62°	4	2.12	2.24	2.33	2.43	2.62		●	9,630
8557481	0.3 × R0.02 × 2.5	45	0.25	9.5	0.28	11.02°	4	2.65	2.78	2.89	3	3.24		●	12,100
8557482	0.3 × R0.02 × 3	45	0.25	10	0.28	10.48°	4	3.18	3.32	3.45	3.58	3.87	A	●	12,100
8557483	0.3 × R0.05 × 1	45	0.25	8	0.28	13.06°	4	1.06	1.13	1.19	1.25	1.37		●	9,630
8557484	0.3 × R0.05 × 1.5	45	0.25	8.5	0.28	12.32°	4	1.59	1.68	1.77	1.84	1.99		●	9,630
8557485	0.3 × R0.05 × 2	45	0.25	9	0.28	11.65°	4	2.12	2.23	2.33	2.42	2.61		●	9,630
8557486	0.3 × R0.05 × 2.5	45	0.25	9.5	0.28	11.05°	4	2.65	2.78	2.89	3	3.24	D	○	12,100
8557487	0.3 × R0.05 × 3	45	0.25	10	0.28	10.51°	4	3.18	3.32	3.44	3.57	3.86	A	●	12,100
8557488	0.4 × R0.02 × 1	45	0.3	8.2	0.37	12.41°	4	1.08	1.17	1.28	1.38	1.62		●	6,450
8557489	0.4 × R0.02 × 1.5	45	0.3	8.7	0.37	11.71°	4	1.62	1.76	1.89	2.03	2.32		●	6,450
8557490	0.4 × R0.02 × 2	45	0.3	9.2	0.37	11.09°	4	2.16	2.33	2.5	2.67	3		●	6,450
8557491	0.4 × R0.02 × 2.5	45	0.3	9.7	0.37	10.53°	4	2.7	2.9	3.1	3.29	3.66	A	●	6,450
8557492	0.4 × R0.02 × 3	45	0.3	10.2	0.37	10.03°	4	3.24	3.47	3.69	3.9	4.31		●	6,450
8557493	0.4 × R0.02 × 4	45	0.3	11.2	0.37	9.15°	4	4.31	4.59	4.85	5.1	5.57		●	6,450
8557494	0.4 × R0.05 × 1	45	0.3	8.2	0.37	12.45°	4	1.08	1.17	1.27	1.37	1.6		●	6,450
8557495	0.4 × R0.05 × 1.5	45	0.3	8.7	0.37	11.75°	4	1.62	1.75	1.89	2.03	2.31	D	○	6,450
8557496	0.4 × R0.05 × 2	45	0.3	9.2	0.37	11.12°	4	2.16	2.33	2.49	2.66	2.99	A	●	6,450
8557497	0.4 × R0.05 × 2.5	45	0.3	9.7	0.37	10.56°	4	2.7	2.9	3.09	3.28	3.65	D	○	6,450
8557498	0.4 × R0.05 × 3	45	0.3	10.2	0.37	10.05°	4	3.24	3.46	3.68	3.89	4.3		○	6,450
8557499	0.4 × R0.05 × 4	45	0.3	11.2	0.37	9.17°	4	4.31	4.59	4.85	5.1	5.56	A	●	6,450
8557500	0.4 × R0.1 × 1	45	0.3	8.2	0.37	12.51°	4	1.07	1.16	1.26	1.36	1.58		●	6,450
8557501	0.4 × R0.1 × 2	45	0.3	9.2	0.37	11.18°	4	2.16	2.32	2.48	2.65	2.98		●	6,450
8557502	0.4 × R0.1 × 3	45	0.3	10.2	0.37	10.1°	4	3.23	3.46	3.67	3.88	4.29	D	○	6,450
8557503	0.4 × R0.1 × 4	45	0.3	11.2	0.37	9.21°	4	4.3	4.58	4.84	5.09	5.55		○	6,450

●＝標準在庫品 Standard stock item　○＝準標準在庫品(在庫をご確認下さい。) Limited standard stock item

注1：ワーク勾配角αに対する実有効長 Le 欄に数値がないものは干渉無しを表します。
Note：If there is no value in the actual effective length (Le column) for the work gradient angle α, it indicates no interference.



単位:mm　Unit:mm

ツールNo. EDP No.	外径×コーナ半径×首下長 DC×RE×LU	全長 LF	刃長 APMX	LH	首径 DN	干渉角度 θk	シャンク径 DCON	ワーク勾配角αに対する実有効長Le 注1 Effective length by inclined angles 0.5°	1°	1.5°	2°	3°	在庫 Stock		標準価格 (Yen)
8557504	0.5×R0.02×1	45	0.4	8	0.46	12.39°	4	1.08	1.17	1.26	1.37	1.59		●	5,290
8557505	0.5×R0.02×2	45	0.4	9	0.46	11.04°	4	2.16	2.32	2.48	2.64	2.97		●	5,290
8557506	0.5×R0.02×3	45	0.4	10	0.46	9.96°	4	3.23	3.45	3.67	3.87	4.27	A	●	5,290
8557507	0.5×R0.02×4	45	0.4	11	0.46	9.07°	4	4.3	4.57	4.83	5.07	5.53		●	5,290
8557508	0.5×R0.02×5	45	0.4	12	0.46	8.32°	4	5.36	5.68	5.98	6.25	6.77		●	5,290
8557509	0.5×R0.02×6	45	0.4	13	0.46	7.69°	4	6.42	6.79	7.11	7.41	8.02	D	○	5,290
8557510	0.5×R0.05×1	45	0.4	8	0.46	12.43°	4	1.08	1.16	1.26	1.36	1.58		●	5,290
8557511	0.5×R0.05×2	45	0.4	9	0.46	11.08°	4	2.15	2.31	2.47	2.64	2.96	A	●	5,290
8557512	0.5×R0.05×3	45	0.4	10	0.46	9.99°	4	3.23	3.45	3.66	3.87	4.27		●	5,290
8557513	0.5×R0.05×4	45	0.4	11	0.46	9.09°	4	4.3	4.57	4.82	5.07	5.52		●	5,290
8557514	0.5×R0.05×5	45	0.4	12	0.46	8.34°	4	5.36	5.68	5.97	6.25	6.77	D	○	5,290
8557515	0.5×R0.05×6	45	0.4	13	0.46	7.71°	4	6.42	6.79	7.11	7.41	8.01		●	5,290
8557516	0.5×R0.1 ×1	45	0.4	8	0.46	12.5°	4	1.07	1.15	1.24	1.34	1.55		●	5,290
8557517	0.5×R0.1 ×2	45	0.4	9	0.46	11.13°	4	2.15	2.31	2.46	2.62	2.95	A	●	5,290
8557518	0.5×R0.1 ×3	45	0.4	10	0.46	10.03°	4	3.22	3.44	3.65	3.86	4.25		●	5,290
8557519	0.5×R0.1 ×4	45	0.4	11	0.46	9.13°	4	4.29	4.56	4.82	5.06	5.51		●	5,290
8557520	0.5×R0.1 ×5	45	0.4	12	0.46	8.37°	4	5.36	5.68	5.97	6.24	6.76	D	○	5,290
8557521	0.5×R0.1 ×6	45	0.4	13	0.46	7.73°	4	6.42	6.78	7.1	7.4	8		○	5,290
8557522	0.6×R0.1 ×2	45	0.48	8.8	0.55	11.08°	4	2.14	2.29	2.45	2.6	2.92		●	5,290
8557523	0.6×R0.1 ×4	45	0.48	10.8	0.55	9.05°	4	4.28	4.55	4.79	5.03	5.48	A	●	5,290
8557524	0.6×R0.1 ×6	45	0.48	12.8	0.55	7.64°	4	6.41	6.76	7.08	7.37	7.97		●	5,290
8557525	0.7×R0.02×2	45	0.55	8.6	0.65	10.9°	4	2.15	2.31	2.46	2.62	2.94	A	●	5,930
8557526	0.7×R0.02×4	45	0.55	10.6	0.65	8.88°	4	4.29	4.55	4.81	5.05	5.5		●	5,930
8557527	0.7×R0.02×6	45	0.55	12.6	0.65	7.48°	4	6.41	6.77	7.09	7.38	7.98	D	○	5,930
8557528	0.7×R0.05×2	45	0.55	8.6	0.65	10.94°	4	2.15	2.3	2.46	2.62	2.93	A	●	5,930
8557529	0.7×R0.05×4	45	0.55	10.6	0.65	8.9°	4	4.28	4.55	4.8	5.04	5.49		●	5,930
8557530	0.7×R0.05×6	45	0.55	12.6	0.65	7.5°	4	6.41	6.76	7.08	7.38	7.98	D	○	5,930
8557531	0.7×R0.1 ×2	45	0.55	8.6	0.65	10.99°	4	2.14	2.29	2.45	2.6	2.92	A	●	5,930
8557532	0.7×R0.1 ×4	45	0.55	10.6	0.65	8.94°	4	4.28	4.55	4.79	5.03	5.48		●	5,930
8557533	0.7×R0.1 ×6	45	0.55	12.6	0.65	7.53°	4	6.41	6.76	7.08	7.37	7.97	D	○	5,930
8557534	0.8×R0.1 ×4	45	0.65	10.4	0.75	8.83°	4	4.28	4.55	4.79	5.03	5.48		●	5,930
8557535	0.8×R0.1 ×6	45	0.65	12.4	0.75	7.41°	4	6.41	6.76	7.08	7.37	7.97		●	5,930
8557536	0.8×R0.2 ×4	45	0.65	10.4	0.75	8.9°	4	4.28	4.53	4.78	5.01	5.46	A	●	5,930
8557537	0.8×R0.2 ×6	45	0.65	12.4	0.75	7.47°	4	6.4	6.75	7.06	7.36	7.94		●	5,930
8557538	0.8×R0.2 ×8	45	0.65	14.4	0.75	6.43°	4	8.52	8.94	9.31	9.66	10.43		●	6,150
8557539	0.9×R0.1 ×4	45	0.7	10.2	0.85	8.71°	4	4.28	4.55	4.79	5.03	5.48	A	●	6,740
8557540	0.9×R0.1 ×8	45	0.7	14.2	0.85	6.27°	4	8.52	8.95	9.32	9.67	10.45		●	6,740
8557541	1 ×R0.05×4	45	0.8	10	0.94	8.57°	4	4.28	4.54	4.78	5.02	5.46		●	4,540
8557542	1 ×R0.05×6	45	0.8	12	0.94	7.16°	4	6.4	6.75	7.06	7.35	7.95	A	●	4,970
8557543	1 ×R0.05×8	45	0.8	14	0.94	6.14°	4	8.51	8.93	9.3	9.65	10.43		●	4,970
8557544	1 ×R0.05×10	45	0.8	16	0.94	5.38°	4	10.61	11.1	11.52	11.95	12.92		●	4,970
8557545	1 ×R0.05×12	45	0.8	18	0.94	4.78°	4	12.71	13.26	13.74	14.25	15.41	D	○	4,970
8557546	1 ×R0.1 ×4	45	0.8	10	0.94	8.61°	4	4.27	4.53	4.77	5.01	5.45		●	4,540
8557547	1 ×R0.1 ×6	45	0.8	12	0.94	7.18°	4	6.39	6.74	7.05	7.34	7.93		●	4,970
8557548	1 ×R0.1 ×8	45	0.8	14	0.94	6.16°	4	8.51	8.93	9.3	9.65	10.42		●	4,970
8557549	1 ×R0.1 ×10	45	0.8	16	0.94	5.39°	4	10.61	11.1	11.52	11.95	12.91		●	4,970
8557550	1 ×R0.1 ×12	45	0.8	18	0.94	4.79°	4	12.71	13.25	13.73	14.25	15.39		●	4,970
8557551	1 ×R0.2 ×4	45	0.8	10	0.94	8.69°	4	4.27	4.52	4.76	4.99	5.42		●	4,540
8557552	1 ×R0.2 ×6	45	0.8	12	0.94	7.24°	4	6.39	6.73	7.04	7.33	7.91		●	4,970
8557553	1 ×R0.2 ×8	45	0.8	14	0.94	6.2°	4	8.5	8.92	9.29	9.63	10.4		●	4,970
8557554	1 ×R0.2 ×10	45	0.8	16	0.94	5.42°	4	10.61	11.09	11.51	11.93	12.88	A	●	4,970
8557555	1 ×R0.2 ×12	45	0.8	18	0.94	4.82°	4	12.7	13.24	13.72	14.23	15.37		●	4,970
8557556	1 ×R0.2 ×16	55	0.8	22	0.94	3.94°	4	16.89	17.53	18.16	18.83	20.34		●	4,970
8557557	1 ×R0.2 ×20	55	0.8	26	0.94	3.33°	4	21.05	21.81	22.59	23.43	25.32		●	4,970
8557558	1 ×R0.3 ×4	45	0.8	10	0.94	8.77°	4	4.26	4.51	4.74	4.97	5.4		●	4,540
8557559	1 ×R0.3 ×6	45	0.8	12	0.94	7.3°	4	6.38	6.72	7.03	7.31	7.89		●	4,970
8557560	1 ×R0.3 ×8	45	0.8	14	0.94	6.24°	4	8.5	8.91	9.27	9.62	10.37		●	4,970
8557561	1 ×R0.3 ×10	45	0.8	16	0.94	5.46°	4	10.6	11.08	11.5	11.92	12.86		●	4,970
8557562	1 ×R0.3 ×12	45	0.8	18	0.94	4.84°	4	12.7	13.24	13.71	14.22	15.35		●	5,110

●＝標準在庫品　Standard stock item
○＝準標準在庫品(在庫をご確認下さい。)　Limited standard stock item

高硬度鋼用超硬エンドミル ロングネックラジアスタイプ 高能率仕上げ用4刃

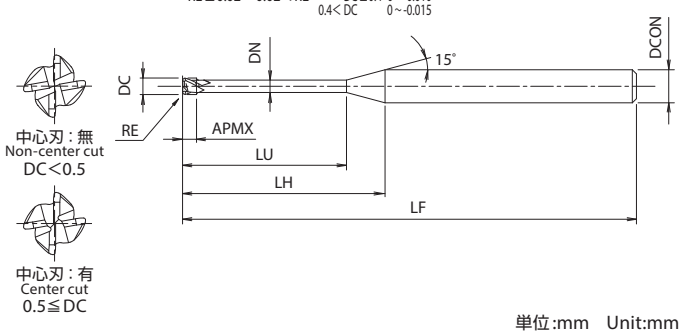
4-flute long neck radius type high efficiency finishing carbide end mills for high-hardness steels

NEW

The A Brand

AE-CPR4-H

CARBIDE | DUROREY | R ±0.002 (RE≦0.02) | R ±0.005 (0.02<RE) | DC≦0.4 0~-0.010, 0.4<DC 0~-0.015 | SHRINK h4 | SHRINK FIT | 30° | SPEED FEED P25~P32



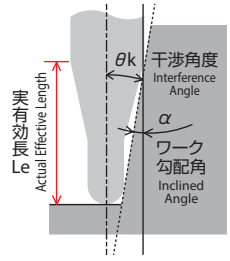
FROM

単位:mm Unit:mm

ツールNo. EDP No.	外径×コーナ半径×首下長 DC × RE × LU	全長 LF	刃長 APMX	LH	首径 DN	干渉角度 θk	シャンク径 DCON	ワーク勾配角αに対する実有効長Le 注1 Effective length by inclined angles 0.5°	1°	1.5°	2°	3°	在庫 Stock		標準価格 (Yen)
8557563	1.2 × R0.2 × 6	45	1	11.6	1.14	6.98°	4	6.39	6.73	7.04	7.33	7.91		●	4,970
8557564	1.2 × R0.2 × 8	45	1	13.6	1.14	5.95°	4	8.5	8.92	9.29	9.63	10.4	A	●	4,970
8557565	1.2 × R0.2 × 10	45	1	15.6	1.14	5.19°	4	10.61	11.09	11.51	11.93	12.88		●	5,110
8557566	1.2 × R0.3 × 6	45	1	11.6	1.14	7.04°	4	6.38	6.72	7.03	7.31	7.89		●	5,110
8557567	1.2 × R0.3 × 8	45	1	13.6	1.14	5.99°	4	8.5	8.91	9.27	9.62	10.37	D	○	5,110
8557568	1.2 × R0.3 × 10	45	1	15.6	1.14	5.22°	4	10.6	11.08	11.5	11.92	12.86		○	5,110
8557569	1.5 × R0.2 × 6	45	1.2	11	1.43	6.57°	4	6.38	6.71	7.02	7.3	7.88		●	4,840
8557570	1.5 × R0.2 × 8	45	1.2	13	1.43	5.56°	4	8.49	8.9	9.26	9.6	10.37		●	5,110
8557571	1.5 × R0.2 × 10	45	1.2	15	1.43	4.81°	4	10.59	11.07	11.48	11.9	12.85		●	5,110
8557572	1.5 × R0.2 × 12	45	1.2	17	1.43	4.25°	4	12.69	13.22	13.7	14.2	15.34		●	5,110
8557573	1.5 × R0.2 × 16	50	1.2	21	1.43	3.44°	4	16.87	17.51	18.13	18.8	20.31		●	5,110
8557574	1.5 × R0.3 × 6	45	1.2	11	1.43	6.63°	4	6.37	6.7	7.01	7.29	7.86	A	●	4,840
8557575	1.5 × R0.3 × 8	45	1.2	13	1.43	5.6°	4	8.48	8.89	9.25	9.59	10.34		●	5,110
8557576	1.5 × R0.3 × 10	45	1.2	15	1.43	4.85°	4	10.59	11.06	11.47	11.89	12.83		●	5,110
8557577	1.5 × R0.3 × 12	45	1.2	17	1.43	4.27°	4	12.68	13.21	13.69	14.19	15.32		●	5,110
8557578	1.5 × R0.3 × 16	50	1.2	21	1.43	3.45°	4	16.86	17.5	18.12	18.79	20.29		●	5,110
8557579	2 × R0.1 × 8	50	1.6	12.1	1.92	4.77°	4	8.48	8.89	9.25	9.59	10.37		●	5,110
8557580	2 × R0.1 × 10	50	1.6	14.1	1.92	4.09°	4	10.58	11.05	11.47	11.89	12.85		●	5,110
8557581	2 × R0.1 × 12	50	1.6	16.1	1.92	3.58°	4	12.68	13.21	13.68	14.19	15.34		●	5,110
8557582	2 × R0.1 × 16	50	1.6	20.1	1.92	2.87°	4	16.85	17.49	18.12	18.79	—		●	5,110
8557583	2 × R0.1 × 20	60	1.6	24.1	1.92	2.39°	4	21.02	21.77	22.55	23.39	—		●	5,110
8557584	2 × R0.1 × 25	60	1.6	29.1	1.92	1.98°	4	26.2	27.12	28.09	—	—		●	5,110
8557585	2 × R0.2 × 8	50	1.6	12.1	1.92	4.81°	4	8.48	8.88	9.24	9.58	10.34		●	5,110
8557586	2 × R0.2 × 10	50	1.6	14.1	1.92	4.12°	4	10.58	11.05	11.46	11.88	12.83		●	5,110
8557587	2 × R0.2 × 12	50	1.6	16.1	1.92	3.6°	4	12.67	13.2	13.67	14.18	15.31		●	5,110
8557588	2 × R0.2 × 16	50	1.6	20.1	1.92	2.88°	4	16.85	17.48	18.11	18.78	—		●	5,110
8557589	2 × R0.2 × 20	60	1.6	24.1	1.92	2.4°	4	21.01	21.76	22.54	23.38	—		●	5,110
8557590	2 × R0.2 × 25	60	1.6	29.1	1.92	1.99°	4	26.2	27.11	28.08	—	—	A	●	5,110
8557591	2 × R0.3 × 8	50	1.6	12.1	1.92	4.85°	4	8.47	8.87	9.23	9.56	10.32		●	5,110
8557592	2 × R0.3 × 10	50	1.6	14.1	1.92	4.15°	4	10.57	11.04	11.45	11.86	12.8		●	5,110
8557593	2 × R0.3 × 12	50	1.6	16.1	1.92	3.63°	4	12.67	13.19	13.66	14.16	15.29		●	5,110
8557594	2 × R0.3 × 16	50	1.6	20.1	1.92	2.9°	4	16.85	17.48	18.1	18.76	—		●	5,110
8557595	2 × R0.3 × 20	60	1.6	24.1	1.92	2.41°	4	21.01	21.75	22.53	23.36	—		●	5,110
8557596	2 × R0.5 × 8	50	1.6	12.1	1.92	4.93°	4	8.46	8.85	9.2	9.54	10.27		●	5,110
8557597	2 × R0.5 × 10	50	1.6	14.1	1.92	4.21°	4	10.56	11.02	11.42	11.83	12.76		●	5,110
8557598	2 × R0.5 × 12	50	1.6	16.1	1.92	3.67°	4	12.66	13.18	13.64	14.13	15.24		●	5,110
8557599	2 × R0.5 × 16	50	1.6	20.1	1.92	2.92°	4	16.84	17.46	18.07	18.73	—		●	5,110
8557600	2 × R0.5 × 20	60	1.6	24.1	1.92	2.43°	4	21	21.74	22.51	23.33	—		●	5,110
8557601	2 × R0.5 × 25	60	1.6	29.1	1.92	2.01°	4	26.19	27.09	28.05	29.08	—		●	5,110

●＝標準在庫品 Standard stock item　○＝準標準在庫品(在庫をご確認下さい。) Limited standard stock item

NEXT



注 1：ワーク勾配角αに対する実有効長 Le 欄に数値がないものは干渉無しを表します。
Note：If there is no value in the actual effective length (Le column) for the work gradient angle α , it indicates no interference.

FROM

単位:mm　Unit:mm

ツールNo. EDP No.	外径×コーナ半径×首下長 DC × RE × LU	全長 LF	刃長 APMX	LH	首径 DN	干渉角度 θk	シャンク径 DCON	ワーク勾配角αに対する実有効長 Le 注1 Effective length by inclined angles 0.5°	1°	1.5°	2°	3°	在庫 Stock		標準価格 (Yen)
8557602	2.5 × R0.2 × 10	55	2	13.1	2.4	3.33°	4	10.55	11.01	11.41	11.83	12.78	A	●	5,290
8557603	2.5 × R0.2 × 20	55	2	23.1	2.4	1.88°	4	20.98	21.72	22.5	—	—		●	5,480
8557604	2.5 × R0.5 × 10	55	2	13.1	2.4	3.4°	4	10.54	10.98	11.38	11.79	12.71		●	5,290
8557605	2.5 × R0.5 × 20	55	2	23.1	2.4	1.9°	4	20.97	21.7	22.46	—	—		●	5,480
8557606	3 × R0.2 × 8	55	2.5	13.8	2.85	6.28°	6	8.41	8.77	9.11	9.44	10.19	A	●	4,390
8557607	3 × R0.2 × 12	55	2.5	17.8	2.85	4.86°	6	12.59	13.07	13.54	14.04	15.16		●	5,290
8557608	3 × R0.2 × 16	55	2.5	21.8	2.85	3.97°	6	16.75	17.35	17.97	18.64	20.14		●	6,590
8557609	3 × R0.2 × 20	55	2.5	25.8	2.85	3.35°	6	20.9	21.63	22.4	23.24	25.11		●	6,590
8557610	3 × R0.2 × 25	70	2.5	30.8	2.85	2.81°	6	26.08	26.98	27.95	28.99	—		●	6,590
8557611	3 × R0.2 × 30	70	2.5	35.8	2.85	2.41°	6	31.25	32.33	33.49	34.74	—		●	7,390
8557612	3 × R0.2 × 35	70	2.5	40.8	2.85	2.12°	6	36.41	37.68	39.03	40.49	—	D	○	8,300
8557613	3 × R0.3 × 12	55	2.5	17.8	2.85	4.89°	6	12.58	13.07	13.53	14.02	15.14	A	●	5,290
8557614	3 × R0.3 × 16	55	2.5	21.8	2.85	3.99°	6	16.75	17.34	17.96	18.62	20.11		●	6,590
8557615	3 × R0.3 × 20	55	2.5	25.8	2.85	3.37°	6	20.9	21.62	22.39	23.22	25.08		●	6,590
8557616	3 × R0.3 × 25	70	2.5	30.8	2.85	2.82°	6	26.07	26.97	27.94	28.97	—		●	6,590
8557617	3 × R0.3 × 30	70	2.5	35.8	2.85	2.42°	6	31.24	32.32	33.48	34.72	—		●	7,390
8557618	3 × R0.3 × 35	70	2.5	40.8	2.85	2.12°	6	36.41	37.67	39.02	40.47	—	D	○	8,300
8557619	3 × R0.5 × 12	55	2.5	17.8	2.85	4.94°	6	12.57	13.05	13.51	13.99	15.09	A	●	5,290
8557620	3 × R0.5 × 16	55	2.5	21.8	2.85	4.02°	6	16.74	17.33	17.94	18.59	20.06		●	6,590
8557621	3 × R0.5 × 20	55	2.5	25.8	2.85	3.39°	6	20.89	21.61	22.37	23.19	25.04		●	6,590
8557622	3 × R0.5 × 25	70	2.5	30.8	2.85	2.83°	6	26.07	26.96	27.91	28.94	—		●	6,590
8557623	3 × R0.5 × 30	70	2.5	35.8	2.85	2.43°	6	31.24	32.31	33.46	34.69	—		●	7,390
8557624	3 × R0.5 × 35	70	2.5	40.8	2.85	2.13°	6	36.4	37.66	39	40.44	—	D	○	8,300
8557625	4 × R0.2 × 16	60	3.2	20	3.84	2.9°	6	16.74	17.34	17.96	18.62	—	A	●	6,590
8557626	4 × R0.2 × 20	60	3.2	24	3.84	2.41°	6	20.89	21.62	22.39	23.22	—		●	6,590
8557627	4 × R0.2 × 25	60	3.2	29	3.84	2°	6	26.06	26.96	27.93	—	—		●	6,590
8557628	4 × R0.2 × 30	75	3.2	34	3.84	1.7°	6	31.23	32.31	33.47	—	—		●	7,390
8557629	4 × R0.2 × 40	75	3.2	44	3.84	1.31°	6	41.57	43.01	—	—	—		●	8,300
8557630	4 × R0.3 × 16	60	3.2	20	3.84	2.92°	6	16.74	17.33	17.95	18.61	—		●	6,590
8557631	4 × R0.3 × 20	60	3.2	24	3.84	2.42°	6	20.89	21.61	22.38	23.21	—		●	6,590
8557632	4 × R0.3 × 25	60	3.2	29	3.84	2°	6	26.06	26.96	27.92	—	—		●	6,590
8557633	4 × R0.3 × 30	75	3.2	34	3.84	1.71°	6	31.23	32.31	33.46	—	—		●	7,390
8557634	4 × R0.3 × 40	75	3.2	44	3.84	1.32°	6	41.56	43	—	—	—	D	○	8,300
8557635	4 × R0.5 × 16	60	3.2	20	3.84	2.95°	6	16.73	17.32	17.92	18.58	—	A	●	6,590
8557636	4 × R0.5 × 20	60	3.2	24	3.84	2.44°	6	20.88	21.59	22.36	23.18	—		●	6,590
8557637	4 × R0.5 × 25	60	3.2	29	3.84	2.02°	6	26.05	26.94	27.9	28.93	—		●	6,590
8557638	4 × R0.5 × 30	75	3.2	34	3.84	1.72°	6	31.22	32.29	33.44	—	—		●	7,390
8557639	4 × R0.5 × 40	75	3.2	44	3.84	1.32°	6	41.56	42.99	—	—	—	D	○	8,300
8557640	4 × R0.5 × 50	90	3.2	54	3.84	1.08°	6	51.89	53.69	—	—	—	A	●	9,300
8557641	4 × R1 × 16	60	3.2	20	3.84	3.02°	6	16.71	17.28	17.87	18.5	19.93		●	6,590
8557642	4 × R1 × 20	60	3.2	24	3.84	2.5°	6	20.86	21.56	22.3	23.1	—		●	6,590
8557643	4 × R1 × 25	60	3.2	29	3.84	2.05°	6	26.04	26.91	27.85	28.85	—		●	6,590
8557644	4 × R1 × 30	75	3.2	34	3.84	1.74°	6	31.2	32.26	33.39	—	—		●	7,390
8557645	4 × R1 × 40	75	3.2	44	3.84	1.34°	6	41.54	42.95	—	—	—		●	8,300

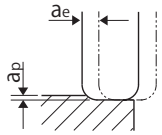
●＝標準在庫品　Standard stock item
○＝準標準在庫品（在庫をご確認下さい。）　Limited standard stock item

AE-CPR4-H 切削条件基準表 Cutting Condition

標準切削 Regular Milling

被削材 Work Material			調質鋼・プリハードン鋼 Hardened Steel・Prehardened Steel PX5・NAK80・SKD61 (～45HRC)				調質鋼 Hardened Steel STAVAX・HPM38 (～55HRC)				調質鋼 Hardened Steel SKH51・YXR7・HAP40 (～66HRC)			
外径 DC	RE	首下長 LU	回転速度 Speed (min⁻¹)	送り速度 Feed (mm/min)	ap (mm)	ae (mm)	回転速度 Speed (min⁻¹)	送り速度 Feed (mm/min)	ap (mm)	ae (mm)	回転速度 Speed (min⁻¹)	送り速度 Feed (mm/min)	ap (mm)	ae (mm)
0.2	R0.02	0.5	40,000	560	0.006	0.072	36,000	470	0.005	0.06	31,500	380	0.003	0.048
		1	38,000	530	0.005	0.072	34,000	440	0.004	0.06	30,000	360	0.002	0.048
		1.5	36,000	430	0.004	0.054	32,000	350	0.003	0.045	28,500	290	0.002	0.036
		2	34,000	250	0.002	0.054	30,000	200	0.002	0.045	27,000	160	0.001	0.036
	R0.05	0.5	40,000	560	0.006	0.072	36,000	470	0.005	0.06	31,500	380	0.003	0.048
		1	38,000	530	0.005	0.072	34,000	440	0.004	0.06	30,000	360	0.002	0.048
		1.5	36,000	430	0.004	0.054	32,000	350	0.003	0.045	28,500	290	0.002	0.036
		2	34,000	250	0.002	0.054	30,000	200	0.002	0.045	27,000	160	0.001	0.036
0.3	R0.02	1	36,500	730	0.006	0.108	32,500	560	0.005	0.09	30,500	480	0.003	0.072
		1.5	33,000	600	0.004	0.09	30,000	470	0.003	0.075	28,000	410	0.002	0.06
		2	30,000	510	0.002	0.073	27,000	390	0.002	0.061	25,500	340	0.001	0.049
		2.5	26,500	400	0.002	0.073	24,000	320	0.002	0.061	22,500	280	0.001	0.049
		3	23,000	190	0.001	0.066	21,000	150	0.001	0.055	19,500	130	0.001	0.044
	R0.05	1	36,500	730	0.006	0.108	32,500	560	0.005	0.09	30,500	480	0.003	0.072
		1.5	33,000	600	0.004	0.09	30,000	470	0.003	0.075	28,000	410	0.002	0.06
		2	30,000	510	0.002	0.073	27,000	390	0.002	0.061	25,500	340	0.001	0.049
		2.5	26,500	400	0.002	0.073	24,000	320	0.002	0.061	22,500	280	0.001	0.049
		3	23,000	190	0.001	0.066	21,000	150	0.001	0.055	19,500	130	0.001	0.044
0.4	R0.02	1	29,500	1,130	0.008	0.144	26,000	870	0.007	0.12	24,500	710	0.004	0.096
		1.5	29,500	1,130	0.008	0.144	26,000	870	0.007	0.12	24,500	710	0.004	0.096
		2	27,500	1,020	0.006	0.122	24,500	780	0.005	0.102	23,000	630	0.003	0.082
		2.5	25,000	860	0.004	0.106	22,500	660	0.003	0.088	21,000	530	0.002	0.07
		3	23,000	710	0.002	0.09	20,000	540	0.002	0.075	19,000	440	0.001	0.06
		4	21,000	570	0.001	0.043	18,500	440	0.001	0.036	17,500	360	0.001	0.029
	R0.05	1	29,500	1,130	0.008	0.144	26,000	870	0.007	0.12	24,500	710	0.004	0.096
		1.5	29,500	1,130	0.008	0.144	26,000	870	0.007	0.12	24,500	710	0.004	0.096
		2	27,500	1,020	0.006	0.122	24,500	780	0.005	0.102	23,000	630	0.003	0.082
		2.5	25,000	860	0.004	0.106	22,500	660	0.003	0.088	21,000	530	0.002	0.07
		3	23,000	710	0.002	0.09	20,000	540	0.002	0.075	19,000	440	0.001	0.06
		4	21,000	570	0.001	0.043	18,500	440	0.001	0.036	17,500	360	0.001	0.029
	R0.1	1	29,500	1,130	0.012	0.144	26,000	870	0.01	0.12	24,500	710	0.006	0.096
		2	27,500	1,020	0.01	0.122	24,500	780	0.008	0.102	23,000	630	0.005	0.082
		3	23,000	710	0.004	0.09	20,000	540	0.003	0.075	19,000	440	0.002	0.06
		4	21,000	570	0.002	0.043	18,500	440	0.002	0.036	17,500	360	0.001	0.029
0.5	R0.02	1	29,000	1,230	0.008	0.18	26,000	1,010	0.007	0.15	26,000	930	0.004	0.12
		2	29,000	1,230	0.008	0.18	26,000	1,010	0.007	0.15	26,000	930	0.004	0.12
		3	27,500	1,050	0.004	0.126	24,500	860	0.003	0.105	24,500	800	0.002	0.084
		4	22,500	770	0.002	0.108	20,000	630	0.002	0.09	20,000	590	0.001	0.072
		5	21,000	630	0.001	0.054	18,500	510	0.001	0.045	18,500	480	0.001	0.036
		6	19,500	540	0.001	0.036	17,000	450	0.001	0.03	17,000	410	0.001	0.024
	R0.05	1	29,000	1,230	0.008	0.18	26,000	1,010	0.007	0.15	26,000	930	0.004	0.12
		2	29,000	1,230	0.008	0.18	26,000	1,010	0.007	0.15	26,000	930	0.004	0.12
		3	27,500	1,050	0.004	0.126	24,500	860	0.003	0.105	24,500	800	0.002	0.084
		4	22,500	770	0.002	0.108	20,000	630	0.002	0.09	20,000	590	0.001	0.072
		5	21,000	630	0.001	0.054	18,500	510	0.001	0.045	18,500	480	0.001	0.036
		6	19,500	540	0.001	0.036	17,000	450	0.001	0.03	17,000	410	0.001	0.024
	R0.1	1	29,000	1,230	0.012	0.18	26,000	1,010	0.01	0.15	26,000	930	0.006	0.12
		2	29,000	1,230	0.012	0.18	26,000	1,010	0.01	0.15	26,000	930	0.006	0.12
		3	27,500	1,050	0.006	0.126	24,500	860	0.005	0.105	24,500	800	0.003	0.084
		4	22,500	770	0.004	0.108	20,000	630	0.003	0.09	20,000	590	0.002	0.072
		5	21,000	630	0.002	0.054	18,500	510	0.002	0.045	18,500	480	0.001	0.036
		6	19,500	540	0.001	0.036	17,000	450	0.001	0.03	17,000	410	0.001	0.024

1. 機械、ホルダは剛性のある精度の高いものをご使用下さい。
2. 切削油剤は被削材に応じてエアブローまたは発煙性の少ない切削油剤をご使用下さい。
   調質鋼の切削では、MQL（オイルミストクーラント）を推奨いたします。
3. 上表は、等高線加工の負荷の少ない加工形状での目安です。加工形状、機械剛性、ワーク保持等の状況により、回転速度、送り速度、切込深さを調整下さい。
4. びびり、振動、異常な切削音が発生する場合、回転速度、送り速度、切込深さを調整下さい。
5. Z切込時のアプローチ方法として、円弧（ヘリカル）、傾斜（ランプ）での加工をお勧めします。
6. φ0.5 未満あるいはL/D（アスペクト比）が10以上では、わずかな負荷の増大で折損することがありますので、切削状況を見て切削条件の調整を行って下さい。
7. 回転速度が不足する場合は、回転速度と送り速度を上表に対して同じ比率で下げて下さい。



NEXT

被削材 Work Material			調質鋼・プリハードン鋼 Hardened Steel・Prehardened Steel PX5・NAK80・SKD61 (～45HRC)				調質鋼 Hardened Steel STAVAX・HPM38 (～55HRC)				調質鋼 Hardened Steel SKH51・YXR7・HAP40 (～66HRC)			
外径 DC	RE	首下長 LU	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)
0.6	R0.1	2	29,000	1,470	0.014	0.216	26,000	1,220	0.012	0.18	21,500	930	0.007	0.144
		4	24,500	1,050	0.006	0.146	21,500	860	0.005	0.122	18,000	660	0.003	0.098
		6	21,000	750	0.002	0.065	18,500	620	0.002	0.054	15,500	480	0.001	0.043
0.7	R0.02	2	27,000	1,580	0.008	0.264	23,500	1,280	0.007	0.22	19,500	970	0.004	0.176
		4	24,000	1,300	0.004	0.192	21,000	1,040	0.003	0.16	17,500	790	0.002	0.128
		6	20,000	900	0.002	0.096	17,500	740	0.002	0.08	14,500	550	0.001	0.064
	R0.05	2	27,000	1,580	0.012	0.264	23,500	1,280	0.01	0.22	19,500	970	0.006	0.176
		4	24,000	1,300	0.006	0.192	21,000	1,040	0.005	0.16	17,500	790	0.003	0.128
		6	20,000	900	0.004	0.096	17,500	740	0.003	0.08	14,500	550	0.002	0.064
	R0.1	2	27,000	1,580	0.022	0.264	23,500	1,280	0.018	0.22	19,500	970	0.011	0.176
		4	24,000	1,300	0.012	0.192	21,000	1,040	0.01	0.16	17,500	790	0.006	0.128
		6	20,000	900	0.006	0.096	17,500	740	0.005	0.08	14,500	550	0.003	0.064
0.8	R0.1	4	23,500	1,500	0.019	0.288	20,500	1,200	0.016	0.24	17,000	860	0.01	0.192
		6	19,500	1,050	0.008	0.288	16,500	840	0.007	0.24	14,000	590	0.004	0.192
	R0.2	4	23,500	1,500	0.038	0.288	20,500	1,200	0.032	0.24	17,000	860	0.019	0.192
		6	19,500	1,050	0.017	0.288	16,500	840	0.014	0.24	14,000	590	0.008	0.192
		8	18,000	860	0.01	0.259	15,500	680	0.008	0.216	13,000	480	0.005	0.173
0.9	R0.1	4	23,000	1,730	0.022	0.324	20,000	1,380	0.018	0.27	17,000	1,000	0.011	0.216
		8	18,000	1,190	0.006	0.276	15,500	930	0.005	0.23	13,000	660	0.003	0.184
1	R0.05	4	23,000	1,950	0.012	0.36	20,000	1,580	0.01	0.3	17,000	1,140	0.006	0.24
		6	20,500	1,580	0.006	0.252	18,000	1,260	0.005	0.21	15,500	920	0.003	0.168
		8	18,000	1,200	0.004	0.216	15,500	980	0.003	0.18	13,500	710	0.002	0.144
		10	16,500	980	0.002	0.108	14,500	800	0.002	0.09	12,500	570	0.001	0.072
		12	15,500	860	0.001	0.072	13,500	690	0.001	0.06	11,500	510	0.001	0.048
	R0.1	4	23,000	1,950	0.024	0.36	20,000	1,580	0.02	0.3	17,000	1,140	0.012	0.24
		6	20,500	1,580	0.012	0.252	18,000	1,260	0.01	0.21	15,500	920	0.006	0.168
		8	18,000	1,200	0.007	0.216	15,500	980	0.006	0.18	13,500	710	0.004	0.144
		10	16,500	980	0.005	0.108	14,500	800	0.004	0.09	12,500	570	0.002	0.072
		12	15,500	860	0.004	0.072	13,500	690	0.003	0.06	11,500	510	0.002	0.048
	R0.2	4	23,000	1,950	0.048	0.36	20,000	1,580	0.04	0.3	17,000	1,140	0.024	0.24
		6	20,500	1,580	0.024	0.252	18,000	1,260	0.02	0.21	15,500	920	0.012	0.168
		8	18,000	1,200	0.014	0.216	15,500	980	0.012	0.18	13,500	710	0.007	0.144
		10	16,500	980	0.01	0.108	14,500	800	0.008	0.09	12,500	570	0.005	0.072
		12	15,500	860	0.007	0.072	13,500	690	0.006	0.06	11,500	510	0.004	0.048
		16	12,000	600	0.005	0.036	10,500	500	0.004	0.03	9,150	360	0.002	0.024
		20	10,000	440	0.004	0.029	8,900	350	0.003	0.024	7,650	260	0.002	0.019
	R0.3	4	23,000	1,950	0.06	0.36	20,000	1,580	0.05	0.3	17,000	1,140	0.03	0.24
		6	20,500	1,580	0.03	0.252	18,000	1,260	0.025	0.21	15,500	920	0.015	0.168
		8	18,000	1,200	0.018	0.216	15,500	980	0.015	0.18	13,500	710	0.009	0.144
		10	16,500	980	0.012	0.108	14,500	800	0.01	0.09	12,500	570	0.006	0.072
		12	15,500	860	0.008	0.072	13,500	690	0.007	0.06	11,500	510	0.004	0.048
1.2	R0.2	6	19,000	1,800	0.038	0.432	18,000	1,580	0.032	0.36	14,500	1,110	0.019	0.288
		8	17,000	1,460	0.022	0.302	16,000	1,280	0.018	0.252	13,000	870	0.011	0.202
		10	16,000	1,280	0.013	0.259	15,000	1,110	0.011	0.216	12,000	770	0.007	0.173
	R0.3	6	19,000	1,800	0.048	0.432	18,000	1,580	0.04	0.36	14,500	1,110	0.024	0.288
		8	17,000	1,460	0.026	0.302	16,000	1,280	0.022	0.252	13,000	870	0.013	0.202
		10	16,000	1,280	0.017	0.259	15,000	1,110	0.014	0.216	12,000	770	0.008	0.173

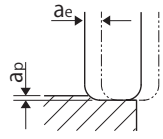
1. Use a rigid and precise machine and holder.
2. When machining carbon steels or hardened steels, using MQL(Minimum Quantity Lubrication / mist coolant) is recommended.
3. The above condition shows an approximate standard for contouring operation(side milling) with a low machining load.
   If abnormal cutting sounds, vibration or chattering occur depending on the machining shape, cutting amount, rigidity of the machine or work holding condition, etc., please adjust the speed, feed and the depth of cut.
4. Adjust the speed, feed rate, and depth of cut if chattering, vibration or abnormal grinding sounds occur.
5. Helical or ramp milling is recommended during the approach of a Z cut.
6. When using a tool with a diameter of ϕ 0.5 or less, or L/D (aspect ratio) is greater than 10, high loads can cause tool breakage.
   Therefore, adjust the cutting conditions based on the machining situation.
7. When RPM are insufficient, please reduce the RPM and feed rates at same ratio as listed above.

AE-CPR4-H 切削条件基準表 Cutting Condition

FROM

標準切削 Regular Milling

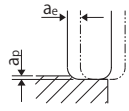
被削材 Work Material			調質鋼・プリハードン鋼 Hardened Steel・Prehardened Steel PX5・NAK80・SKD61 (～45HRC)				調質鋼 Hardened Steel STAVAX・HPM38 (～55HRC)				調質鋼 Hardened Steel SKH51・YXR7・HAP40 (～66HRC)			
外径 DC	RE	首下長 LU	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)
1.5	R0.2	6	17,000	2,180	0.048	0.54	16,000	1,880	0.04	0.45	13,500	1,320	0.024	0.36
		8	16,000	1,880	0.031	0.458	15,500	1,650	0.026	0.382	12,500	1,130	0.016	0.306
		10	14,500	1,500	0.022	0.35	13,500	1,350	0.018	0.292	11,000	950	0.011	0.234
		12	13,500	1,350	0.014	0.324	12,500	1,190	0.012	0.27	10,500	830	0.007	0.216
		16	9,150	800	0.008	0.134	8,650	690	0.007	0.112	7,150	480	0.004	0.09
	R0.3	6	17,000	2,180	0.072	0.54	16,000	1,880	0.06	0.45	13,500	1,320	0.036	0.36
		8	16,000	1,880	0.047	0.458	15,500	1,650	0.039	0.382	12,500	1,130	0.023	0.306
		10	14,500	1,500	0.032	0.35	13,500	1,350	0.027	0.292	11,000	950	0.016	0.234
		12	13,500	1,350	0.022	0.324	12,500	1,190	0.018	0.27	10,500	830	0.011	0.216
		16	9,150	800	0.012	0.134	8,650	690	0.01	0.112	7,150	480	0.006	0.09
2	R0.1	8	13,000	2,180	0.024	0.72	13,000	1,950	0.02	0.6	11,500	1,500	0.012	0.48
		10	12,000	1,950	0.019	0.612	12,000	1,730	0.016	0.51	11,000	1,370	0.01	0.408
		12	11,500	1,730	0.012	0.504	11,500	1,580	0.01	0.42	10,000	1,220	0.006	0.336
		16	10,000	1,350	0.007	0.432	10,000	1,200	0.006	0.36	8,900	950	0.004	0.288
		20	9,300	1,100	0.005	0.216	9,300	980	0.004	0.18	8,250	770	0.002	0.144
		25	8,600	950	0.002	0.144	8,600	840	0.002	0.12	7,650	660	0.001	0.096
	R0.2	8	13,000	2,180	0.048	0.72	13,000	1,950	0.04	0.6	11,500	1,500	0.024	0.48
		10	12,000	1,950	0.038	0.612	12,000	1,730	0.032	0.51	11,000	1,370	0.019	0.408
		12	11,500	1,730	0.024	0.504	11,500	1,580	0.02	0.42	10,000	1,220	0.012	0.336
		16	10,000	1,350	0.014	0.432	10,000	1,200	0.012	0.36	8,900	950	0.007	0.288
		20	9,300	1,100	0.01	0.216	9,300	980	0.008	0.18	8,250	770	0.005	0.144
		25	8,600	950	0.005	0.144	8,600	840	0.004	0.12	7,650	660	0.002	0.096
	R0.3	8	13,000	2,180	0.072	0.72	13,000	1,950	0.06	0.6	11,500	1,500	0.036	0.48
		10	12,000	1,950	0.058	0.612	12,000	1,730	0.048	0.51	11,000	1,370	0.029	0.408
		12	11,500	1,730	0.036	0.504	11,500	1,580	0.03	0.42	10,000	1,220	0.018	0.336
		16	10,000	1,350	0.022	0.432	10,000	1,200	0.018	0.36	8,900	950	0.011	0.288
		20	9,300	1,100	0.014	0.216	9,300	980	0.012	0.18	8,250	770	0.007	0.144
	R0.5	8	13,000	2,180	0.09	0.72	13,000	1,950	0.075	0.6	11,500	1,500	0.045	0.48
		10	12,000	1,950	0.072	0.612	12,000	1,730	0.06	0.51	11,000	1,370	0.036	0.408
		12	11,500	1,730	0.044	0.504	11,500	1,580	0.037	0.42	10,000	1,220	0.022	0.336
		16	10,000	1,350	0.026	0.432	10,000	1,200	0.022	0.36	8,900	950	0.013	0.288
		20	9,300	1,100	0.018	0.216	9,300	980	0.015	0.18	8,250	770	0.009	0.144
		25	8,600	950	0.011	0.144	8,600	840	0.009	0.12	7,650	660	0.005	0.096
2.5	R0.2	10	11,500	2,400	0.048	0.9	10,500	1,800	0.04	0.75	9,150	1,500	0.024	0.6
		20	8,900	1,500	0.024	0.54	8,000	1,110	0.02	0.45	7,150	950	0.012	0.36
	R0.5	10	11,500	2,400	0.09	0.9	10,500	1,800	0.075	0.75	9,150	1,500	0.045	0.6
		20	8,900	1,500	0.044	0.54	8,000	1,110	0.037	0.45	7,150	950	0.022	0.36



1. 機械、ホルダは剛性のある精度の高いものをご使用下さい。
2. 切削油剤は被削材に応じてエアブローまたは発煙性の少ない切削油剤をご使用下さい。調質鋼の切削では、MQL（オイルミストクーラント）を推奨いたします。
3. 上表は、等高線加工の負荷の少ない加工形状での目安です。加工形状、機械剛性、ワーク 保持等の状況により、回転速度、送り速度、切込深さを調整下さい。
4. びびり、振動、異常な切削音が発生する場合、回転速度、送り速度、切込深さを調整下さい。
5. Z切込時のアプローチ方法として、円弧（ヘリカル）、傾斜（ランプ）での加工をお勧めします。
6. φ0.5 未満あるいはL/D（アスペクト比）が10以上では、わずかな負荷の増大で折損することがありますので、切削状況を見て切削条件の調整を行って下さい。
7. 回転速度が不足する場合は、回転速度と送り速度を上表に対して同じ比率で下げて下さい。

NEXT

FROM

被削材 Work Material			調質鋼・プリハードン鋼 Hardened Steel・Prehardened Steel PX5・NAK80・SKD61 (～45HRC)				調質鋼 Hardened Steel STAVAX・HPM38 (～55HRC)				調質鋼 Hardened Steel SKH51・YXR7・HAP40 (～66HRC)			
外径 DC	RE	首下長 LU	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)
3	R0.2	8	9,550	2,250	0.048	1.08	8,600	1,730	0.04	0.9	7,650	1,250	0.024	0.72
		12	9,550	2,250	0.048	1.08	8,600	1,730	0.04	0.9	7,650	1,250	0.024	0.72
		16	8,500	1,800	0.034	0.864	7,650	1,370	0.028	0.72	6,800	990	0.017	0.576
		20	7,400	1,490	0.022	0.734	6,700	1,130	0.018	0.612	5,950	830	0.011	0.49
		25	7,100	1,250	0.014	0.648	6,400	960	0.012	0.54	5,700	690	0.007	0.432
		30	6,900	1,140	0.01	0.324	6,200	870	0.008	0.27	5,500	630	0.005	0.216
		35	6,350	990	0.007	0.216	5,700	750	0.006	0.18	5,100	560	0.004	0.144
	R0.3	12	9,550	2,250	0.072	1.08	8,600	1,730	0.06	0.9	7,650	1,250	0.036	0.72
		16	8,500	1,800	0.05	0.864	7,650	1,370	0.042	0.72	6,800	990	0.025	0.576
		20	7,400	1,490	0.032	0.734	6,700	1,130	0.027	0.612	5,950	830	0.016	0.49
		25	7,100	1,250	0.022	0.648	6,400	960	0.018	0.54	5,700	690	0.011	0.432
		30	6,900	1,140	0.014	0.324	6,200	870	0.012	0.27	5,500	630	0.007	0.216
		35	6,350	990	0.011	0.216	5,700	750	0.009	0.18	5,100	560	0.005	0.144
	R0.5	12	9,550	2,250	0.09	1.08	8,600	1,730	0.075	0.9	7,650	1,250	0.045	0.72
		16	8,500	1,800	0.062	0.864	7,650	1,370	0.052	0.72	6,800	990	0.031	0.576
		20	7,400	1,490	0.04	0.734	6,700	1,130	0.033	0.612	5,950	830	0.02	0.49
		25	7,100	1,250	0.026	0.648	6,400	960	0.022	0.54	5,700	690	0.013	0.432
		30	6,900	1,140	0.018	0.324	6,200	870	0.015	0.27	5,500	630	0.009	0.216
		35	6,350	990	0.013	0.216	5,700	750	0.011	0.18	5,100	560	0.007	0.144
4	R0.2	16	7,150	2,050	0.048	1.44	6,450	1,550	0.04	1.2	5,000	970	0.024	0.96
		20	6,750	1,950	0.038	1.224	6,100	1,450	0.032	1.02	4,750	910	0.019	0.816
		25	5,950	1,700	0.024	0.979	5,350	1,300	0.02	0.816	4,150	800	0.012	0.653
		30	5,550	1,600	0.017	0.893	5,000	1,200	0.014	0.744	3,900	750	0.008	0.595
		40	5,150	1,500	0.01	0.432	4,650	1,100	0.008	0.36	3,600	700	0.005	0.288
	R0.3	16	7,150	2,050	0.072	1.44	6,450	1,550	0.06	1.2	5,000	970	0.036	0.96
		20	6,750	1,950	0.058	1.224	6,100	1,450	0.048	1.02	4,750	910	0.029	0.816
		25	5,950	1,700	0.036	0.979	5,350	1,300	0.03	0.816	4,150	800	0.018	0.653
		30	5,550	1,600	0.025	0.893	5,000	1,200	0.021	0.744	3,900	750	0.013	0.595
		40	5,150	1,500	0.014	0.432	4,650	1,100	0.012	0.36	3,600	700	0.007	0.288
	R0.5	16	7,150	2,050	0.09	1.44	6,450	1,550	0.075	1.2	5,000	970	0.045	0.96
		20	6,750	1,950	0.072	1.224	6,100	1,450	0.06	1.02	4,750	910	0.036	0.816
		25	5,950	1,700	0.044	0.979	5,350	1,300	0.037	0.816	4,150	800	0.022	0.653
		30	5,550	1,600	0.031	0.893	5,000	1,200	0.026	0.744	3,900	750	0.016	0.595
		40	5,150	1,500	0.018	0.432	4,650	1,100	0.015	0.36	3,600	700	0.009	0.288
		50	4,550	1,300	0.011	0.259	4,100	980	0.009	0.216	3,150	610	0.005	0.173
	R1	16	7,150	2,050	0.144	1.44	6,450	1,550	0.12	1.2	5,000	970	0.072	0.96
		20	6,750	1,950	0.12	1.224	6,100	1,450	0.1	1.02	4,750	910	0.06	0.816
		25	5,950	1,700	0.072	0.979	5,350	1,300	0.06	0.816	4,150	800	0.036	0.653
		30	5,550	1,600	0.048	0.893	5,000	1,200	0.04	0.744	3,900	750	0.024	0.595
		40	5,150	1,500	0.029	0.432	4,650	1,100	0.024	0.36	3,600	700	0.014	0.288
切込深さ Depth of Cut														

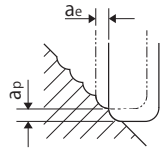
1. Use a rigid and precise machine and holder.
2. When machining carbon steels or hardened steels, using MQL(Minimum Quantity Lubrication / mist coolant) is recommended.
3. The above condition shows an approximate standard for contouring operation(side milling) with a low machining load.
   If abnormal cutting sounds, vibration or chattering occur depending on the machining shape, cutting amount, rigidity of the machine or work holding condition, etc., please adjust the speed, feed and the depth of cut.
4. Adjust the speed, feed rate, and depth of cut if chattering, vibration or abnormal grinding sounds occur.
5. Helical or ramp milling is recommended during the approach of a Z cut.
6. When using a tool with a diameter of ϕ 0.5 or less, or L/D (aspect ratio) is greater than 10, high loads can cause tool breakage.
   Therefore, adjust the cutting conditions based on the machining situation.
7. When RPM are insufficient, please reduce the RPM and feed rates at same ratio as listed above.

AE-CPR4-H 切削条件基準表 Cutting Condition

側面切削(等高線仕上げ加工) Side Milling (Contour Line Finish Milling)

被削材 Work Material			調質鋼・プリハードン鋼 Hardened Steel・Prehardened Steel PX5・NAK80・SKD61 (～45HRC)				調質鋼 Hardened Steel STAVAX・HPM38 (～55HRC)				調質鋼 Hardened Steel SKH51・YXR7・HAP40 (～66HRC)			
外径 DC	RE	首下長 LU	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)
0.2	R0.02	0.5	50,000	700	0.006	0.007	43,000	550	0.005	0.006	43,000	520	0.003	0.005
		1	47,500	680	0.006	0.007	40,500	520	0.005	0.006	40,500	490	0.003	0.005
		1.5	45,000	540	0.005	0.006	38,000	420	0.004	0.005	38,000	400	0.002	0.004
		2	42,000	300	0.004	0.006	35,500	230	0.003	0.005	35,500	220	0.002	0.004
	R0.05	0.5	50,000	700	0.006	0.007	43,000	550	0.005	0.006	43,000	520	0.003	0.005
		1	47,500	680	0.006	0.007	40,500	520	0.005	0.006	40,500	490	0.003	0.005
		1.5	45,000	540	0.005	0.006	38,000	420	0.004	0.005	38,000	400	0.002	0.004
		2	42,000	300	0.004	0.006	35,500	230	0.003	0.005	35,500	220	0.002	0.004
0.3	R0.02	1	43,000	850	0.006	0.011	38,000	690	0.005	0.009	33,500	530	0.003	0.007
		1.5	40,000	740	0.006	0.011	35,000	590	0.005	0.009	30,500	440	0.003	0.007
		2	36,000	610	0.005	0.01	32,000	500	0.004	0.008	28,000	370	0.002	0.006
		2.5	32,000	480	0.004	0.01	28,000	380	0.003	0.008	24,500	290	0.002	0.006
		3	28,000	220	0.002	0.008	24,500	180	0.002	0.007	21,500	130	0.001	0.006
	R0.05	1	43,000	850	0.006	0.011	38,000	690	0.005	0.009	33,500	530	0.003	0.007
		1.5	40,000	740	0.006	0.011	35,000	590	0.005	0.009	30,500	440	0.003	0.007
		2	36,000	610	0.005	0.01	32,000	500	0.004	0.008	28,000	370	0.002	0.006
		2.5	32,000	480	0.004	0.01	28,000	380	0.003	0.008	24,500	290	0.002	0.006
		3	28,000	220	0.002	0.008	24,500	180	0.002	0.007	21,500	130	0.001	0.006
0.4	R0.02	1	39,500	1,510	0.007	0.014	32,000	1,170	0.006	0.012	28,500	820	0.004	0.01
		1.5	39,500	1,510	0.007	0.014	32,000	1,170	0.006	0.012	28,500	820	0.004	0.01
		2	37,000	1,370	0.007	0.014	30,500	1,050	0.006	0.012	27,000	750	0.004	0.01
		2.5	33,500	1,130	0.006	0.012	27,500	870	0.005	0.01	24,500	620	0.003	0.008
		3	30,500	950	0.005	0.01	25,000	720	0.004	0.008	22,500	510	0.002	0.006
		4	28,500	760	0.002	0.007	23,500	590	0.002	0.006	20,500	420	0.001	0.005
	R0.05	1	39,500	1,510	0.007	0.014	32,000	1,170	0.006	0.012	28,500	820	0.004	0.01
		1.5	39,500	1,510	0.007	0.014	32,000	1,170	0.006	0.012	28,500	820	0.004	0.01
		2	37,000	1,370	0.007	0.014	30,500	1,050	0.006	0.012	27,000	750	0.004	0.01
		2.5	33,500	1,130	0.006	0.012	27,500	870	0.005	0.01	24,500	620	0.003	0.008
		3	30,500	950	0.005	0.01	25,000	720	0.004	0.008	22,500	510	0.002	0.006
		4	28,500	760	0.002	0.007	23,500	590	0.002	0.006	20,500	420	0.001	0.005
	R0.1	1	39,500	1,510	0.012	0.014	32,000	1,170	0.01	0.012	28,500	820	0.006	0.01
		2	37,000	1,370	0.012	0.014	30,500	1,050	0.01	0.012	27,000	750	0.006	0.01
		3	30,500	950	0.008	0.01	25,000	720	0.007	0.008	22,500	510	0.004	0.006
		4	28,500	760	0.005	0.007	23,500	590	0.004	0.006	20,500	420	0.002	0.005
0.5	R0.02	1	34,500	1,460	0.007	0.018	28,500	1,170	0.006	0.015	24,000	870	0.004	0.012
		2	34,500	1,460	0.007	0.018	28,500	1,170	0.006	0.015	24,000	870	0.004	0.012
		3	32,500	1,230	0.007	0.016	27,000	990	0.006	0.013	22,500	740	0.004	0.01
		4	26,500	900	0.004	0.012	22,500	720	0.003	0.01	18,500	540	0.002	0.008
		5	25,000	740	0.002	0.008	20,500	590	0.002	0.007	17,500	440	0.001	0.006
		6	23,000	650	0.001	0.007	19,000	510	0.001	0.006	16,000	390	0.001	0.005
	R0.05	1	34,500	1,460	0.007	0.018	28,500	1,170	0.006	0.015	24,000	870	0.004	0.012
		2	34,500	1,460	0.007	0.018	28,500	1,170	0.006	0.015	24,000	870	0.004	0.012
		3	32,500	1,230	0.007	0.016	27,000	990	0.006	0.013	22,500	740	0.004	0.01
		4	26,500	900	0.004	0.012	22,500	720	0.003	0.01	18,500	540	0.002	0.008
		5	25,000	740	0.002	0.008	20,500	590	0.002	0.007	17,500	440	0.001	0.006
		6	23,000	650	0.001	0.007	19,000	510	0.001	0.006	16,000	390	0.001	0.005
	R0.1	1	34,500	1,460	0.012	0.018	28,500	1,170	0.01	0.015	24,000	870	0.006	0.012
		2	34,500	1,460	0.012	0.018	28,500	1,170	0.01	0.015	24,000	870	0.006	0.012
		3	32,500	1,230	0.012	0.016	27,000	990	0.01	0.013	22,500	740	0.006	0.01
		4	26,500	900	0.007	0.012	22,500	720	0.006	0.01	18,500	540	0.004	0.008
		5	25,000	740	0.005	0.008	20,500	590	0.004	0.007	17,500	440	0.002	0.006
		6	23,000	650	0.004	0.007	19,000	510	0.003	0.006	16,000	390	0.002	0.005

1. 機械、ホルダは剛性のある精度の高いものをご使用下さい。
2. 切削油剤は被削材に応じてエアブローまたは発煙性の少ない切削油剤をご使用下さい。調質鋼の切削では、MQL(オイルミストクーラント)を推奨いたします。
3. 上表は、等高線加工(側面)の負荷の少ない加工形状での目安です。加工形状、機械剛性、ワーク保持等の状況により、回転速度、送り速度、切込深さを調整下さい。
4. びびり、振動、異常な切削音が発生する場合、回転速度、送り速度、切込深さを調整下さい。
5. Z切込時のアプローチ方法として、円弧(ヘリカル)、傾斜(ランプ)での加工をお勧めします。
6. φ0.5 未満あるいはL/D(アスペクト比)が10以上では、わずかな負荷の増大で折損することがありますので、切削状況を見て切削条件の調整を行って下さい。
7. 加工精度を要求される場合は、回転速度、送り速度、切込量を抑えて使用下さい。
8. 回転速度が不足する場合は、回転速度と送り速度を上表に対して同じ比率で下げて下さい。



NEXT

FROM

被削材 Work Material			調質鋼・プリハードン鋼 Hardened Steel・Prehardened Steel PX5・NAK80・SKD61 (～45HRC)				調質鋼 Hardened Steel STAVAX・HPM38 (～55HRC)				調質鋼 Hardened Steel SKH51・YXR7・HAP40 (～66HRC)			
外径 DC	RE	首下長 LU	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)
0.6	R0.1	2	31,000	1,580	0.014	0.022	26,500	1,280	0.012	0.018	24,000	1,040	0.007	0.014
		4	26,000	1,110	0.011	0.014	22,000	900	0.009	0.012	20,000	740	0.005	0.01
		6	22,500	800	0.005	0.011	19,000	650	0.004	0.009	17,000	530	0.002	0.007
0.7	R0.02	2	30,000	1,800	0.007	0.026	26,000	1,560	0.006	0.022	24,000	1,220	0.004	0.018
		4	27,000	1,420	0.005	0.019	23,500	1,210	0.004	0.016	21,500	940	0.002	0.013
		6	22,500	980	0.002	0.012	19,500	830	0.002	0.01	18,000	650	0.001	0.008
	R0.05	2	30,000	1,800	0.007	0.026	26,000	1,560	0.006	0.022	24,000	1,220	0.004	0.018
		4	27,000	1,420	0.005	0.019	23,500	1,210	0.004	0.016	21,500	940	0.002	0.013
		6	22,500	980	0.002	0.012	19,500	830	0.002	0.01	18,000	650	0.001	0.008
	R0.1	2	30,000	1,800	0.018	0.026	26,000	1,560	0.015	0.022	24,000	1,220	0.009	0.018
		4	27,000	1,420	0.014	0.019	23,500	1,210	0.012	0.016	21,500	940	0.007	0.013
		6	22,500	980	0.011	0.012	19,500	830	0.009	0.01	18,000	650	0.005	0.008
0.8	R0.1	4	29,000	1,800	0.018	0.024	25,500	1,580	0.015	0.02	23,500	1,190	0.009	0.016
		6	23,500	1,280	0.014	0.017	21,000	1,080	0.012	0.014	19,500	830	0.007	0.011
	R0.2	4	29,000	1,800	0.024	0.024	25,500	1,580	0.02	0.02	23,500	1,190	0.012	0.016
		6	23,500	1,280	0.019	0.017	21,000	1,080	0.016	0.014	19,500	830	0.01	0.011
		8	22,000	1,040	0.01	0.012	19,500	890	0.008	0.01	18,000	680	0.005	0.008
0.9	R0.1	4	28,000	2,020	0.018	0.03	25,000	1,690	0.015	0.025	23,000	1,330	0.009	0.02
		8	21,500	1,360	0.011	0.024	19,000	1,140	0.009	0.02	17,500	890	0.005	0.016
1	R0.05	4	27,000	2,250	0.007	0.036	24,500	1,880	0.006	0.03	22,500	1,500	0.004	0.024
		6	24,000	1,800	0.007	0.032	21,500	1,500	0.006	0.027	20,000	1,200	0.004	0.022
		8	21,000	1,430	0.004	0.025	19,000	1,190	0.003	0.021	17,500	930	0.002	0.017
		10	19,500	1,160	0.004	0.018	17,500	960	0.003	0.015	16,500	770	0.002	0.012
		12	18,000	1,010	0.004	0.016	16,000	840	0.003	0.013	15,000	660	0.002	0.01
	R0.1	4	27,000	2,250	0.018	0.036	24,500	1,880	0.015	0.03	22,500	1,500	0.009	0.024
		6	24,000	1,800	0.018	0.032	21,500	1,500	0.015	0.027	20,000	1,200	0.009	0.022
		8	21,000	1,430	0.011	0.025	19,000	1,190	0.009	0.021	17,500	930	0.005	0.017
		10	19,500	1,160	0.007	0.018	17,500	960	0.006	0.015	16,500	770	0.004	0.012
		12	18,000	1,010	0.005	0.016	16,000	840	0.004	0.013	15,000	660	0.002	0.01
	R0.2	4	27,000	2,250	0.024	0.036	24,500	1,880	0.02	0.03	22,500	1,500	0.012	0.024
		6	24,000	1,800	0.024	0.032	21,500	1,500	0.02	0.027	20,000	1,200	0.012	0.022
		8	21,000	1,430	0.014	0.025	19,000	1,190	0.012	0.021	17,500	930	0.007	0.017
		10	19,500	1,160	0.01	0.018	17,500	960	0.008	0.015	16,500	770	0.005	0.012
		12	18,000	1,010	0.007	0.016	16,000	840	0.006	0.013	15,000	660	0.004	0.01
		16	14,500	710	0.005	0.012	13,000	590	0.004	0.01	12,000	470	0.002	0.008
		20	12,000	510	0.004	0.011	11,000	420	0.003	0.009	10,000	330	0.002	0.007
	R0.3	4	27,000	2,250	0.036	0.036	24,500	1,880	0.03	0.03	22,500	1,500	0.018	0.024
		6	24,000	1,800	0.036	0.032	21,500	1,500	0.03	0.027	20,000	1,200	0.018	0.022
		8	21,000	1,430	0.022	0.025	19,000	1,190	0.018	0.021	17,500	930	0.011	0.017
		10	19,500	1,160	0.014	0.018	17,500	960	0.012	0.015	16,500	770	0.007	0.012
		12	18,000	1,010	0.011	0.016	16,000	840	0.009	0.013	15,000	660	0.005	0.01
1.2	R0.2	6	22,500	2,180	0.019	0.043	21,000	1,880	0.016	0.036	19,000	1,440	0.01	0.029
		8	20,000	1,730	0.011	0.034	18,500	1,470	0.009	0.028	17,000	1,140	0.005	0.022
		10	18,500	1,500	0.006	0.025	17,500	1,290	0.005	0.021	16,000	1,010	0.003	0.017
	R0.3	6	22,500	2,180	0.029	0.043	21,000	1,880	0.024	0.036	19,000	1,440	0.014	0.029
		8	20,000	1,730	0.016	0.034	18,500	1,470	0.013	0.028	17,000	1,140	0.008	0.022
		10	18,500	1,500	0.01	0.025	17,500	1,290	0.008	0.021	16,000	1,010	0.005	0.017

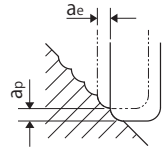
1. Use a rigid and precise machine and holder.
2. When machining carbon steels or hardened steels, using MQL(Minimum Quantity Lubrication / mist coolant) is recommended.
3. The above condition shows an approximate standard for contouring operation(side milling) with a low machining load.
   If abnormal cutting sounds, vibration or chattering occur depending on the machining shape, cutting amount, rigidity of the machine or work holding condition, etc., please adjust the speed, feed and the depth of cut.
4. Adjust the speed, feed rate, and depth of cut if chattering, vibration or abnormal grinding sounds occur.
5. Helical or ramp milling is recommended during the approach of a Z cut.
6. When using a tool with a diameter of ϕ 0.5 or less, or L/D (aspect ratio) is greater than 10, high loads can cause tool breakage.
   Therefore, adjust the cutting conditions based on the machining situation.
7. Adjust the speed, feed rate, and the depth of the cut according to the shape of the work, rigidity of the machine, and how the work is held.
8. When RPM are insufficient, please reduce the RPM and feed rates at same ratio as listed above.

AE-CPR4-H 切削条件基準表 Cutting Condition

FROM

側面切削(等高線仕上げ加工) Side Milling (Contour Line Finish Milling)

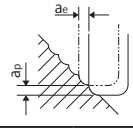
被削材 Work Material			調質鋼・プリハードン鋼 Hardened Steel・Prehardened Steel PX5・NAK80・SKD61 (～45HRC)				調質鋼 Hardened Steel STAVAX・HPM38 (～55HRC)				調質鋼 Hardened Steel SKH51・YXR7・HAP40 (～66HRC)			
外径 DC	RE	首下長 LU	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)
1.5	R0.2	6	21,000	2,630	0.024	0.054	18,500	2,180	0.02	0.045	16,000	1,580	0.012	0.036
		8	20,000	2,250	0.024	0.054	17,500	1,880	0.02	0.045	15,500	1,370	0.012	0.036
		10	17,500	1,880	0.022	0.043	15,500	1,580	0.018	0.036	13,500	1,140	0.011	0.029
		12	16,500	1,650	0.014	0.037	14,500	1,370	0.012	0.031	12,500	1,010	0.007	0.025
		16	11,000	960	0.01	0.026	10,000	800	0.008	0.022	8,650	590	0.005	0.018
	R0.3	6	21,000	2,630	0.036	0.054	18,500	2,180	0.03	0.045	16,000	1,580	0.018	0.036
		8	20,000	2,250	0.036	0.054	17,500	1,880	0.03	0.045	15,500	1,370	0.018	0.036
		10	17,500	1,880	0.032	0.043	15,500	1,580	0.027	0.036	13,500	1,140	0.016	0.029
		12	16,500	1,650	0.022	0.037	14,500	1,370	0.018	0.031	12,500	1,010	0.011	0.025
		16	11,000	960	0.014	0.026	10,000	800	0.012	0.022	8,650	590	0.007	0.018
2	R0.1	8	16,500	2,780	0.018	0.072	16,000	2,400	0.015	0.06	15,000	2,030	0.009	0.048
		10	15,500	2,480	0.018	0.072	15,500	2,180	0.015	0.06	14,500	1,800	0.009	0.048
		12	14,500	2,250	0.018	0.065	14,500	1,950	0.015	0.054	13,500	1,580	0.009	0.043
		16	13,000	1,730	0.011	0.05	12,500	1,500	0.009	0.042	12,000	1,250	0.005	0.034
		20	12,000	1,410	0.007	0.036	11,500	1,230	0.006	0.03	11,000	1,020	0.004	0.024
		25	11,000	1,200	0.005	0.032	11,000	1,050	0.004	0.027	10,000	870	0.002	0.022
	R0.2	8	16,500	2,780	0.024	0.072	16,000	2,400	0.02	0.06	15,000	2,030	0.012	0.048
		10	15,500	2,480	0.024	0.072	15,500	2,180	0.02	0.06	14,500	1,800	0.012	0.048
		12	14,500	2,250	0.024	0.065	14,500	1,950	0.02	0.054	13,500	1,580	0.012	0.043
		16	13,000	1,730	0.014	0.05	12,500	1,500	0.012	0.042	12,000	1,250	0.007	0.034
		20	12,000	1,410	0.01	0.036	11,500	1,230	0.008	0.03	11,000	1,020	0.005	0.024
		25	11,000	1,200	0.007	0.032	11,000	1,050	0.006	0.027	10,000	870	0.004	0.022
	R0.3	8	16,500	2,780	0.036	0.072	16,000	2,400	0.03	0.06	15,000	2,030	0.018	0.048
		10	15,500	2,480	0.036	0.072	15,500	2,180	0.03	0.06	14,500	1,800	0.018	0.048
		12	14,500	2,250	0.036	0.065	14,500	1,950	0.03	0.054	13,500	1,580	0.018	0.043
		16	13,000	1,730	0.022	0.05	12,500	1,500	0.018	0.042	12,000	1,250	0.011	0.034
		20	12,000	1,410	0.014	0.036	11,500	1,230	0.012	0.03	11,000	1,020	0.007	0.024
	R0.5	8	16,500	2,780	0.06	0.072	16,000	2,400	0.05	0.06	15,000	2,030	0.03	0.048
		10	15,500	2,480	0.06	0.072	15,500	2,180	0.05	0.06	14,500	1,800	0.03	0.048
		12	14,500	2,250	0.06	0.065	14,500	1,950	0.05	0.054	13,500	1,580	0.03	0.043
		16	13,000	1,730	0.036	0.05	12,500	1,500	0.03	0.042	12,000	1,250	0.018	0.034
		20	12,000	1,410	0.024	0.036	11,500	1,230	0.02	0.03	11,000	1,020	0.012	0.024
		25	11,000	1,200	0.018	0.032	11,000	1,050	0.015	0.027	10,000	870	0.009	0.022
2.5	R0.2	10	13,000	2,780	0.024	0.09	13,000	2,100	0.02	0.075	12,000	2,030	0.012	0.06
		20	10,000	1,730	0.014	0.062	10,000	1,340	0.012	0.052	9,450	1,250	0.007	0.042
	R0.5	10	13,000	2,780	0.06	0.09	13,000	2,100	0.05	0.075	12,000	2,030	0.03	0.06
		20	10,000	1,730	0.036	0.062	10,000	1,340	0.03	0.052	9,450	1,250	0.018	0.042



1. 機械、ホルダは剛性のある精度の高いものをご使用下さい。
2. 切削油剤は被削材に応じてエアブローまたは発煙性の少ない切削油剤をご使用下さい。調質鋼の切削では、MQL(オイルミストクーラント)を推奨いたします。
3. 上表は、等高線加工(側面)の負荷の少ない加工形状での目安です。加工形状、機械剛性、ワーク保持等の状況により、回転速度、送り速度、切込深さを調整下さい。
4. びびり、振動、異常な切削音が発生する場合、回転速度、送り速度、切込深さを調整下さい。
5. Z切込時のアプローチ方法として、円弧(ヘリカル)、傾斜(ランプ)での加工をお勧めします。
6. φ0.5 未満あるいはL/D(アスペクト比)が10以上では、わずかな負荷の増大で折損することがありますので、切削状況を見て切削条件の調整を行って下さい。
7. 加工精度を要求される場合は、回転速度、送り速度、切込量を抑えて使用下さい。
8. 回転速度が不足する場合は、回転速度と送り速度を上表に対して同じ比率で下げて下さい。

NEXT

FROM

被削材 Work Material			調質鋼・プリハードン鋼 Hardened Steel・Prehardened Steel PX5・NAK80・SKD61 (～45HRC)				調質鋼 Hardened Steel STAVAX・HPM38 (～55HRC)				調質鋼 Hardened Steel SKH51・YXR7・HAP40 (～66HRC)			
外径 DC	RE	首下長 LU	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)	回転速度 Speed (min^{-1})	送り速度 Feed (mm/min)	ap (mm)	ae (mm)
3	R0.2	8	12,000	3,000	0.024	0.096	11,000	2,100	0.02	0.08	10,000	1,650	0.012	0.064
		12	12,000	3,000	0.024	0.096	11,000	2,100	0.02	0.08	10,000	1,650	0.012	0.064
		16	10,500	2,400	0.024	0.096	9,600	1,730	0.02	0.08	9,000	1,320	0.012	0.064
		20	9,300	2,030	0.024	0.077	8,400	1,410	0.02	0.064	7,850	1,100	0.012	0.051
		25	8,900	1,650	0.014	0.058	8,050	1,200	0.012	0.048	7,550	920	0.007	0.038
		30	8,600	1,500	0.01	0.048	7,800	1,080	0.008	0.04	7,300	840	0.005	0.032
		35	7,950	1,320	0.007	0.043	7,200	950	0.006	0.036	6,750	720	0.004	0.029
	R0.3	12	12,000	3,000	0.036	0.096	11,000	2,100	0.03	0.08	10,000	1,650	0.018	0.064
		16	10,500	2,400	0.036	0.096	9,600	1,730	0.03	0.08	9,000	1,320	0.018	0.064
		20	9,300	2,030	0.036	0.077	8,400	1,410	0.03	0.064	7,850	1,100	0.018	0.051
		25	8,900	1,650	0.022	0.058	8,050	1,200	0.018	0.048	7,550	920	0.011	0.038
		30	8,600	1,500	0.014	0.048	7,800	1,080	0.012	0.04	7,300	840	0.007	0.032
		35	7,950	1,320	0.011	0.043	7,200	950	0.009	0.036	6,750	720	0.005	0.029
	R0.5	12	12,000	3,000	0.06	0.096	11,000	2,100	0.05	0.08	10,000	1,650	0.03	0.064
		16	10,500	2,400	0.06	0.096	9,600	1,730	0.05	0.08	9,000	1,320	0.03	0.064
		20	9,300	2,030	0.06	0.077	8,400	1,410	0.05	0.064	7,850	1,100	0.03	0.051
		25	8,900	1,650	0.036	0.058	8,050	1,200	0.03	0.048	7,550	920	0.018	0.038
		30	8,600	1,500	0.024	0.048	7,800	1,080	0.02	0.04	7,300	840	0.012	0.032
		35	7,950	1,320	0.018	0.043	7,200	950	0.015	0.036	6,750	720	0.009	0.029
4	R0.2	16	7,900	2,500	0.024	0.096	7,150	2,050	0.02	0.08	6,450	1,450	0.012	0.064
		20	7,450	2,400	0.024	0.096	6,750	1,950	0.02	0.08	6,100	1,350	0.012	0.064
		25	6,550	2,000	0.024	0.086	5,950	1,650	0.02	0.072	5,350	1,150	0.012	0.058
		30	6,100	1,650	0.017	0.067	5,550	1,350	0.014	0.056	5,000	960	0.008	0.045
		40	5,700	1,300	0.01	0.048	5,150	1,050	0.008	0.04	4,650	730	0.005	0.032
	R0.3	16	7,900	2,500	0.036	0.096	7,150	2,050	0.03	0.08	6,450	1,450	0.018	0.064
		20	7,450	2,400	0.036	0.096	6,750	1,950	0.03	0.08	6,100	1,350	0.018	0.064
		25	6,550	2,000	0.036	0.086	5,950	1,650	0.03	0.072	5,350	1,150	0.018	0.058
		30	6,100	1,650	0.025	0.067	5,550	1,350	0.021	0.056	5,000	960	0.013	0.045
		40	5,700	1,300	0.014	0.048	5,150	1,050	0.012	0.04	4,650	730	0.007	0.032
	R0.5	16	7,900	2,500	0.06	0.096	7,150	2,050	0.05	0.08	6,450	1,450	0.03	0.064
		20	7,450	2,400	0.06	0.096	6,750	1,950	0.05	0.08	6,100	1,350	0.03	0.064
		25	6,550	2,000	0.06	0.086	5,950	1,650	0.05	0.072	5,350	1,150	0.03	0.058
		30	6,100	1,650	0.042	0.067	5,550	1,350	0.035	0.056	5,000	960	0.021	0.045
		40	5,700	1,300	0.024	0.048	5,150	1,050	0.02	0.04	4,650	730	0.012	0.032
		50	5,000	960	0.018	0.043	4,550	790	0.015	0.036	4,100	550	0.009	0.029
	R1	16	7,900	2,500	0.096	0.096	7,150	2,050	0.08	0.08	6,450	1,450	0.048	0.064
		20	7,450	2,400	0.096	0.096	6,750	1,950	0.08	0.08	6,100	1,350	0.048	0.064
		25	6,550	2,000	0.096	0.086	5,950	1,650	0.08	0.072	5,350	1,150	0.048	0.058
		30	6,100	1,650	0.067	0.067	5,550	1,350	0.056	0.056	5,000	960	0.034	0.045
		40	5,700	1,300	0.038	0.048	5,150	1,050	0.032	0.04	4,650	730	0.019	0.032
切込深さ Depth of Cut														

1. Use a rigid and precise machine and holder.
2. When machining carbon steels or hardened steels, using MQL(Minimum Quantity Lubrication / mist coolant) is recommended.
3. The above condition shows an approximate standard for contouring operation(side milling) with a low machining load.
   If abnormal cutting sounds, vibration or chattering occur depending on the machining shape, cutting amount, rigidity of the machine or work holding condition, etc., please adjust the speed, feed and the depth of cut.
4. Adjust the speed, feed rate, and depth of cut if chattering, vibration or abnormal grinding sounds occur.
5. Helical or ramp milling is recommended during the approach of a Z cut.
6. When using a tool with a diameter of ϕ 0.5 or less, or L/D (aspect ratio) is greater than 10, high loads can cause tool breakage.
   Therefore, adjust the cutting conditions based on the machining situation.
7. Adjust the speed, feed rate, and the depth of the cut according to the shape of the work, rigidity of the machine, and how the work is held.
8. When RPM are insufficient, please reduce the RPM and feed rates at same ratio as listed above.

ロングネックボールタイプ高精度仕上げ用２刃

AE-LNBD-H

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ロングネックラジアスタイプ高能率仕上げ用４刃

AE-CPR4-H

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