

# EPDBPE

## Epoch Deep Ball Pencil Evolution

High Efficiency & High Precision Deep Milling

**D0.2mm ~ D6mm**

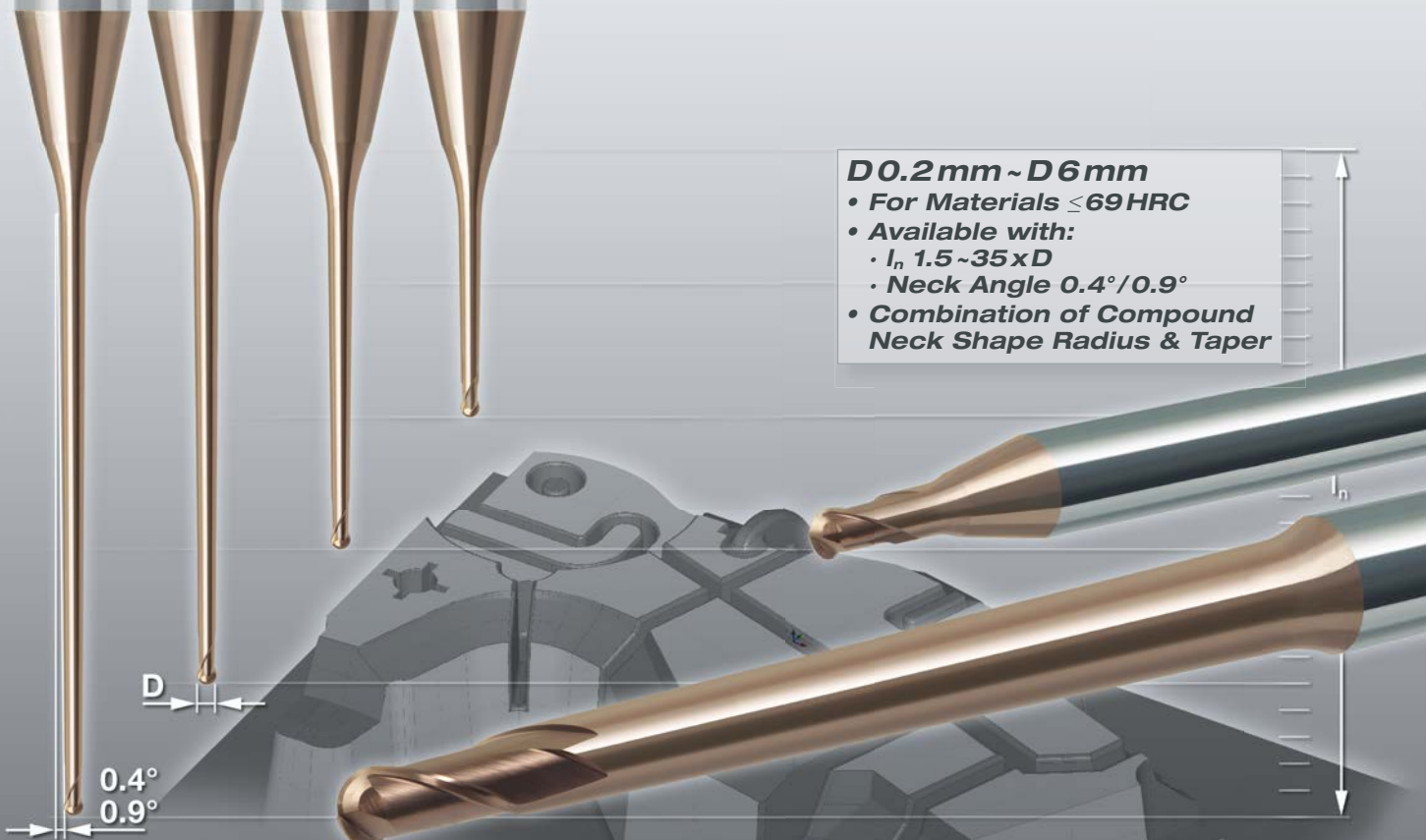
• For Materials  $\leq 69\text{HRC}$

• Available with:

•  $l_n 1.5 \sim 35 \times D$

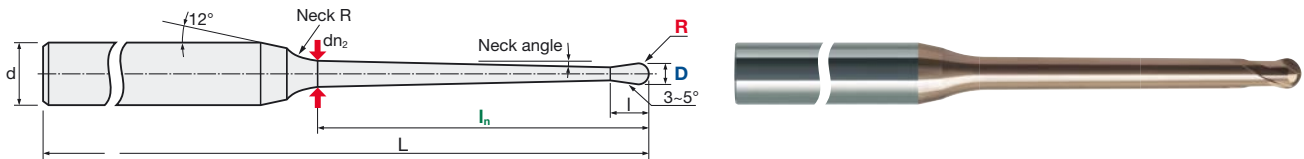
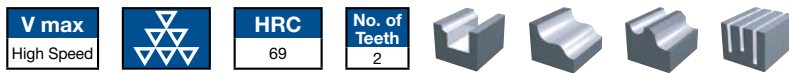
• Neck Angle  $0.4^\circ/0.9^\circ$

• Combination of Compound Neck Shape Radius & Taper

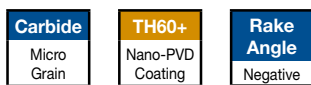


Carbide End Mills · Nano PVD Coated

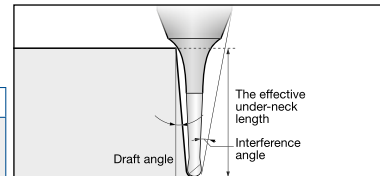
## EPDBPE-ATH | Epoch Deep Ball Pencil Evolution ATH



※ Back Draft is not available for Diameters 4–6mm



Helix Angle	R Tol. [mm]	d Tol.
30°	R0.1~R0.25: +/-0.003 R0.3~R3: +/-0.005	h5



Size												Actual Effective Length in Incline angles				
ID Code	Item Code	Z	D	Neck angle°	In	I	dn <sub>2</sub>	L	d	Neck R		0.5°	1°	1.5°	2°	3°
EP1357	EPDBPE-2002-1-04-ATH	2	0.2		1	0.15	0.182	50	4	7		1.55	1.72	1.88	2.03	2.31
EP1358	EPDBPE-2002-1.5-04-ATH				1.5		0.189					2.06	2.28	2.47	2.64	2.97
EP1359	EPDBPE-2002-2-04-ATH				2		0.196					2.7	3.03	3.3	3.56	4.02
EP1360	EPDBPE-2002-3-04-ATH				3		0.21					3.73	4.14	4.47	4.77	5.29
EP1361	EPDBPE-2003-2-04-ATH		0.3	0.4	2	0.25	0.294			7		2.57	2.83	3.04	3.24	3.59
EP1362	EPDBPE-2003-3-04-ATH				3		0.308					3.73	4.14	4.47	4.76	5.28
EP1363	EPDBPE-2004-2-04-ATH				2		0.394			10		2.57	2.82	3.03	3.23	3.57
EP1364	EPDBPE-2004-3-04-ATH				3		0.408					3.6	3.92	4.18	4.4	4.8
EP1365	EPDBPE-2004-4-04-ATH		0.4	0.9	4	0.3	0.422			7		4.76	5.23	5.61	5.93	6.51
EP1366	EPDBPE-2004-5-04-ATH				5		0.436					5.78	6.33	6.74	7.1	7.71
EP1367	EPDBPE-2004-6-04-ATH				6		0.45			10		6.81	7.41	7.86	8.25	8.9
EP1368	EPDBPE-2004-2-09-ATH				2		0.423					2.3	2.66	2.9	3.12	3.49
EP1369	EPDBPE-2004-4-09-ATH				4		0.486			7		2.57	4.87	5.35	5.72	6.34
EP1370	EPDBPE-2004-5-09-ATH				5		0.518					2.57	5.9	6.44	6.85	7.53
EP1371	EPDBPE-2004-6-09-ATH				6		0.549			10		2.57	6.92	7.52	7.97	8.69
EP1372	EPDBPE-2005-4-04-ATH		0.5	0.4	4	0.35	0.521			7		4.62	5	5.3	5.55	5.99
EP1373	EPDBPE-2005-6-04-ATH				6		0.549					6.8	7.41	7.86	8.24	8.89
EP1374	EPDBPE-2005-6-09-ATH				6		0.648			10		2.62	6.92	7.52	7.97	8.69
EP1375	EPDBPE-2005-8-09-ATH				8		0.71					2.62	8.96	9.67	10.18	10.99
EP1376	EPDBPE-2006-2-04-ATH		0.6	0.4	2	0.4	0.592			4		2.42	2.59	2.73	2.85	3.08
EP1377	EPDBPE-2006-4-04-ATH				4		0.62			7		4.62	5	5.29	5.54	5.98
EP1378	EPDBPE-2006-6-04-ATH				6		0.648			10		6.8	7.41	7.85	8.23	8.88
EP1379	EPDBPE-2006-8-04-ATH				8		0.676					8.85	9.56	10.07	10.5	11.22
EP1380	EPDBPE-2006-10-04-ATH				10		0.704			55		10.89	11.7	12.27	12.73	13.52
EP1381	EPDBPE-2006-12-04-ATH				12		0.732					12.94	13.83	14.44	14.95	15.79
EP1382	EPDBPE-2006-15-04-ATH				15		0.774			7		15.99	17.01	17.68	18.24	19.27
EP1383	EPDBPE-2006-4-09-ATH				4		0.683			10		2.67	4.7	5.07	5.37	5.85
EP1384	EPDBPE-2006-6-09-ATH				6		0.746			50		2.67	6.92	7.51	7.96	8.68
EP1385	EPDBPE-2006-8-09-ATH				8		0.809			10		2.67	8.96	9.67	10.18	10.98
EP1386	EPDBPE-2006-10-09-ATH				10		0.872					2.67	11.01	11.81	12.37	13.25
EP1387	EPDBPE-2006-12-09-ATH				12		0.934			55		2.67	13.05	13.94	14.54	15.49
EP1388	EPDBPE-2006-15-09-ATH				15		1.029					2.67	16.1	17.11	17.78	18.81
EP1389	EPDBPE-2008-4-04-ATH		0.8	0.4	4	0.5	0.819			50		4.61	4.99	5.28	5.53	5.97
EP1390	EPDBPE-2008-6-04-ATH				6		0.847			55		6.66	7.14	7.5	7.79	8.3
EP1391	EPDBPE-2008-8-04-ATH				8		0.875			10		8.85	9.56	10.06	10.49	11.21
EP1392	EPDBPE-2008-12-04-ATH				12		0.931					12.93	13.83	14.44	14.94	15.77
EP1393	EPDBPE-2008-8-09-ATH				8		1.006			50		2.77	8.96	9.66	10.17	10.97
EP1394	EPDBPE-2008-12-09-ATH				12		1.131			55		2.77	13.04	13.93	14.54	15.48
EP1395	EPDBPE-2008-16-09-ATH				16		1.257					2.77	17.12	18.16	18.85	19.9
EP1396	EPDBPE-2009-4-04-ATH		0.9	0.4	4	0.6	0.907			50		4.5	4.75	4.94	5.11	5.41
EP1397	EPDBPE-2009-8-04-ATH				8		0.963			55		8.75	9.3	9.7	10.03	10.6
EP1398	EPDBPE-2009-12-04-ATH				12		1.019				10		12.99	13.86	14.46	14.95
EP1399	EPDBPE-2009-16-04-ATH				16		1.075					17.07	18.08	18.77	19.33	20.54
EP1400	EPDBPE-2009-20-04-ATH				20		1.131			65		21.13	22.29	23.05	23.66	25.68

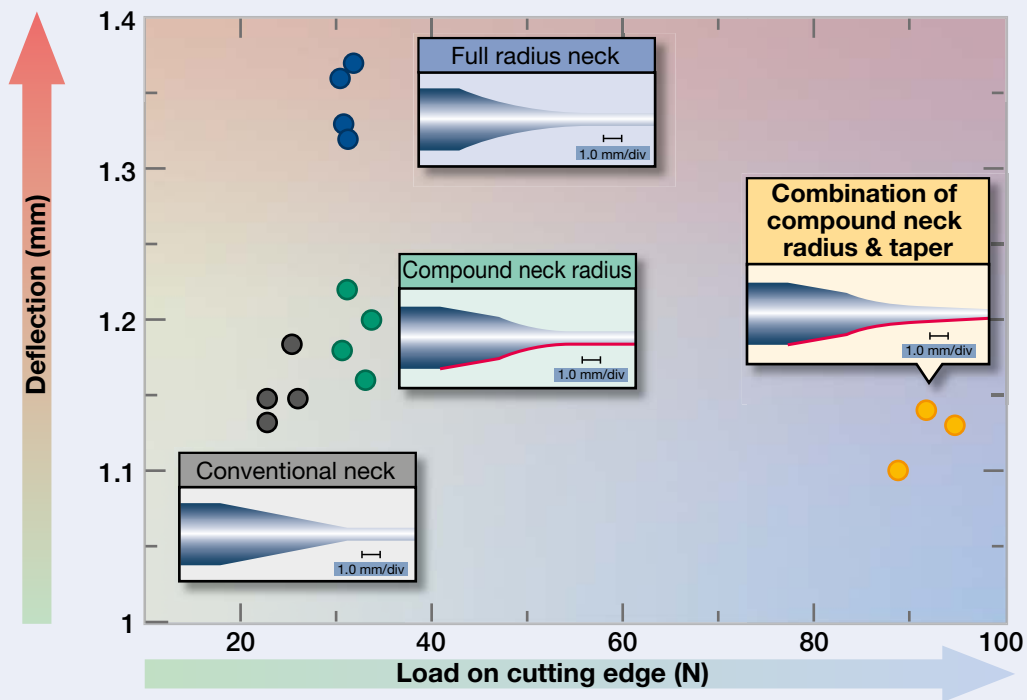


## EPDBPE-ATH | Epoch Deep Ball Pencil Evolution ATH

Size											Actual Effective Length in Incline angles						
ID Code	Item Code	Z	D	Neck angle°	In	l	dn <sub>2</sub>	L	d	Neck R	0.5°	1°	1.5°	2°	3°		
EP1401	EPDBPE-2010-6-04-ATH	2	1	0.4	6	0.8	1.013	50	6	7	6.82	7.24	7.57	7.85	8.34		
EP1402	EPDBPE-2010-8-04-ATH				8		1.041	55		10	8.85	9.36	9.74	10.07	10.62		
EP1403	EPDBPE-2010-10-04-ATH				10		1.068	60			11.07	11.79	12.33	12.78	13.54		
EP1404	EPDBPE-2010-15-04-ATH				15		1.138	65			16.16	17.08	17.73	18.27	19.31		
EP1405	EPDBPE-2010-20-04-ATH				20		1.208	70			21.23	22.33	23.08	23.69	25.73		
EP1406	EPDBPE-2010-25-04-ATH				25		1.278	75			26.31	27.56	28.38	29.05	32.15		
EP1407	EPDBPE-2010-30-04-ATH				30		1.348	80			31.37	32.76	33.66	34.82	38.57		
EP1408	EPDBPE-2010-6-09-ATH			0.9	10		6	1.103		50	7	5.47	6.91	7.32	7.65	8.19	
EP1409	EPDBPE-2010-10-09-ATH						10	1.229		55	10	5.47	11.2	11.91	12.44	13.28	
EP1410	EPDBPE-2010-15-09-ATH						15	1.386		60		5.47	16.28	17.19	17.84	18.84	
EP1411	EPDBPE-2010-20-09-ATH						20	1.543		65		5.47	21.35	22.44	23.18	24.68	
EP1412	EPDBPE-2010-25-09-ATH						25	1.7		70		5.47	26.42	27.66	28.48	30.83	
EP1413	EPDBPE-2010-30-09-ATH						30	1.857		75		5.47	31.49	32.86	33.75	36.98	
EP1414	EPDBPE-2010-35-09-ATH						35	2.015		80		5.47	36.55	38.04	39	43.12	
EP1415	EPDBPE-2015-8-04-ATH		1.5	0.4	8	1.513	1.35	55		7	8.95	9.41	9.78	10.09	10.62		
EP1416	EPDBPE-2015-10-04-ATH				10	1.541					10.97	11.52	11.93	12.28	12.9		
EP1417	EPDBPE-2015-12-04-ATH				12	1.569					13	13.62	14.07	14.45	15.47		
EP1418	EPDBPE-2015-30-04-ATH				30	1.82					75	31.46	32.79	33.68	34.85	38.57	
EP1419	EPDBPE-2015-10-09-ATH				10	1.692					55	7	7.83	11.08	11.61	12.02	12.67
EP1420	EPDBPE-2015-15-09-ATH				15	1.849					60	10	7.83	16.4	17.25	17.88	18.86
EP1421	EPDBPE-2015-20-09-ATH				20	2.006		65		7.83	21.47		22.49	23.21	24.72		
EP1422	EPDBPE-2015-30-09-ATH			30	2.32	75	7.83	31.59		32.9	33.78		37.01				
EP1423	EPDBPE-2020-8-04-ATH			2	0.4	8	2.008	50		4	8.7	9.03	9.28	9.5	10.27		
EP1424	EPDBPE-2020-12-04-ATH					12	2.064	55		7	13	13.61	14.06	14.43	15.4		
EP1425	EPDBPE-2020-16-04-ATH					16	2.12	60			17.05	17.79	18.31	18.74	20.54		
EP1426	EPDBPE-2020-20-04-ATH					20	2.176	65			21.33	22.37	23.09	23.68	25.67		
EP1427	EPDBPE-2020-25-04-ATH					25	2.245	65		10	26.4	27.59	28.39	29.05	32.09		
EP1428	EPDBPE-2020-30-04-ATH					30	2.315	70			31.46	32.79	33.67	34.81	38.51		
EP1429	EPDBPE-2020-40-04-ATH		40			2.455	80	41.58			43.14	44.26	46.39	x			
EP1430	EPDBPE-2020-12-09-ATH		0.9		1.7	12	2.244	55		7	8.3	13.11	13.7	14.14	14.84		
EP1431	EPDBPE-2020-16-09-ATH					16	2.369	60		10	8.3	17.16	17.88	18.39	19.76		
EP1432	EPDBPE-2020-20-09-ATH					20	2.495	65			8.3	21.48	22.49	23.2	24.68		
EP1433	EPDBPE-2020-25-09-ATH					25	2.652	65			8.3	26.54	27.7	28.5	30.82		
EP1434	EPDBPE-2020-30-09-ATH					30	2.809	70			8.3	31.6	32.9	33.77	36.97		
EP1435	EPDBPE-2020-35-09-ATH					35	2.966	75			8.3	36.66	38.08	39.02	x		
EP1436	EPDBPE-2020-40-09-ATH					40	3.123	80			8.3	41.72	43.25	44.5	x		
EP1437	EPDBPE-2020-50-09-ATH					50	3.438	90			8.3	51.82	53.56	55.58	x		
EP1438	EPDBPE-2030-8-04-ATH		3	0.4	8	2.937	50	4		8.87	9.13	9.35	9.55	10.33			
EP1439	EPDBPE-2030-16-04-ATH				16	3.048	55	7		17.25	17.89	18.38	18.79	20.6			
EP1440	EPDBPE-2030-20-04-ATH				20	3.104	60			21.29	22.04	22.6	23.34	25.74			
EP1441	EPDBPE-2030-30-04-ATH				30	3.244	70			31.67	32.88	33.73	34.92	x			
EP1442	EPDBPE-2030-40-04-ATH				40	3.384	80			41.78	43.23	44.38	x	x			
EP1443	EPDBPE-2030-50-04-ATH				50	3.523	90			51.87	53.53	55.41	x	x			
EP1444	EPDBPE-2030-15-09-ATH			0.9	2.5	15	3.253	55		7	13.78	16.35	16.95	17.41	18.64		
EP1445	EPDBPE-2030-20-09-ATH					20	3.41	60		10	13.78	21.4	22.14	22.68	24.78		
EP1446	EPDBPE-2030-30-09-ATH					30	3.724	70			13.78	31.82	33	33.84	x		
EP1447	EPDBPE-2030-40-09-ATH					40	4.038	80			13.78	41.92	43.34	x	x		
EP1448	EPDBPE-2030-50-09-ATH					50	4.352	90			13.78	52.01	53.64	x	x		
EP1449	EPDBPE-2030-60-09-ATH					60	4.667	100			13.78	62.1	x	x	x		
EP1450	EPDBPE-2040-20-09-ATH		4	0.9	20	4.237	70	7		20.79	21.76	22.37	22.87	25.16			
EP1451	EPDBPE-2040-30-09-ATH				30	4.551	80			10	25.53	31.83	32.66	33.95	37.45		
EP1452	EPDBPE-2040-40-09-ATH				40	4.865	90				25.53	42.31	43.56	45.04	x		
EP1453	EPDBPE-2040-60-09-ATH				60	5.494	110	25.53		62.46	64.14	x	x				
EP1454	EPDBPE-2050-30-09-ATH		5		10	30	5.488	80		7	29.41	31.92	32.71	34.04	x		
EP1455	EPDBPE-2050-40-09-ATH					40	5.803	90			10	29.41	41.98	43.12	45.12	x	
EP1456	EPDBPE-2050-60-09-ATH					60	6.431	110				29.41	62.56	x	x	x	
EP1457	EPDBPE-2050-90-09-ATH					90	7.373	140		29.41	x	x	x	x			
EP1458	EPDBPE-2060-30-09-ATH		6		12	30	6.426	80		7	30.63	32	32.76	x	x		
EP1459	EPDBPE-2060-45-09-ATH					45	6.897	95			33.29	47.09	x	x	x		
EP1460	EPDBPE-2060-60-09-ATH					60	7.368	110			33.29	62.65	64.34	x	x		
EP1461	EPDBPE-2060-80-09-ATH					80	7.996	130		33.29	82.78	x	x	x			

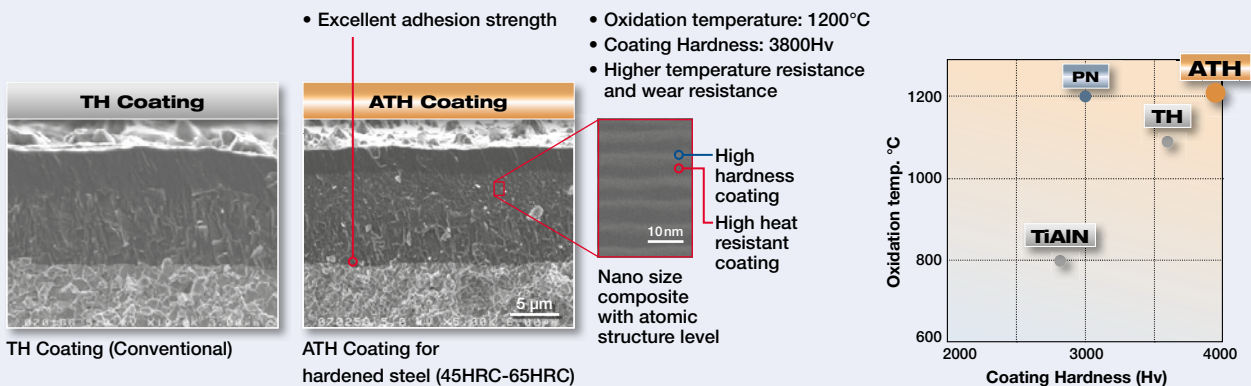
Cutting Conditions   Schnittwerte		D	Page   Seite	D	Page   Seite
Roughing		D0.2 – D1.5	8–9	D2.0 – D6.0	10–11
Finishing		D0.2 – D1.0	12–13	D1.5 – D6.0	14–15

### Combination of compound neck radius and taper



Combination of compound neck radius and taper can dramatically reduce deflection to improve the geometrical precision of your mold!

### ATH (Advanced TH) Coating



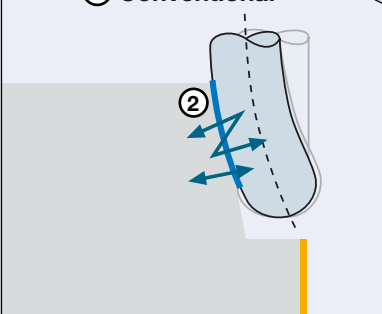


## EPDBPE-ATH | Epoch Deep Ball Pencil Evolution ATH


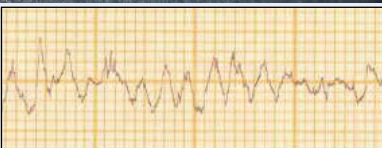
### Advanced by Back Draft

#### Standard

**① Conventional**



#### Cutting surface

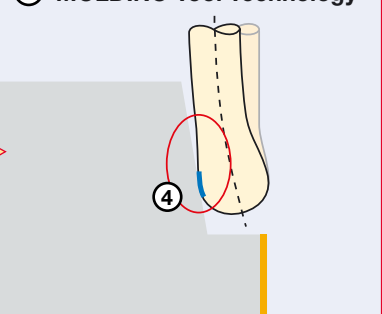
**Rz: 3.4 μm · Ra<sub>75</sub>: 0.52 μm**

#### ADVANCED BY BACK DRAFT



- 1. Conventional:**  
More contact between cutter and work piece due to deflection
2. More contact between cutter and work piece stimulate the vibration characteristic
- 3. MOLDINO Technology:** Featured with MOLDINO Tool's "Back Draft" Geometry, which can effectively avoid excessive contact between cutter and work piece, and guarantees stable process especially in deep geometry applications
4. Shorter contact length between cutter and work piece
5. Back Draft improves your mold surface quality!

#### EPDBPE-ATH


**③ MOLDINO Tool Technology**



#### Cutting surface

**Rz: 1.5 μm · Ra<sub>75</sub>: 0.37 μm**



**⑤ Back Draft improves your surface quality!**

#### EVOLUZIONE CON IL BACK DRAFT

- 1. Le frese convenzionali:**  
Eccessivo contatto tra tagliente e pezzo dovuto alla flessione
2. Il maggior contatto tra tagliente e pezzo induce maggiori vibrazioni
- 3. Tecnologia MOLDINO:** Caratterizzata dalla Geometria brevettata Back Draft , che effettivamente evita l'eccessivo contatto tra fresa e pezzo e garantisce un processo stabile specialmente con lunghe sporgenze
4. Minore lunghezza di contatto tra fresa e pezzo
5. La tecnologia Back Draft" migliora la qualità superficiale delle lavorazioni!

#### SOLUTIONNÉ PAR LA GÉOMÉTRIE « BACK DRAFT »

- 1. Conventiennel :**  
À Cause de la flexion, le contact entre la pièce et l'outil est plus important
2. Le contact excessif entre l'outil et la pièce augmente les phénomènes vibratoires
- 3. Technologie MOLDINO:** La géométrie « Back Draft » brevetée par MOLDINO permet effectivement d'éviter les zones de contact non désirées et garantie un processus stable, tout particulièrement lors d'usinages profonds
4. Zone de contact réduite entre l'outil et la pièce à usiner
5. La géométrie « Back Draft » améliore la qualité surfacique des pièces que vous usinez !

#### VENTAJAS DEL BACK DRAFT

- 1. Convencional:**  
Una mayor superficie de contacto entre la herramienta y la pieza de trabajo debido a la flexión.
2. Un mayor contacto entre la herramienta y el material provoca vibraciones.
- 3. Tecnología MOLDINO:** MOLDINO ha patentado la geometría "Back Draft", que permite evitar el contacto excesivo entre la herramienta y el material, garantizando un proceso estable especialmente en aplicaciones de geometría profunda
4. Zona de contacto menor entre la herramienta y el material.
5. La tecnología "Back Draft" mejora la calidad superficial de la pieza.

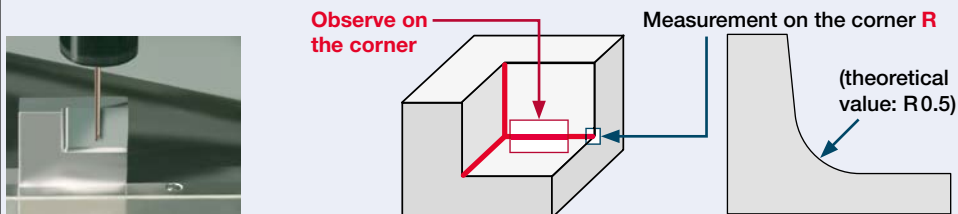
#### AVANÇADO POR BACK DRAFT

- 1. Convencional :**  
Mais contacto entre a navalha e a peça a maquinar maior deflexão.
2. Mais contacto entre a navalha e peça a maquinar vai provocar mais vibração.
- 3. Tecnologia MOLDINO:** Apresentado e patenteado pela MOLDINO a geometria "Back Draft " pode evitar o contacto excessivo entre a navalha e a peça a maquinar, e garante um processo estável, especialmente em aplicações profundas.
4. Menor face de contacto entre a fresa e peça a maquinar.
5. "Back Draft" melhora a qualidade de superfície do seu molde!

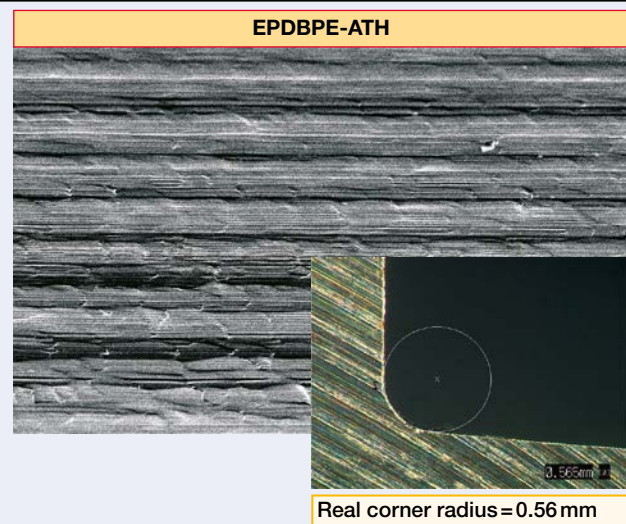
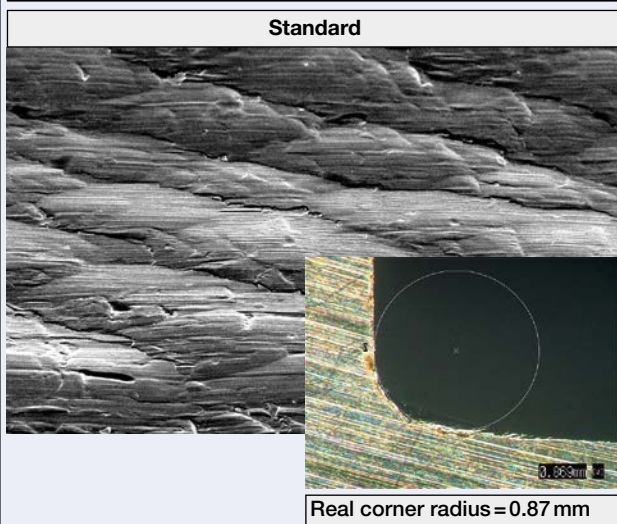
## EPDBPE-ATH | Epoch Deep Ball Pencil Evolution ATH

### Finishing application of hardened Material: 1.2343 (52HRC)

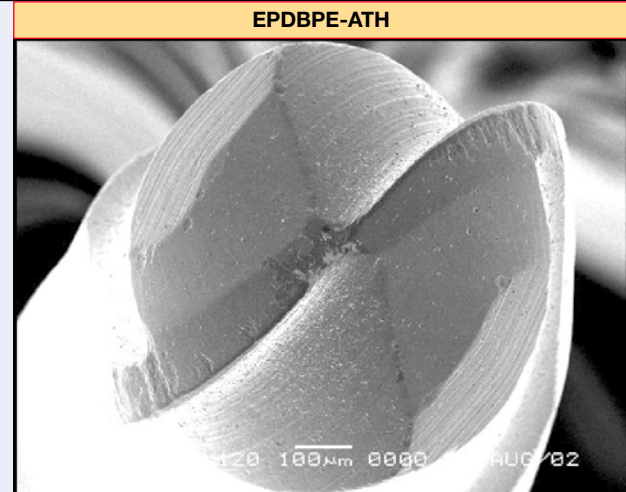
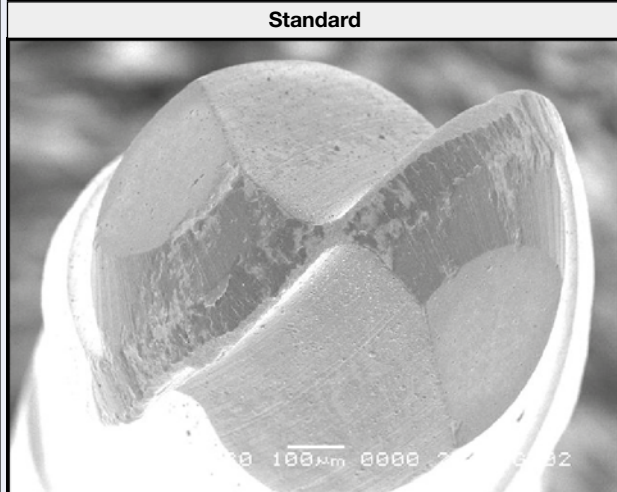
	Tool: Item Code	Neck length (mm)	RPM (min <sup>-1</sup> )	Table feed (mm/min)	a <sub>p</sub> (mm)	a <sub>s</sub> (mm)	Cooling	machining time (hours)
Finishing	EPDBPE2010-15-09-ATH	15	13,000	780	0.015	0.045	Emulsion	3



### Surface picture & Corner picture



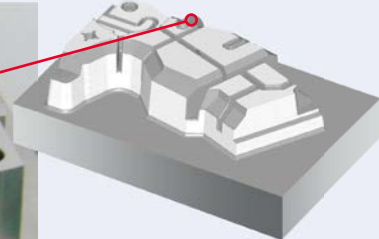
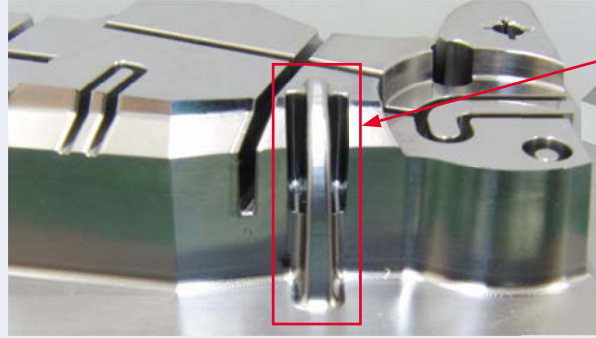
### Tool after using



## EPDBPE-ATH | Epoch Deep Ball Pencil Evolution ATH

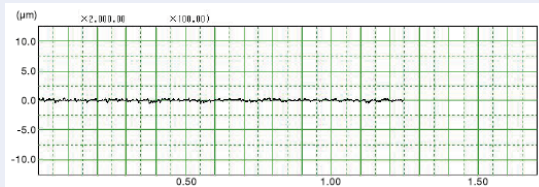
### Ribbing application of hard Material: 1.2083 (52HRC)

	Tool: Item Code	Neck length (mm)	Cutting depth (mm)	RPM (min <sup>-1</sup> )	Table feed (mm/min)	a <sub>p</sub> (mm)	a <sub>e</sub> (mm)	Stock (mm)
Roughing	EPDBPE2010-10-04-ATH	10	10	24,000	910	Roughing: 0.01	0.09	0.01
Semi-Finishing				10,000	200	Semi-Finishing: 0.015		
Finishing						Finishing: 0.015	0.01	0



Bottom width: 1.2 mm  
 Depth: 10 mm  
 Incline angle: 1°

#### Rib Surface Roughness



Rz: 0.81 μm

Ra<sub>75</sub>: 0.12 μm



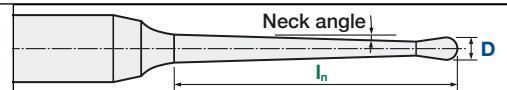
## EPDBPE-ATH | Recommended Cutting Conditions | Roughing

Workpiece Material			I					II				
			Carbon Steels, Alloy Steels (180~250HB)					Tool Steels (25~35HRC)				
D	I <sub>n</sub>	Neck angle °	a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min
Roughing	0.2	1	0.017	0.051	50,000	0.025	2,475	0.015	0.046	45,000	0.025	2,228
		1.5	0.009	0.027	49,500	0.022	2,205	0.008	0.024	44,550	0.022	1,985
		2	0.006	0.019	49,500	0.022	2,138	0.005	0.017	44,550	0.022	1,925
		3	0.004	0.011	44,000	0.022	1,901	0.004	0.010	39,600	0.022	1,711
	0.3	2	0.021	0.062	46,750	0.028	2,521	0.019	0.056	42,075	0.028	2,270
		3	0.012	0.035	41,800	0.026	2,127	0.011	0.032	37,620	0.026	1,914
		2	0.035	0.105	44,000	0.033	2,904	0.032	0.095	39,600	0.033	2,614
		3	0.020	0.060	39,600	0.030	2,352	0.018	0.054	35,640	0.030	2,117
	0.4	4	0.008	0.024	39,600	0.029	2,281	0.007	0.022	35,640	0.029	2,053
		5	0.006	0.019	35,200	0.029	2,028	0.005	0.017	31,680	0.029	1,825
		6	0.013	0.039	35,640	0.027	1,925	0.011	0.035	32,076	0.027	1,732
		2	0.039	0.116	44,000	0.033	2,904	0.035	0.105	39,600	0.033	2,614
		4	0.009	0.027	39,600	0.029	2,281	0.008	0.024	35,640	0.029	2,053
		5	0.007	0.021	35,200	0.029	2,028	0.006	0.019	31,680	0.029	1,825
		6	0.014	0.043	35,640	0.027	1,925	0.012	0.039	32,076	0.027	1,732
		4	0.013	0.039	37,620	0.033	2,509	0.012	0.035	33,858	0.033	2,258
	0.5	6	0.020	0.062	33,858	0.031	2,103	0.018	0.056	30,472	0.031	1,892
		6	0.022	0.069	33,858	0.031	2,103	0.020	0.062	30,472	0.031	1,892
		8	0.012	0.036	36,960	0.025	1,822	0.011	0.032	33,264	0.025	1,640
		2	0.055	0.165	44,000	0.033	2,904	0.050	0.149	39,600	0.033	2,614
	0.6	4	0.035	0.105	39,600	0.030	2,352	0.032	0.095	35,640	0.030	2,117
		6	0.018	0.054	39,600	0.029	2,281	0.016	0.049	35,640	0.029	2,053
		8	0.018	0.054	35,200	0.029	2,028	0.016	0.049	31,680	0.029	1,825
		10	0.014	0.041	35,200	0.025	1,774	0.013	0.037	31,680	0.025	1,597
		12	0.009	0.027	26,400	0.025	1,331	0.008	0.024	23,760	0.025	1,198
		15	0.005	0.016	22,000	0.025	1,109	0.005	0.014	19,800	0.025	998
		4	0.039	0.116	39,600	0.030	2,352	0.035	0.105	35,640	0.030	2,117
		6	0.020	0.060	39,600	0.029	2,281	0.018	0.054	35,640	0.029	2,053
	0.8	8	0.020	0.060	35,200	0.029	2,028	0.018	0.054	31,680	0.029	1,825
		10	0.015	0.045	35,200	0.025	1,774	0.014	0.041	31,680	0.025	1,597
		12	0.010	0.030	26,400	0.025	1,331	0.009	0.027	23,760	0.025	1,198
		15	0.006	0.018	22,000	0.025	1,109	0.005	0.016	19,800	0.025	998
		4	0.062	0.186	44,000	0.041	3,630	0.056	0.167	39,600	0.041	3,267
		6	0.045	0.135	39,600	0.037	2,940	0.041	0.122	35,640	0.037	2,646
		8	0.023	0.070	39,600	0.036	2,851	0.021	0.063	35,640	0.036	2,566
		12	0.018	0.054	35,200	0.036	2,534	0.016	0.049	31,680	0.036	2,281
	0.9	12	0.026	0.078	39,600	0.036	2,851	0.023	0.070	35,640	0.036	2,566
		16	0.020	0.060	35,200	0.036	2,534	0.018	0.054	31,680	0.036	2,281
		16	0.018	0.054	26,400	0.032	1,663	0.016	0.049	23,760	0.032	1,497
		4	0.099	0.298	41,800	0.047	3,942	0.090	0.267	37,620	0.047	3,548
		8	0.037	0.112	37,620	0.041	3,115	0.033	0.101	33,858	0.041	2,803
		12	0.029	0.086	33,440	0.041	2,769	0.026	0.078	30,096	0.041	2,492
		16	0.016	0.047	33,347	0.037	2,494	0.014	0.043	30,013	0.037	2,244
		20	0.011	0.034	25,011	0.033	1,653	0.010	0.030	22,509	0.033	1,488
	1	6	0.055	0.165	35,640	0.045	3,176	0.050	0.149	32,076	0.045	2,858
		8	0.055	0.165	35,640	0.045	3,176	0.050	0.149	32,076	0.045	2,858
		10	0.032	0.095	35,640	0.043	3,079	0.029	0.086	32,076	0.043	2,771
		15	0.025	0.076	31,680	0.043	2,737	0.023	0.068	28,512	0.043	2,463
		20	0.018	0.054	23,760	0.038	1,796	0.016	0.049	21,384	0.038	1,617
		25	0.015	0.046	19,800	0.038	1,497	0.014	0.041	17,820	0.038	1,347
		30	0.015	0.046	19,800	0.038	1,497	0.014	0.041	17,820	0.038	1,347
		6	0.061	0.182	35,640	0.045	3,176	0.055	0.164	32,076	0.045	2,858
		10	0.035	0.105	35,640	0.043	3,079	0.032	0.095	32,076	0.043	2,771
		15	0.028	0.084	31,680	0.043	2,737	0.025	0.076	28,512	0.043	2,463
		20	0.020	0.060	23,760	0.038	1,796	0.018	0.054	21,384	0.038	1,617
		25	0.017	0.051	19,800	0.038	1,497	0.015	0.046	17,820	0.038	1,347
	1.5	30	0.017	0.051	19,800	0.038	1,497	0.015	0.046	17,820	0.038	1,347
		35	0.010	0.030	19,800	0.038	1,497	0.009	0.027	17,820	0.038	1,347
		8	0.070	0.210	27,720	0.045	2,470	0.063	0.189	24,948	0.045	2,223
		10	0.070	0.210	27,720	0.045	2,470	0.063	0.189	24,948	0.045	2,223
		12	0.070	0.210	27,720	0.045	2,470	0.063	0.189	24,948	0.045	2,223
		30	0.025	0.076	24,640	0.043	2,129	0.023	0.068	22,176	0.043	1,916
		10	0.077	0.231	27,720	0.045	2,470	0.069	0.208	24,948	0.045	2,223
		15	0.045	0.135	27,720	0.043	2,395	0.041	0.122	24,948	0.043	2,156
		20	0.040	0.120	24,640	0.043	2,129	0.036	0.108	22,176	0.043	1,916
		30	0.028	0.084	24,640	0.043	2,129	0.025	0.076	22,176	0.043	1,916

✳ In the case of rib roughing application, please reduce V<sub>f</sub> and a<sub>p</sub> by 20%

According to circumstances like workpiece geometry/machine limitations, speed and feed can be increased or reduced in equal ratio. Choose an rpm according to material/hardness and the achievable feed in your geometry. The f<sub>z</sub>-value should not differ more than 20–30% from the original value.





III					IV					V					D I <sub>n</sub>	
Tool Steels (35~45HRC)					Hardened Steels (45~55HRC)					Hardened Steels (55~70HRC)						
a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min		
0.014	0.041	42,500	0.022	1,893	0.011	0.033	37,500	0.020	1,485	0.010	0.031	35,000	0.017	1,213	0.2	1
0.007	0.022	42,075	0.022	1,874	0.006	0.018	37,125	0.020	1,470	0.005	0.016	34,650	0.017	1,201		1.5
0.005	0.015	42,075	0.019	1,590	0.005	0.013	37,125	0.019	1,403	0.004	0.012	34,650	0.016	1,123		2
0.003	0.009	37,400	0.019	1,414	0.003	0.007	33,000	0.019	1,247	0.002	0.006	30,800	0.016	998		3
0.017	0.050	39,738	0.025	1,906	0.014	0.040	35,063	0.023	1,573	0.012	0.037	32,725	0.020	1,273	0.3	2
0.009	0.029	35,530	0.025	1,707	0.008	0.023	31,350	0.023	1,408	0.007	0.021	29,260	0.020	1,140		3
0.028	0.084	37,400	0.030	2,222	0.023	0.068	33,000	0.026	1,742	0.021	0.063	30,800	0.023	1,423	0.4	2
0.016	0.048	33,660	0.030	1,999	0.013	0.039	29,700	0.026	1,568	0.012	0.036	27,720	0.023	1,281		3
0.006	0.020	33,660	0.025	1,696	0.005	0.016	29,700	0.025	1,497	0.005	0.014	27,720	0.022	1,198		4
0.005	0.015	29,920	0.025	1,508	0.005	0.013	26,400	0.025	1,331	0.004	0.012	24,640	0.022	1,064		5
0.010	0.031	30,294	0.027	1,636	0.008	0.025	26,730	0.023	1,251	0.008	0.023	24,948	0.021	1,033	0.5	6
0.031	0.092	37,400	0.030	2,222	0.025	0.075	33,000	0.026	1,742	0.023	0.069	30,800	0.023	1,423		2
0.007	0.022	33,660	0.025	1,696	0.006	0.018	29,700	0.025	1,497	0.005	0.016	27,720	0.022	1,198		4
0.006	0.017	29,920	0.025	1,508	0.005	0.014	26,400	0.025	1,331	0.004	0.013	24,640	0.022	1,064		5
0.011	0.034	30,294	0.027	1,636	0.009	0.028	26,730	0.023	1,251	0.008	0.026	24,948	0.021	1,033	0.6	6
0.010	0.032	31,977	0.029	1,839	0.009	0.026	28,215	0.029	1,622	0.007	0.023	26,334	0.025	1,333		4
0.016	0.050	28,779	0.031	1,787	0.013	0.041	25,394	0.027	1,367	0.012	0.037	23,701	0.024	1,128		6
0.018	0.055	28,779	0.031	1,787	0.014	0.045	25,394	0.027	1,367	0.013	0.041	23,701	0.024	1,128		6
0.010	0.029	31,416	0.021	1,335	0.008	0.023	27,720	0.021	1,178	0.007	0.022	25,872	0.019	968	0.7	8
0.044	0.132	37,400	0.030	2,222	0.036	0.107	33,000	0.026	1,742	0.033	0.099	30,800	0.023	1,423		2
0.028	0.084	33,660	0.030	1,999	0.023	0.068	29,700	0.026	1,568	0.021	0.063	27,720	0.023	1,281		4
0.014	0.043	33,660	0.025	1,696	0.012	0.035	29,700	0.025	1,497	0.011	0.032	27,720	0.022	1,198		6
0.014	0.043	29,920	0.025	1,508	0.012	0.035	26,400	0.025	1,331	0.011	0.032	24,640	0.022	1,064	0.8	8
0.011	0.032	29,920	0.023	1,400	0.009	0.026	26,400	0.022	1,140	0.008	0.024	24,640	0.018	887		10
0.007	0.022	22,440	0.023	1,050	0.006	0.018	19,800	0.022	855	0.005	0.016	18,480	0.018	665		12
0.005	0.013	18,700	0.023	875	0.004	0.011	16,500	0.022	713	0.004	0.010	15,400	0.018	554		15
0.031	0.092	33,660	0.030	1,999	0.025	0.075	29,700	0.026	1,568	0.023	0.069	27,720	0.023	1,281	0.9	4
0.016	0.048	33,660	0.025	1,696	0.013	0.039	29,700	0.025	1,497	0.012	0.036	27,720	0.022	1,198		6
0.016	0.048	29,920	0.025	1,508	0.013	0.039	26,400	0.025	1,331	0.012	0.036	24,640	0.022	1,064		8
0.012	0.036	29,920	0.023	1,400	0.010	0.029	26,400	0.022	1,140	0.009	0.027	24,640	0.018	887		10
0.008	0.024	22,440	0.023	1,050	0.007	0.020	19,800	0.022	855	0.006	0.018	18,480	0.018	665	1.0	12
0.005	0.014	18,700	0.023	875	0.004	0.012	16,500	0.022	713	0.004	0.011	15,400	0.018	554		15
0.050	0.149	37,400	0.037	2,777	0.040	0.121	33,000	0.033	2,178	0.037	0.112	30,800	0.029	1,779		4
0.036	0.108	33,660	0.037	2,499	0.029	0.088	29,700	0.033	1,960	0.027	0.081	27,720	0.029	1,601		6
0.019	0.056	33,660	0.032	2,121	0.015	0.046	29,700	0.032	1,871	0.014	0.042	27,720	0.027	1,497	1.1	8
0.014	0.043	29,920	0.032	1,885	0.012	0.035	26,400	0.032	1,663	0.011	0.032	24,640	0.027	1,331		12
0.021	0.062	33,660	0.032	2,121	0.017	0.051	29,700	0.032	1,871	0.016	0.047	27,720	0.027	1,497		8
0.016	0.048	29,920	0.032	1,885	0.013	0.039	26,400	0.032	1,663	0.012	0.036	24,640	0.027	1,331		12
0.014	0.043	22,440	0.029	1,313	0.012	0.035	19,800	0.027	1,069	0.011	0.032	18,480	0.023	832	1.2	16
0.080	0.238	35,530	0.043	3,024	0.064	0.194	31,350	0.038	2,379	0.059	0.179	29,260	0.033	1,952		4
0.030	0.089	31,977	0.037	2,354	0.024	0.073	28,215	0.037	2,077	0.023	0.068	26,334	0.031	1,635		8
0.023	0.069	28,424	0.037	2,092	0.019	0.056	25,080	0.037	1,846	0.017	0.052	23,408	0.031	1,454		12
0.013	0.038	28,345	0.037	2,120	0.010	0.031	25,011	0.034	1,683	0.009	0.028	23,343	0.029	1,362	1.3	16
0.009	0.027	21,259	0.033	1,405	0.007	0.022	18,758	0.030	1,116	0.007	0.020	17,507	0.026	902		20
0.044	0.132	30,294	0.045	2,699	0.036	0.107	26,730	0.040	2,117	0.033	0.099	24,948	0.035	1,729		6
0.044	0.132	30,294	0.045	2,699	0.036	0.107	26,730	0.040	2,117	0.033	0.099	24,948	0.035	1,729		8
0.025	0.076	30,294	0.038	2,290	0.021	0.061	26,730	0.038	2,021	0.019	0.057	24,948	0.032	1,617	1.4	10
0.020	0.060	26,928	0.038	2,036	0.016	0.050	23,760	0.038	1,796	0.015	0.045	22,176	0.032	1,437		15
0.014	0.043	20,196	0.035	1,418	0.012	0.035	17,820	0.032	1,155	0.011	0.032	16,632	0.027	898		20
0.013	0.037	16,830	0.035	1,181	0.010	0.030	14,850	0.032	962	0.009	0.028	13,860	0.027	748		25
0.013	0.037	16,830	0.035	1,181	0.010	0.030	14,850	0.032	962	0.009	0.028	13,860	0.027	748	1.5	30
0.048	0.145	30,294	0.045	2,699	0.040	0.118	26,730	0.040	2,117	0.036	0.109	24,948	0.035	1,729		6
0.028	0.084	30,294	0.038	2,290	0.023	0.068	26,730	0.038	2,021	0.021	0.063	24,948	0.032	1,617		10
0.022	0.067	26,928	0.038	2,036	0.018	0.055	23,760	0.038	1,796	0.017	0.050	22,176	0.032	1,437		15
0.016	0.048	20,196	0.035	1,418	0.013	0.039	17,820	0.032	1,155	0.012	0.036	16,632	0.027	898	1.6	20
0.014	0.041	16,830	0.035	1,181	0.011	0.033	14,850	0.032	962	0.010	0.031	13,860	0.027	748		25
0.014	0.041	16,830	0.035	1,181	0.011	0.033	14,850	0.032	962	0.010	0.031	13,860	0.027	748		30
0.008	0.024	16,830	0.035	1,181	0.007	0.020	14,850	0.032	962	0.006	0.018	13,860	0.027	748		35
0.056	0.168	23,562	0.045	2,099	0.046	0.137	20,790	0.040	1,647	0.042	0.126	19,404	0.035	1,345	1.7	8
0.056	0.168	23,562	0.045	2,099	0.046	0.137	20,790	0.040	1,647	0.042	0.126	19,404	0.035	1,345		10
0.056	0.168	23,562	0.045	2,099	0.046	0.137	20,790	0.040	1,647	0.042	0.126	19,404	0.035	1,345		12
0.020	0.060	20,944	0.038	1,583	0.016	0.050	18,480	0.038	1,397	0.015	0.045	17,248	0.032	1,118		30
0.062	0.185	23,562	0.045	2,099	0.051	0.151	20,790	0.040	1,647	0.046	0.139	19,404	0.035	1,345	1.8	10
0.036	0.108	23,562	0.038	1,781	0.029	0.088	20,790	0.038	1,572	0.027	0.081	19,				

## EPDBPE-ATH | Recommended Cutting Conditions | Roughing

	Workpiece Material			I					II					
				Carbon Steels, Alloy Steels (180~250HB)					Tool Steels (25~35HRC)					
	D	I <sub>n</sub>	Neck angle °	a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min	
<div><div></div><div>Roughing</div></div>	2	8	0.4	0.150	0.450	23,100	0.083	3,812	0.135	0.405	20,790	0.083	3,430	
		12		0.090	0.270	20,790	0.074	3,087	0.081	0.243	18,711	0.074	2,779	
		16		0.090	0.270	20,790	0.074	3,087	0.081	0.243	18,711	0.074	2,779	
		20		0.063	0.189	20,790	0.072	2,994	0.057	0.170	18,711	0.072	2,694	
		25		0.063	0.189	18,480	0.072	2,661	0.057	0.170	16,632	0.072	2,395	
		30		0.041	0.122	18,480	0.072	2,661	0.037	0.110	16,632	0.072	2,395	
		40	0.032	0.095	13,860	0.063	1,746	0.029	0.086	12,474	0.063	1,572		
		12	0.9	0.099	0.297	20,790	0.074	3,087	0.089	0.267	18,711	0.074	2,779	
		16		0.099	0.297	20,790	0.074	3,087	0.089	0.267	18,711	0.074	2,779	
		20		0.070	0.210	20,790	0.072	2,994	0.063	0.189	18,711	0.072	2,694	
		25		0.070	0.210	18,480	0.072	2,661	0.063	0.189	16,632	0.072	2,395	
		30		0.045	0.135	18,480	0.072	2,661	0.041	0.122	16,632	0.072	2,395	
		35		0.045	0.135	13,860	0.063	1,746	0.041	0.122	12,474	0.063	1,572	
		40		0.035	0.105	13,860	0.063	1,746	0.032	0.095	12,474	0.063	1,572	
		50		0.017	0.051	11,550	0.063	1,455	0.015	0.046	10,395	0.063	1,310	
			3	8	0.4	0.320	0.960	17,600	0.083	2,904	0.288	0.864	15,840	0.083
16	0.220			0.660		15,840	0.074	2,352	0.198	0.594	14,256	0.074	2,117	
20	0.150			0.450		15,840	0.074	2,352	0.135	0.405	14,256	0.074	2,117	
30	0.081			0.243		15,840	0.072	2,281	0.073	0.219	14,256	0.072	2,053	
40	0.063			0.189		14,080	0.072	2,028	0.057	0.170	12,672	0.072	1,825	
50	0.045			0.135		10,560	0.063	1,331	0.041	0.122	9,504	0.063	1,198	
15	0.9			0.242	0.726	15,840	0.074	2,352	0.218	0.653	14,256	0.074	2,117	
20				0.165	0.495	15,840	0.074	2,352	0.149	0.446	14,256	0.074	2,117	
30				0.090	0.270	15,840	0.072	2,281	0.081	0.243	14,256	0.072	2,053	
40				0.070	0.210	14,080	0.072	2,028	0.063	0.189	12,672	0.072	1,825	
50				0.050	0.150	10,560	0.063	1,331	0.045	0.135	9,504	0.063	1,198	
60				0.030	0.090	10,560	0.063	1,331	0.027	0.081	9,504	0.063	1,198	
20				0.9	0.316	0.949	13,524	0.122	3,311	0.285	0.854	12,172	0.122	2,980
30					0.181	0.542	12,172	0.110	2,687	0.163	0.488	10,954	0.110	2,419
40					0.158	0.475	12,036	0.105	2,534	0.142	0.427	10,833	0.105	2,281
60					0.118	0.353	10,954	0.099	2,177	0.106	0.317	9,859	0.099	1,959
30	0.226	0.678	9,526		0.138	2,629	0.203	0.610	8,573	0.138	2,366			
40	0.224	0.672	9,441		0.132	2,497	0.202	0.605	8,496	0.132	2,247			
	5	60	0.158	0.475	8,573	0.124	2,130	0.142	0.427	7,716	0.124	1,917		
		90	0.146	0.437	8,496	0.119	2,023	0.131	0.393	7,647	0.119	1,820		
		30	0.475	1.424	9,408	0.154	2,890	0.427	1.281	8,467	0.154	2,601		
		45	0.270	0.810	8,921	0.140	2,503	0.243	0.729	8,029	0.140	2,253		
	6	60	0.237	0.712	8,467	0.138	2,341	0.214	0.641	7,620	0.138	2,107		
		80	0.176	0.527	8,029	0.126	2,028	0.158	0.474	7,226	0.126	1,825		



### RECOMMENDED CUTTING CONDITIONS

1. Use a highly rigid and accurate machine as possible.
2. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
3. If the rpm available is lower than recommended please reduce the feed rate to the same ratio.



### CONDIZIONI DI TAGLIO RACCOMANDATE

1. Usate centri di lavoro più precisi e rigidi possibile
2. Le condizioni di taglio sono valori generali. Per ottimizzare il processo di lavoro rispettate le geometrie dello stampo e la macchina disponibile.
3. Quando i giri della macchina disponibili sono più bassi rispetto al valore espresso regolate l'avanzamento con lo stesso rapporto.



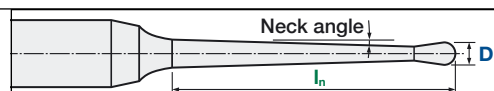
### EMPFOHLENE SCHNITTBEDINGUNGEN

1. Benutzen Sie für die Bearbeitung jeweils die Maschine mit der höchsten Genauigkeit und der höchsten Stabilität.
2. Die angegebenen Schnittwerte stellen eine generelle Empfehlung dar. Die Werte sollten immer an die jeweilige Bearbeitung, deren Form und die verwendete Maschine angepasst werden.
3. Ist die Ihnen verfügbare Drehzahl niedriger als der in der Tabelle angegebene Wert, sollte der Vorschub im gleichen Verhältnis reduziert werden.



### CONDICIONES DE CORTE RECOMENDADAS

1. Utilizar la máquina más rígida y precisa posible.
2. Las condiciones de corte de la tabla son una orientación general. Para un trabajo específico hay que ajustar las condiciones en función de la geometría de la pieza, el resultado esperado y el tipo de máquina que vamos a utilizar.
3. Si las rpm máximas de la máquina son inferiores, hay que ajustar el avance en proporción a las mismas.



III Tool Steels (35~45HRC)					IV Hardened Steels (45~55HRC)					V Hardened Steels (55~70HRC)					D	L <sub>n</sub>
a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min		
0.120	0.360	19,635	0.074	2,916	0.098	0.293	17,325	0.066	2,287	0.090	0.270	16,170	0.058	1,868	2	8
0.072	0.216	17,672	0.074	2,624	0.059	0.176	15,593	0.066	2,058	0.054	0.162	14,553	0.058	1,681		12
0.072	0.216	17,672	0.074	2,624	0.059	0.176	15,593	0.066	2,058	0.054	0.162	14,553	0.058	1,681		16
0.050	0.151	17,672	0.063	2,227	0.041	0.123	15,593	0.063	1,965	0.038	0.113	14,553	0.054	1,572		20
0.050	0.151	15,708	0.063	1,979	0.041	0.123	13,860	0.063	1,746	0.038	0.113	12,936	0.054	1,397		25
0.032	0.097	15,708	0.063	1,979	0.026	0.079	13,860	0.063	1,746	0.024	0.073	12,936	0.054	1,397		30
0.025	0.076	11,781	0.059	1,378	0.021	0.061	10,395	0.054	1,123	0.019	0.057	9,702	0.045	873		40
0.079	0.238	17,672	0.074	2,624	0.065	0.194	15,593	0.066	2,058	0.059	0.178	14,553	0.058	1,681		12
0.079	0.238	17,672	0.074	2,624	0.065	0.194	15,593	0.066	2,058	0.059	0.178	14,553	0.058	1,681		16
0.056	0.168	17,672	0.063	2,227	0.046	0.137	15,593	0.063	1,965	0.042	0.126	14,553	0.054	1,572		20
0.056	0.168	15,708	0.063	1,979	0.046	0.137	13,860	0.063	1,746	0.042	0.126	12,936	0.054	1,397	3	25
0.036	0.108	15,708	0.063	1,979	0.029	0.088	13,860	0.063	1,746	0.027	0.081	12,936	0.054	1,397		30
0.036	0.108	11,781	0.059	1,378	0.029	0.088	10,395	0.054	1,123	0.027	0.081	9,702	0.045	873		35
0.028	0.084	11,781	0.059	1,378	0.023	0.068	10,395	0.054	1,123	0.021	0.063	9,702	0.045	873		40
0.014	0.041	9,818	0.059	1,149	0.011	0.033	8,663	0.054	936	0.010	0.031	8,085	0.045	728		50
0.256	0.768	14,960	0.074	2,222	0.208	0.624	13,200	0.066	1,742	0.192	0.576	12,320	0.058	1,423		8
0.176	0.528	13,464	0.074	1,999	0.143	0.429	11,880	0.066	1,568	0.132	0.396	11,088	0.058	1,281		16
0.120	0.360	13,464	0.074	1,999	0.098	0.293	11,880	0.066	1,568	0.090	0.270	11,088	0.058	1,281		20
0.065	0.194	13,464	0.063	1,696	0.053	0.158	11,880	0.063	1,497	0.049	0.146	11,088	0.054	1,198		30
0.050	0.151	11,968	0.063	1,508	0.041	0.123	10,560	0.063	1,331	0.038	0.113	9,856	0.054	1,064		40
0.036	0.108	8,976	0.059	1,050	0.030	0.088	7,920	0.054	855	0.027	0.081	7,392	0.045	665	4	50
0.194	0.581	13,464	0.074	1,999	0.157	0.472	11,880	0.066	1,568	0.145	0.436	11,088	0.058	1,281		15
0.132	0.396	13,464	0.074	1,999	0.108	0.322	11,880	0.066	1,568	0.099	0.297	11,088	0.058	1,281		20
0.072	0.216	13,464	0.063	1,696	0.059	0.176	11,880	0.063	1,497	0.054	0.162	11,088	0.054	1,198		30
0.056	0.168	11,968	0.063	1,508	0.046	0.137	10,560	0.063	1,331	0.042	0.126	9,856	0.054	1,064		40
0.040	0.120	8,976	0.059	1,050	0.033	0.098	7,920	0.054	855	0.030	0.090	7,392	0.045	665		50
0.024	0.072	8,976	0.059	1,050	0.020	0.059	7,920	0.054	855	0.018	0.054	7,392	0.045	665		60
0.253	0.759	11,495	0.122	2,814	0.206	0.617	10,143	0.110	2,235	0.190	0.570	9,467	0.095	1,808		20
0.145	0.434	10,346	0.110	2,284	0.118	0.353	9,129	0.099	1,814	0.108	0.325	8,520	0.086	1,467		30
0.127	0.380	10,231	0.105	2,154	0.103	0.308	9,027	0.095	1,710	0.095	0.285	8,425	0.082	1,384		40
0.094	0.282	9,311	0.099	1,850	0.076	0.229	8,216	0.089	1,469	0.071	0.212	7,668	0.078	1,189	5	60
0.181	0.542	8,097	0.138	2,235	0.147	0.441	7,144	0.124	1,775	0.136	0.407	6,668	0.108	1,435		30
0.179	0.538	8,024	0.132	2,122	0.146	0.437	7,080	0.119	1,685	0.134	0.403	6,608	0.103	1,363		40
0.127	0.380	7,287	0.124	1,810	0.103	0.308	6,430	0.112	1,437	0.095	0.285	6,001	0.097	1,163		60
0.116	0.349	7,222	0.119	1,719	0.095	0.284	6,372	0.107	1,365	0.087	0.262	5,948	0.093	1,104		90
0.380	1.139	7,997	0.154	2,457	0.308	0.925	7,056	0.138	1,951	0.285	0.854	6,586	0.120	1,578	6	30
0.216	0.648	7,583	0.140	2,128	0.176	0.527	6,691	0.126	1,690	0.162	0.486	6,245	0.109	1,367		45
0.190	0.570	7,197	0.138	1,990	0.154	0.463	6,350	0.124	1,580	0.142	0.427	5,927	0.108	1,278		60
0.140	0.421	6,824	0.126	1,723	0.114	0.342	6,022	0.114	1,369	0.105	0.316	5,620	0.098	1,107		80


**D0.2 – D1.0**

## CONDITIONS DE COUPE RECOMMANDÉES

1. Utiliser une machine aussi rigide et fiable que possible.
2. Ces conditions sont indicatives : en utilisation, ajuster les conditions en fonction de la machine et de la pièce usinée.
3. Si la rotation possible est inférieure à celle recommandée, ajuster l'avance dans la même proportion.

**Note:** For finishing and precise tool definition for the CAM system please download DXF data (QuickFinder), or contact your local MOLDINO Tool staff for more details.

**Nota:** Per lavorazioni di finitura e per una precisa e corretta definizione del profilo dell'utensile per l'utilizzo CAM si prega di richiedere file DXF tramite QuickFinder o rivolgendosi al personale MOLDINO Tool.

**Remarque :** Pour les opérations de finition et une définition précise de l'outil dans votre système FAO, demandez nous le fichier DXF des outils, téléchargez les via notre logiciel QuickFinder, ou contactez votre interlocuteur commercial pour plus de détails.

## CONDIÇÕES DE CORTE RECOMENDADAS


1. Use uma máquina rígida e o mais precisa possível.
2. Estas condições são para orientação geral, em condições de maquinação real ajustar os parâmetros de acordo com a sua máquina e com as condições das peças a maquinar.
3. Se o número de rotações disponível na máquina for menor do que o recomendado por favor reduza avanço na mesma proporção.

**Achtung:** Bitte laden Sie sich für die Schlichtbearbeitung und die präzise Definition der Werkzeuge die DXF Daten herunter (QuickFinder) oder wenden Sie sich an Ihren MOLDINO Anwendungstechniker.

**Nota:** En procesos de acabado y para una más precisa definición de la herramienta en el sistema de CAM por favor solicite los ficheros DXF (QuickFinder), o póngase en contacto con MOLDINO Tool para obtener más detalles.

**Nota:** Para o acabamento e precisão assim como melhor definição da ferramenta para o sistema CAM por favor solicitar dados DXF (QuickFinder), ou entre em contato com sua equipe de ferramentas MOLDINO local para obter mais detalhes.

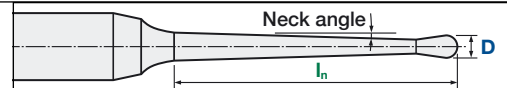
## EPDBPE-ATH | Recommended Cutting Conditions | Finishing

	Workpiece Material			I					II				
				Carbon Steels, Alloy Steels (180~250HB)					Tool Steels (25~35HRC)				
	D	I <sub>n</sub>	Neck angle °	a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min
 Finishing	0.2	1	0.4	0.011	0.011	45,000	0.023	2,025	0.010	0.010	40,500	0.023	1,823
		1.5		0.006	0.006	44,550	0.020	1,764	0.005	0.005	40,095	0.020	1,588
		2		0.004	0.004	44,550	0.020	1,764	0.004	0.004	40,095	0.020	1,588
		3		0.002	0.002	39,600	0.020	1,568	0.002	0.002	35,640	0.020	1,411
	0.3	2	0.4	0.013	0.013	42,075	0.025	2,083	0.012	0.012	37,868	0.025	1,874
		3		0.008	0.008	37,620	0.023	1,761	0.007	0.007	33,858	0.023	1,585
		2		0.023	0.023	39,600	0.030	2,352	0.021	0.021	35,640	0.030	2,117
		3		0.013	0.013	35,640	0.027	1,925	0.012	0.012	32,076	0.027	1,732
	0.4	4	0.4	0.005	0.005	35,640	0.026	1,860	0.005	0.005	32,076	0.026	1,674
		5		0.004	0.004	31,680	0.026	1,654	0.004	0.004	28,512	0.026	1,488
		6		0.008	0.008	32,076	0.024	1,559	0.007	0.007	28,868	0.024	1,403
		2		0.025	0.025	39,600	0.030	2,352	0.023	0.023	35,640	0.030	2,117
		4	0.9	0.006	0.006	35,640	0.026	1,860	0.005	0.005	32,076	0.026	1,674
		5		0.005	0.005	31,680	0.026	1,654	0.004	0.004	28,512	0.026	1,488
		6		0.009	0.009	32,076	0.024	1,559	0.008	0.008	28,868	0.024	1,403
		4		0.008	0.008	33,858	0.030	2,032	0.007	0.007	30,472	0.030	1,829
	0.5	6	0.4	0.013	0.013	30,472	0.028	1,703	0.012	0.012	27,425	0.028	1,533
		6		0.014	0.014	30,472	0.028	1,703	0.013	0.013	27,425	0.028	1,533
		8	0.9	0.008	0.008	33,264	0.022	1,476	0.007	0.007	29,938	0.022	1,328
		2		0.036	0.036	39,600	0.030	2,352	0.033	0.033	35,640	0.030	2,117
	0.6	4	0.4	0.023	0.023	35,640	0.027	1,925	0.021	0.021	32,076	0.027	1,732
		6		0.012	0.012	35,640	0.026	1,860	0.011	0.011	32,076	0.026	1,674
		8		0.012	0.012	31,680	0.026	1,654	0.011	0.011	28,512	0.026	1,488
		10		0.009	0.009	31,680	0.023	1,426	0.008	0.008	28,512	0.023	1,283
		12	0.9	0.006	0.006	23,760	0.023	1,069	0.005	0.005	21,384	0.023	962
		15		0.004	0.004	19,800	0.023	891	0.003	0.003	17,820	0.023	802
		4		0.025	0.025	35,640	0.027	1,925	0.023	0.023	32,076	0.027	1,732
		6		0.013	0.013	35,640	0.026	1,860	0.012	0.012	32,076	0.026	1,674
	0.8	8	0.9	0.013	0.013	31,680	0.026	1,654	0.012	0.012	28,512	0.026	1,488
		10		0.010	0.010	31,680	0.023	1,426	0.009	0.009	28,512	0.023	1,283
		12		0.007	0.007	23,760	0.023	1,069	0.006	0.006	21,384	0.023	962
		15		0.004	0.004	19,800	0.023	891	0.003	0.003	17,820	0.023	802
		4	0.4	0.040	0.040	39,600	0.037	2,922	0.036	0.036	35,640	0.037	2,630
		6		0.029	0.029	35,640	0.033	2,374	0.027	0.027	32,076	0.033	2,136
		8		0.015	0.015	35,640	0.032	2,309	0.013	0.013	32,076	0.032	2,079
		12		0.012	0.012	31,680	0.032	2,053	0.011	0.011	28,512	0.032	1,848
	0.9	8	0.9	0.017	0.017	35,640	0.032	2,309	0.015	0.015	32,076	0.032	2,079
		12		0.013	0.013	31,680	0.032	2,053	0.012	0.012	28,512	0.032	1,848
		16		0.012	0.012	23,760	0.029	1,369	0.010	0.010	21,384	0.029	1,232
		4		0.064	0.064	37,620	0.042	3,193	0.058	0.058	33,858	0.042	2,874
	1	8	0.4	0.024	0.024	33,858	0.037	2,523	0.022	0.022	30,472	0.037	2,271
		12		0.019	0.019	30,096	0.037	2,243	0.017	0.017	27,086	0.037	2,018
		16		0.010	0.010	30,013	0.034	2,020	0.009	0.009	27,011	0.034	1,818
		20		0.007	0.007	22,509	0.030	1,339	0.007	0.007	20,259	0.030	1,205
		6	0.9	0.036	0.036	32,076	0.041	2,598	0.033	0.033	28,868	0.041	2,338
		8		0.036	0.036	32,076	0.041	2,598	0.033	0.033	28,868	0.041	2,338
		10		0.020	0.020	32,076	0.039	2,483	0.019	0.019	28,868	0.039	2,234
		15		0.016	0.016	28,512	0.039	2,207	0.015	0.015	25,661	0.039	1,986
		20	0.4	0.012	0.012	21,384	0.034	1,463	0.011	0.011	19,246	0.034	1,316
		25		0.010	0.010	17,820	0.034	1,219	0.009	0.009	16,038	0.034	1,097
		30		0.010	0.010	17,820	0.034	1,219	0.009	0.009	16,038	0.034	1,097
		6		0.039	0.039	32,076	0.041	2,598	0.036	0.036	28,868	0.041	2,338
		10	0.9	0.023	0.023	32,076	0.039	2,483	0.021	0.021	28,868	0.039	2,234
		15		0.018	0.018	28,512	0.039	2,207	0.016	0.016	25,661	0.039	1,986
		20		0.013	0.013	21,384	0.034	1,463	0.012	0.012	19,246	0.034	1,316
		25		0.011	0.011	17,820	0.034	1,219	0.010	0.010	16,038	0.034	1,097
		30	0.4	0.011	0.011	17,820	0.034	1,219	0.010	0.010	16,038	0.034	1,097
		35		0.007	0.007	17,820	0.034	1,219	0.006	0.006	16,038	0.034	1,097

 ※ In caso di applicazione di sgrossatura nervature ridurre V<sub>c</sub> e a<sub>p</sub> del 20%

Considerando variabili quali morfologia del pezzo / limitazioni della macchina, velocità di rotazione ed avanzamento possono essere aumentate o ridotte nella stessa proporzione. Selezionare una velocità mandrino in funzione del materiale / durezza e dell'avanzamento raggiungibile sul pezzo da lavorare. Il valore f<sub>z</sub> non dovrebbe differire più del 20 / 30% rispetto all'originale.





III					IV					V						
Tool Steels (35~45HRC)					Hardened Steels (45~55HRC)					Hardened Steels (55~70HRC)						
a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min	D	I <sub>n</sub>
0.009	0.009	38,250	0.020	1,515	0.007	0.007	33,750	0.018	1,215	0.007	0.007	31,500	0.015	964	0.2	1
0.005	0.005	37,868	0.020	1,500	0.004	0.004	33,413	0.018	1,203	0.003	0.003	31,185	0.015	954		1.5
0.004	0.004	37,868	0.017	1,295	0.003	0.003	33,413	0.017	1,143	0.002	0.002	31,185	0.014	898		2
0.002	0.002	33,660	0.017	1,151	0.002	0.002	29,700	0.017	1,016	0.001	0.001	27,720	0.014	798		3
0.011	0.011	35,764	0.022	1,577	0.009	0.009	31,556	0.020	1,278	0.008	0.008	29,453	0.018	1,034	0.3	2
0.006	0.006	31,977	0.022	1,410	0.005	0.005	28,215	0.020	1,143	0.004	0.004	26,334	0.018	924		3
0.018	0.018	33,660	0.027	1,818	0.015	0.015	29,700	0.023	1,390	0.014	0.014	27,720	0.021	1,148	0.4	2
0.010	0.010	30,294	0.027	1,636	0.008	0.008	26,730	0.023	1,251	0.008	0.008	24,948	0.021	1,033		3
0.004	0.004	30,294	0.023	1,363	0.004	0.004	26,730	0.023	1,203	0.003	0.003	24,948	0.020	988		4
0.004	0.004	26,928	0.023	1,212	0.003	0.003	23,760	0.023	1,069	0.002	0.002	22,176	0.020	878		5
0.007	0.007	27,265	0.024	1,325	0.005	0.005	24,057	0.021	1,013	0.005	0.005	22,453	0.019	837	0.5	6
0.020	0.020	33,660	0.027	1,818	0.016	0.016	29,700	0.023	1,390	0.015	0.015	27,720	0.021	1,148		2
0.005	0.005	30,294	0.023	1,363	0.004	0.004	26,730	0.023	1,203	0.003	0.003	24,948	0.020	988		4
0.004	0.004	26,928	0.023	1,212	0.003	0.003	23,760	0.023	1,069	0.003	0.003	22,176	0.020	878		5
0.007	0.007	27,265	0.024	1,325	0.006	0.006	24,057	0.021	1,013	0.005	0.005	22,453	0.019	837	0.6	6
0.007	0.007	28,779	0.026	1,489	0.006	0.006	25,394	0.026	1,314	0.005	0.005	23,701	0.023	1,079		4
0.010	0.010	25,901	0.028	1,448	0.009	0.009	22,854	0.024	1,107	0.008	0.008	21,331	0.021	914		6
0.012	0.012	25,901	0.028	1,448	0.009	0.009	22,854	0.024	1,107	0.009	0.009	21,331	0.021	914		6
0.006	0.006	28,274	0.019	1,081	0.005	0.005	24,948	0.019	954	0.005	0.005	23,285	0.017	784	0.7	8
0.029	0.029	33,660	0.027	1,818	0.023	0.023	29,700	0.023	1,390	0.021	0.021	27,720	0.021	1,148		2
0.018	0.018	30,294	0.027	1,636	0.015	0.015	26,730	0.023	1,251	0.014	0.014	24,948	0.021	1,033		4
0.009	0.009	30,294	0.023	1,363	0.008	0.008	26,730	0.023	1,203	0.007	0.007	24,948	0.020	988		6
0.009	0.009	26,928	0.023	1,212	0.008	0.008	23,760	0.023	1,069	0.007	0.007	22,176	0.020	878	0.8	8
0.007	0.007	26,928	0.021	1,115	0.006	0.006	23,760	0.020	941	0.005	0.005	22,176	0.016	719		10
0.005	0.005	20,196	0.021	836	0.004	0.004	17,820	0.020	706	0.004	0.004	16,632	0.016	539		12
0.003	0.003	16,830	0.021	697	0.002	0.002	14,850	0.020	588	0.002	0.002	13,860	0.016	449		15
0.020	0.020	30,294	0.027	1,636	0.016	0.016	26,730	0.023	1,251	0.015	0.015	24,948	0.021	1,033	0.9	4
0.010	0.010	30,294	0.023	1,363	0.008	0.008	26,730	0.023	1,203	0.008	0.008	24,948	0.020	988		6
0.010	0.010	26,928	0.023	1,212	0.008	0.008	23,760	0.023	1,069	0.008	0.008	22,176	0.020	878		8
0.008	0.008	26,928	0.021	1,115	0.007	0.007	23,760	0.020	941	0.006	0.006	22,176	0.016	719		10
0.005	0.005	20,196	0.021	836	0.005	0.005	17,820	0.020	706	0.004	0.004	16,632	0.016	539	1.0	12
0.003	0.003	16,830	0.021	697	0.003	0.003	14,850	0.020	588	0.003	0.003	13,860	0.016	449		15
0.033	0.033	33,660	0.033	2,242	0.026	0.026	29,700	0.030	1,764	0.024	0.024	27,720	0.026	1,447		4
0.023	0.023	30,294	0.033	2,018	0.019	0.019	26,730	0.030	1,588	0.018	0.018	24,948	0.026	1,302		6
0.012	0.012	30,294	0.029	1,745	0.010	0.010	26,730	0.029	1,540	0.009	0.009	24,948	0.024	1,212	0.8	8
0.009	0.009	26,928	0.029	1,551	0.008	0.008	23,760	0.029	1,369	0.007	0.007	22,176	0.024	1,078		12
0.014	0.014	30,294	0.029	1,745	0.011	0.011	26,730	0.029	1,540	0.010	0.010	24,948	0.024	1,212		8
0.010	0.010	26,928	0.029	1,551	0.008	0.008	23,760	0.029	1,369	0.008	0.008	22,176	0.024	1,078		12
0.009	0.009	20,196	0.026	1,054	0.008	0.008	17,820	0.024	866	0.007	0.007	16,632	0.021	689	1.1	16
0.052	0.052	31,977	0.038	2,449	0.042	0.042	28,215	0.034	1,927	0.038	0.038	26,334	0.030	1,581		4
0.020	0.020	28,779	0.033	1,906	0.016	0.016	25,394	0.033	1,682	0.015	0.015	23,701	0.028	1,325		8
0.015	0.015	25,582	0.033	1,695	0.012	0.012	22,572	0.033	1,495	0.011	0.011	21,067	0.028	1,177		12
0.008	0.008	25,511	0.034	1,717	0.007	0.007	22,509	0.030	1,363	0.006	0.006	21,009	0.026	1,103	1.2	16
0.006	0.006	19,133	0.030	1,138	0.005	0.005	16,882	0.027	904	0.004	0.004	15,757	0.023	731		20
0.029	0.029	27,265	0.041	2,208	0.023	0.023	24,057	0.036	1,732	0.021	0.021	22,453	0.032	1,415		6
0.029	0.029	27,265	0.041	2,208	0.023	0.023	24,057	0.036	1,732	0.021	0.021	22,453	0.032	1,415		8
0.016	0.016	27,265	0.034	1,865	0.013	0.013	24,057	0.034	1,645	0.012	0.012	22,453	0.029	1,293	1.3	10
0.013	0.013	24,235	0.034	1,658	0.011	0.011	21,384	0.034	1,463	0.010	0.010	19,958	0.029	1,150		15
0.009	0.009	18,176	0.032	1,145	0.008	0.008	16,038	0.029	924	0.007	0.007	14,969	0.024	727		20
0.008	0.008	15,147	0.032	954	0.006	0.006	13,365	0.029	770	0.006	0.006	12,474	0.024	606		25
0.008	0.008	15,147	0.032	954	0.006	0.006	13,365	0.029	770	0.006	0.006	12,474	0.024	606	1.4	30
0.031	0.031	27,265	0.041	2,208	0.026	0.026	24,057	0.036	1,732	0.024	0.024	22,453	0.032	1,415		6
0.018	0.018	27,265	0.034	1,865	0.015	0.015	24,057	0.034	1,645	0.014	0.014	22,453	0.029	1,293		10
0.014	0.014	24,235	0.034	1,658	0.012	0.012	21,384	0.034	1,463	0.011	0.011	19,958	0.029	1,150		15
0.010	0.010	18,176	0.032	1,145	0.008	0.008	16,038	0.029	924	0.008	0.008	14,969	0.024	727		20
0.009	0.009	15,147	0.032	954	0.007	0.007	13,365	0.029	770	0.007	0.007	12,474	0.024	606	1.5	25
0.009	0.009	15,147	0.032	954	0.007	0.007	13,365	0.029	770	0.007	0.007	12,474	0.024	606		30
0.005	0.005	15,147	0.032	954	0.005	0.005	13,365	0.029	770	0.004	0.004	12,474	0.024	606	D 1.5 – D 6.0	




D 1.5 – D 6.0

✳ Para el desbaste de ranuras, reduzca V<sub>c</sub> y a<sub>p</sub> en un 20 %

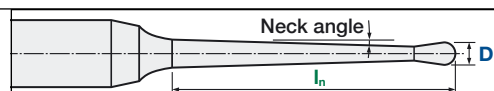
Según las circunstancias como la geometría de la pieza / limitaciones de la máquina, la velocidad y el avance se pueden incrementar o reducir en igual proporción. Elija unas rpm de acuerdo con el material / la dureza y el avance que pueda lograr en su geometría. El valor de f<sub>z</sub> no debe diferir más de un 20 - 30 % del valor original.

## EPDBPE-ATH | Recommended Cutting Conditions | Finishing

	Workpiece Material			I					II				
				Carbon Steels, Alloy Steels (180~250HB)					Tool Steels (25~35HRC)				
	D	I <sub>n</sub>	Neck angle °	a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min
 Finishing	1.5	8	0.4	0.046	0.046	24,948	0.041	2,021	0.041	0.041	22,453	0.041	1,819
		10		0.046	0.046	24,948	0.041	2,021	0.041	0.041	22,453	0.041	1,819
		12		0.046	0.046	24,948	0.041	2,021	0.041	0.041	22,453	0.041	1,819
		30		0.016	0.016	22,176	0.039	1,716	0.015	0.015	19,958	0.039	1,545
		10	0.9	0.050	0.050	24,948	0.041	2,021	0.045	0.045	22,453	0.041	1,819
		15		0.029	0.029	24,948	0.039	1,931	0.027	0.027	22,453	0.039	1,738
		20		0.026	0.026	22,176	0.039	1,716	0.023	0.023	19,958	0.039	1,545
		30		0.018	0.018	22,176	0.039	1,716	0.016	0.016	19,958	0.039	1,545
	2	8	0.4	0.098	0.098	20,790	0.075	3,106	0.088	0.088	18,711	0.075	2,795
		12		0.059	0.059	18,711	0.067	2,492	0.053	0.053	16,840	0.067	2,243
		16		0.059	0.059	18,711	0.067	2,492	0.053	0.053	16,840	0.067	2,243
		20		0.041	0.041	18,711	0.065	2,425	0.037	0.037	16,840	0.065	2,182
		25		0.041	0.041	16,632	0.065	2,156	0.037	0.037	14,969	0.065	1,940
		30		0.026	0.026	16,632	0.065	2,156	0.024	0.024	14,969	0.065	1,940
		40	0.9	0.020	0.020	12,474	0.057	1,415	0.019	0.019	11,227	0.057	1,273
		12		0.064	0.064	18,711	0.067	2,492	0.058	0.058	16,840	0.067	2,243
		16		0.064	0.064	18,711	0.067	2,492	0.058	0.058	16,840	0.067	2,243
		20		0.046	0.046	18,711	0.065	2,425	0.041	0.041	16,840	0.065	2,182
		25		0.046	0.046	16,632	0.065	2,156	0.041	0.041	14,969	0.065	1,940
		30		0.029	0.029	16,632	0.065	2,156	0.027	0.027	14,969	0.065	1,940
		35	0.9	0.029	0.029	12,474	0.057	1,415	0.027	0.027	11,227	0.057	1,273
		40		0.023	0.023	12,474	0.057	1,415	0.021	0.021	11,227	0.057	1,273
		50		0.011	0.011	10,395	0.057	1,179	0.010	0.010	9,356	0.057	1,061
		8	0.4	0.208	0.208	15,840	0.075	2,366	0.187	0.187	14,256	0.075	2,130
		16		0.143	0.143	14,256	0.067	1,899	0.129	0.129	12,830	0.067	1,709
		20		0.098	0.098	14,256	0.067	1,899	0.088	0.088	12,830	0.067	1,709
		30		0.053	0.053	14,256	0.065	1,848	0.047	0.047	12,830	0.065	1,663
		40		0.041	0.041	12,672	0.065	1,642	0.037	0.037	11,405	0.065	1,478
		50	0.9	0.029	0.029	9,504	0.057	1,078	0.026	0.026	8,554	0.057	970
		15		0.157	0.157	14,256	0.067	1,899	0.142	0.142	12,830	0.067	1,709
		20		0.107	0.107	14,256	0.067	1,899	0.097	0.097	12,830	0.067	1,709
		30		0.059	0.059	14,256	0.065	1,848	0.053	0.053	12,830	0.065	1,663
		40		0.046	0.046	12,672	0.065	1,642	0.041	0.041	11,405	0.065	1,478
		50		0.033	0.033	9,504	0.057	1,078	0.029	0.029	8,554	0.057	970
		60	0.9	0.020	0.020	9,504	0.057	1,078	0.018	0.018	8,554	0.057	970
		20		0.206	0.206	12,172	0.110	2,682	0.185	0.185	10,954	0.110	2,413
		30		0.118	0.118	10,954	0.099	2,177	0.106	0.106	9,859	0.099	1,959
		40		0.103	0.103	10,833	0.095	2,053	0.093	0.093	9,749	0.095	1,847
		60		0.076	0.076	9,859	0.089	1,763	0.069	0.069	8,873	0.089	1,587
		30	0.9	0.147	0.147	8,573	0.124	2,130	0.132	0.132	7,716	0.124	1,917
		40		0.146	0.146	8,496	0.119	2,023	0.131	0.131	7,647	0.119	1,820
		60		0.103	0.103	7,716	0.112	1,725	0.093	0.093	6,944	0.112	1,552
		90		0.095	0.095	7,647	0.107	1,638	0.085	0.085	6,882	0.107	1,474
		30	0.9	0.308	0.308	8,467	0.138	2,341	0.278	0.278	7,620	0.138	2,107
		45		0.176	0.176	8,029	0.126	2,028	0.158	0.158	7,226	0.126	1,825
		60		0.154	0.154	7,620	0.124	1,896	0.139	0.139	6,858	0.124	1,707
		80		0.114	0.114	7,226	0.114	1,642	0.103	0.103	6,503	0.114	1,478

 ✖ Dans le cas d'application en ébauche de nervures, veuillez réduire V<sub>c</sub> et a<sub>p</sub> de 20%

Selon les circonstances d'usinage, telles que la géométrie de la pièce à usiner / limitations machine ou CN : les avances et vitesses peuvent être augmentées ou réduites du même ratio. Choisissez une vitesse de rotation en accord avec la matière / dureté et une avance atteignable dans votre géométrie. La valeur f<sub>z</sub> ne doit pas différer de plus de 20~30% de la valeur originale.



III Tool Steels (35~45HRC)					IV Hardened Steels (45~55HRC)					V Hardened Steels (55~70HRC)					D	L <sub>n</sub>
a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	n min <sup>-1</sup>	f <sub>z</sub> mm/t	V <sub>f</sub> mm/min		
0.036	0.036	21,206	0.041	1,718	0.030	0.030	18,711	0.036	1,347	0.027	0.027	17,464	0.032	1,100	1.5	8
0.036	0.036	21,206	0.041	1,718	0.030	0.030	18,711	0.036	1,347	0.027	0.027	17,464	0.032	1,100		10
0.036	0.036	21,206	0.041	1,718	0.030	0.030	18,711	0.036	1,347	0.027	0.027	17,464	0.032	1,100		12
0.013	0.013	18,850	0.034	1,289	0.011	0.011	16,632	0.034	1,138	0.010	0.010	15,523	0.029	894		30
0.040	0.040	21,206	0.041	1,718	0.033	0.033	18,711	0.036	1,347	0.030	0.030	17,464	0.032	1,100		10
0.023	0.023	21,206	0.034	1,450	0.019	0.019	18,711	0.034	1,280	0.018	0.018	17,464	0.029	1,006		15
0.021	0.021	18,850	0.034	1,289	0.017	0.017	16,632	0.034	1,138	0.016	0.016	15,523	0.029	894		20
0.014	0.014	18,850	0.034	1,289	0.012	0.012	16,632	0.034	1,138	0.011	0.011	15,523	0.029	894		30
0.078	0.078	17,672	0.067	2,354	0.064	0.064	15,593	0.059	1,852	0.059	0.059	14,553	0.052	1,519		8
0.047	0.047	15,905	0.067	2,119	0.038	0.038	14,034	0.059	1,667	0.035	0.035	13,098	0.052	1,367		12
0.047	0.047	15,905	0.067	2,119	0.038	0.038	14,034	0.059	1,667	0.035	0.035	13,098	0.052	1,367	2	16
0.033	0.033	15,905	0.057	1,804	0.027	0.027	14,034	0.057	1,591	0.025	0.025	13,098	0.049	1,273		20
0.033	0.033	14,137	0.057	1,603	0.027	0.027	12,474	0.057	1,415	0.025	0.025	11,642	0.049	1,132		25
0.021	0.021	14,137	0.057	1,603	0.017	0.017	12,474	0.057	1,415	0.016	0.016	11,642	0.049	1,132		30
0.016	0.016	10,603	0.053	1,126	0.013	0.013	9,356	0.049	909	0.012	0.012	8,732	0.041	707		40
0.051	0.051	15,905	0.067	2,119	0.042	0.042	14,034	0.059	1,667	0.039	0.039	13,098	0.052	1,367		12
0.051	0.051	15,905	0.067	2,119	0.042	0.042	14,034	0.059	1,667	0.039	0.039	13,098	0.052	1,367		16
0.036	0.036	15,905	0.057	1,804	0.030	0.030	14,034	0.057	1,591	0.027	0.027	13,098	0.049	1,273		20
0.036	0.036	14,137	0.057	1,603	0.030	0.030	12,474	0.057	1,415	0.027	0.027	11,642	0.049	1,132		25
0.023	0.023	14,137	0.057	1,603	0.019	0.019	12,474	0.057	1,415	0.018	0.018	11,642	0.049	1,132		30
0.023	0.023	10,603	0.053	1,126	0.019	0.019	9,356	0.049	909	0.018	0.018	8,732	0.041	707	3	35
0.018	0.018	10,603	0.053	1,126	0.015	0.015	9,356	0.049	909	0.014	0.014	8,732	0.041	707		40
0.009	0.009	8,836	0.053	938	0.007	0.007	7,797	0.049	758	0.007	0.007	7,277	0.041	589		50
0.166	0.166	13,464	0.067	1,793	0.135	0.135	11,880	0.059	1,411	0.125	0.125	11,088	0.052	1,158		8
0.114	0.114	12,118	0.067	1,614	0.093	0.093	10,692	0.059	1,270	0.086	0.086	9,979	0.052	1,042		16
0.078	0.078	12,118	0.067	1,614	0.064	0.064	10,692	0.059	1,270	0.059	0.059	9,979	0.052	1,042		20
0.042	0.042	12,118	0.057	1,374	0.035	0.035	10,692	0.057	1,212	0.032	0.032	9,979	0.049	970		30
0.033	0.033	10,771	0.057	1,221	0.027	0.027	9,504	0.057	1,078	0.025	0.025	8,870	0.049	862		40
0.023	0.023	8,078	0.053	858	0.019	0.019	7,128	0.049	693	0.018	0.018	6,653	0.041	539		50
0.126	0.126	12,118	0.067	1,614	0.102	0.102	10,692	0.059	1,270	0.094	0.094	9,979	0.052	1,042		15
0.086	0.086	12,118	0.067	1,614	0.070	0.070	10,692	0.059	1,270	0.064	0.064	9,979	0.052	1,042	4	20
0.047	0.047	12,118	0.057	1,374	0.038	0.038	10,692	0.057	1,212	0.035	0.035	9,979	0.049	970		30
0.036	0.036	10,771	0.057	1,221	0.030	0.030	9,504	0.057	1,078	0.027	0.027	8,870	0.049	862		40
0.026	0.026	8,078	0.053	858	0.021	0.021	7,128	0.049	693	0.020	0.020	6,653	0.041	539		50
0.016	0.016	8,078	0.053	858	0.013	0.013	7,128	0.049	693	0.012	0.012	6,653	0.041	539		60
0.165	0.165	10,346	0.110	2,279	0.134	0.134	9,129	0.099	1,810	0.123	0.123	8,520	0.086	1,464		20
0.094	0.094	9,311	0.099	1,850	0.076	0.076	8,216	0.089	1,469	0.071	0.071	7,668	0.078	1,189		30
0.082	0.082	9,208	0.095	1,745	0.067	0.067	8,125	0.085	1,385	0.062	0.062	7,583	0.074	1,121		40
0.061	0.061	8,380	0.089	1,499	0.050	0.050	7,394	0.080	1,190	0.046	0.046	6,901	0.070	963		60
0.118	0.118	7,287	0.124	1,810	0.095	0.095	6,430	0.112	1,437	0.088	0.088	6,001	0.097	1,163	5	30
0.116	0.116	7,222	0.119	1,719	0.095	0.095	6,372	0.107	1,365	0.087	0.087	5,948	0.093	1,104		40
0.082	0.082	6,558	0.112	1,466	0.067	0.067	5,787	0.101	1,164	0.062	0.062	5,401	0.087	942		60
0.076	0.076	6,500	0.107	1,393	0.062	0.062	5,735	0.096	1,106	0.057	0.057	5,353	0.084	895		90
0.247	0.247	7,197	0.138	1,990	0.201	0.201	6,350	0.124	1,580	0.185	0.185	5,927	0.108	1,278	6	30
0.140	0.140	6,824	0.126	1,723	0.114	0.114	6,022	0.114	1,369	0.105	0.105	5,620	0.098	1,107		45
0.123	0.123	6,477	0.124	1,612	0.100	0.100	5,715	0.112	1,280	0.093	0.093	5,334	0.097	1,035		60
0.091	0.091	6,142	0.114	1,396	0.074	0.074	5,419	0.102	1,109	0.068	0.068	5,058	0.089	897		80

✖ Em caso de aplicação para desbaste em frisos („ribes“), reduza V<sub>c</sub> e a<sub>p</sub> em 20%.

Em situações de limitação pela geometria da peça a maquinar ou pela máquina, a velocidade corte e o avanço podem ser aumentados ou reduzidos em igual proporção. Selecione uma rotação (rpm) de acordo com o material/dureza e o avanço exequível na sua geometria. O valor f<sub>z</sub> não deve variar mais de 20-30% em relação ao valor original.

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



### **Attentions on Safety**

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

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

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

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

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

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

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

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

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

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