Advanced Engineering

MMC Hitachi Tool

No. 427.2

Epoch21

D-EPDB/EPDR

88 NEW Items

Solid Carbide End Mill
Epoch Deep HD Series for Graphite

HD COATING

In total 128 Items

D-EPDB
- Ball nose type
- Diameter : 0.1mm–10mm
- L/D : max.30xD (D1 l_n=30mm)
- Total : 62 items
- Tolerance R : +/- 0.005mm

D-EPDR
- Radius type
- Diameter : 0.1mm–10mm
- L/D : max.30xD (D1 l_n=30mm)
- Total : 66 items
- Tolerance CR : +/- 0.005mm
  D : 0/-0.01mm

D-EPDR-2001-0.2-001
D=0.1 mm
CR=0.01 mm

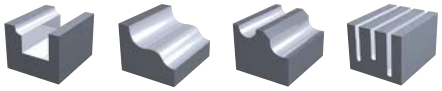
MMC Hitachi Tool Engineering Europe GmbH

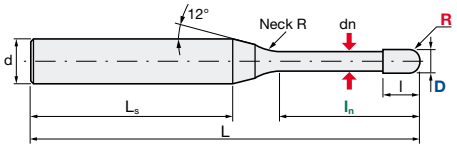
www.high-speed-cutting.com

HD – High Adhesion Diamond Coated Solid Carbide End Mill

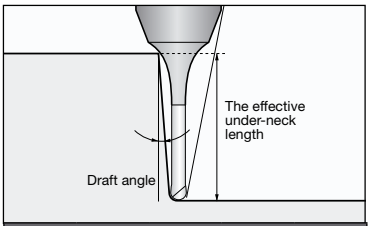
D-EPDB | Epoch HD Coated Deep Ball End Mill

HD	V max			No. of Teeth
Diamond Coating	High Speed	Roughing	Finishing	2





Helix angle	30°
R accuracy	+/- 0.005 mm
Shank tolerance	h5

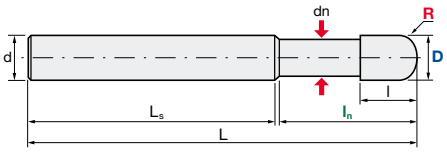


Size											Effective Underneck Using Length by Draft Angle				
ID Code	Item Code	Z	D	R	l_n	l	dn	L_s	NeckR	L	d	0.5°	1°	1.5°	2°	3°
DC077	**D-EPDB-2001-0.2**	2	0.1	0.05	0.2	0.15	0.08	35.63	1	45	4	0.35	0.37	0.39	0.41	0.44
DC078	**D-EPDB-2001-0.5**				0.5			35.33				0.67	0.70	0.73	0.76	0.81
DC079	**D-EPDB-2002-0.5**		0.2	0.1		0.3	0.17	40.56		50		0.70	0.72	0.75	0.77	0.82
DC080	**D-EPDB-2002-1**				1			40.06				1.22	1.26	1.30	1.33	1.39
DC081	**D-EPDB-2002-1.5**				1.5			39.56				1.74	1.79	1.84	1.88	2.05
DC082	**D-EPDB-2003-1**		0.3	0.15	1	0.45	0.27	40.30	2			1.31	1.38	1.43	1.49	1.59
DC083	**D-EPDB-2003-2**				2			39.30				2.36	2.46	2.55	2.62	2.76
DC084	**D-EPDB-2003-3**				3			38.30				3.41	3.53	3.64	3.73	4.02
DC085	**D-EPDB-2004-1**		0.4	0.2	1	0.6	0.37	40.53				1.31	1.37	1.43	1.48	1.58
DC086	**D-EPDB-2004-2**				2			39.53				2.36	2.46	2.54	2.62	2.75
DC087	**D-EPDB-2004-4**				4			37.53				4.45	4.59	4.71	4.83	5.33
DC088	**D-EPDB-2004-6**				6			35.53				6.52	6.70	6.89	7.22	7.99
DC089	**D-EPDB-2005-1**		0.5	0.25	1	0.75	0.47	40.77				1.31	1.37	1.42	1.47	1.57
DC090	**D-EPDB-2005-2**				2			39.77				2.36	2.45	2.54	2.61	2.75
DC091	**D-EPDB-2005-4**				4			37.77				4.45	4.59	4.71	4.82	5.32
DC092	**D-EPDB-2005-6**				6			35.77				6.52	6.70	6.88	7.21	7.97
DC093	**D-EPDB-2005-8**				8			33.77				8.58	8.79	9.16	9.60	10.63
DC094	**D-EPDB-2005-10**				10			31.77				10.64	10.94	11.45	12.00	13.28
DC095	**D-EPDB-2006-2**		0.6	0.3	2	0.9	0.57	40.00	4			2.52	2.66	2.79	2.91	3.13
DC096	**D-EPDB-2006-4**				4			38.00				4.64	4.86	5.04	5.20	5.48
DC097	**D-EPDB-2006-6**				6			36.00				6.75	7.02	7.23	7.42	7.96
DC098	**D-EPDB-2006-10**				10			32.00				10.92	11.26	11.54	11.99	13.27
DC099	**D-EPDB-2008-2**		0.8	0.4	2	1.2	0.77	40.47				2.51	2.65	2.78	2.89	3.11
DC100	**D-EPDB-2008-4**				4			38.47				4.64	4.85	5.03	5.19	5.47
DC101	**D-EPDB-2008-6**				6			36.47				6.74	7.01	7.23	7.41	7.92
DC102	**D-EPDB-2008-8**				8			34.47				8.83	9.14	9.39	9.60	10.58
DC103	**D-EPDB-2008-12**				12			30.47				12.99	13.36	13.71	14.36	15.89
DC104	**D-EPDB-2008-16**				16			31.47		55		17.12	17.55	18.27	19.15	21.20
DC001	**D-EPDB-2010-5**		1	0.5	5	1.5	0.95	47.94		60		5.74	5.97	6.16	6.33	6.63
DC002	**D-EPDB-2010-10**				10			42.94				10.95	11.28	11.55	12.01	13.26
DC123	**D-EPDB-2010-15**				15			37.94	6			16.39	16.90	17.31	17.99	19.90
DC003	**D-EPDB-2010-20**				20			32.94				21.56	22.16	22.87	23.97	26.54
DC124	**D-EPDB-2010-25**				25			27.94				26.72	27.38	28.57	29.95	-
DC004	**D-EPDB-2010-30**				30			42.94		80		31.86	32.76	34.27	35.94	-

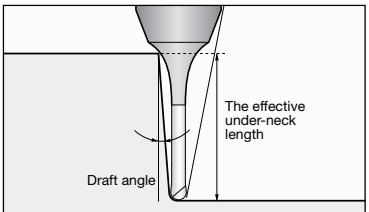
- = no contact

HD – High Adhesion Diamond Coated Solid Carbide End Mill

D-EPDB | Epoch HD Coated Deep Ball End Mill



Helix angle	30°
R accuracy	+/- 0.005 mm
Shank tolerance	h5



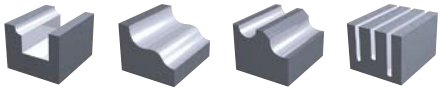
Size											Effective Underneck Using Length by Draft Angle				
ID Code	Item Code	Z	D	R	l_n	l	dn	L_s	NeckR	L	d	0.5°	1°	1.5°	2°	3°
DC125	**D-EPDB-2015-5**	2	1.5	0.75	5	2.25	1.4	49.12	4	60	4	5.86	6.05	6.22	6.38	6.70
DC126	**D-EPDB-2015-10**				10			44.12				11.04	11.35	11.60	12.10	13.34
DC005	**D-EPDB-2015-15**				15			39.12				16.20	16.58	17.27	18.08	19.98
DC127	**D-EPDB-2015-20**				20			34.12	6			21.65	22.21	22.97	24.06	-
DC006	**D-EPDB-2015-30**				30			44.12		80		31.93	32.87	34.37	36.03	-
DC128	**D-EPDB-2020-5**		2	1	5	3	1.9	50.30	4	60		5.85	6.04	6.20	6.35	6.62
DC007	**D-EPDB-2020-10**				10			45.30				11.04	11.33	11.58	12.05	13.26
DC129	**D-EPDB-2020-15**				15			40.30				16.19	16.57	17.23	18.03	19.90
DC008	**D-EPDB-2020-20**				20			35.30				21.32	21.95	22.93	24.02	-
DC009	**D-EPDB-2020-30**				30			45.30	6	80		31.93	32.85	34.34	-	-
DC010	**D-EPDB-2020-40**				40			35.30				42.17	43.74	-	-	-
DC130	**D-EPDB-2030-10**		3	1.5	10	4.5	2.9	42.94	4	60	6	11.02	11.31	11.55	11.95	13.10
DC131	**D-EPDB-2030-20**				20			32.94				21.31	21.91	22.87	23.92	26.37
DC011	**D-EPDB-2030-30**				30			42.94		80		31.54	32.80	34.27	35.88	-
DC132	**D-EPDB-2030-40**				40			32.94	6			42.16	43.70	45.68	-	-
DC012	**D-EPDB-2030-60**				60					100		62.75	65.49	-	-	-
DC133	**D-EPDB-2040-10**		4	2	10	8	3.8	45.30	4	60		11.18	11.43	11.66	12.14	13.25
DC134	**D-EPDB-2040-20**				20			35.30				21.44	22.12	23.06	24.10	-
DC135	**D-EPDB-2040-30**				30			45.30		80		31.68	33.01	34.47	-	-
DC013	**D-EPDB-2040-40**				40			35.30				42.11	43.91	-	-	-
DC014	**D-EPDB-2040-80**				80			45.30	6	130		83.83	-	-	-	-
DC015	**D-EPDB-2060-20**		6	3	20	12	5.7	100.00	-	120		-	-	-	-	-
DC136	**D-EPDB-2060-40**				40			80.00				-	-	-	-	-
DC016	**D-EPDB-2060-60**				60			60.00				-	-	-	-	-
DC017	**D-EPDB-2080-25**		8	4	25	16	7.6	115.00		140	8	-	-	-	-	-
DC018	**D-EPDB-2080-80**				80			60.00				-	-	-	-	-
DC019	**D-EPDB-2100-30**		10	5	30	20	9.5	120.00		150	10	-	-	-	-	-
DC020	**D-EPDB-2100-100**				100			50.00				-	-	-	-	-

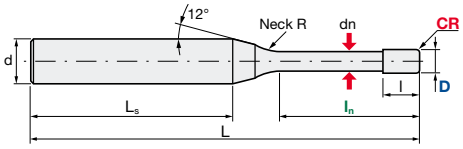
- = no contact

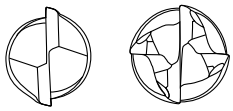
HD – High Adhesion Diamond Coated Solid Carbide End Mill

D-EPDR | Epoch HD Coated Deep Radius End Mill

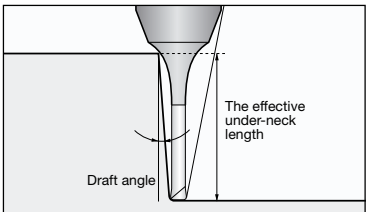
HD	V max			No. of Teeth	No. of Teeth
Diamond Coating	High Speed	Roughing	Finishing	2	4







Helix angle	30°
CR	+/- 0.005 mm
Shank tolerance	h5
D	(0/-0.01 mm)

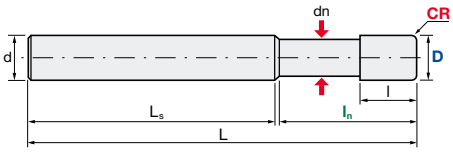


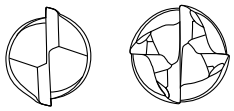
Size											Effective Underneck Using Length by Draft Angle				
ID Code	Item Code	Z	D	CR	l_n	l	dn	L_s	NeckR	L	d	0.5°	1°	1.5°	2°	3°
DC049	D-EPDR-2001-0.2-001	2	0.1	0.01	0.2	0.15	0.08	35.63	1	45	4	0.36	0.38	0.40	0.41	0.45
DC050	D-EPDR-2001-0.5-001				0.5			35.33				0.67	0.70	0.73	0.76	0.81
DC051	D-EPDR-2002-0.5-002		0.2	0.02		0.3	0.17	40.56		50		0.70	0.73	0.75	0.78	0.83
DC052	D-EPDR-2002-1-002				1			40.06				1.22	1.26	1.30	1.34	1.41
DC053	D-EPDR-2002-1.5-002				1.5			39.56				1.74	1.80	1.84	1.89	2.07
DC054	D-EPDR-2003-1-002		0.3		1	0.45	0.27	40.30	2			1.32	1.39	1.45	1.51	1.62
DC055	D-EPDR-2003-2-002				2			39.30				2.37	2.47	2.56	2.64	2.78
DC056	D-EPDR-2003-3-002				3			38.30				3.42	3.54	3.65	3.74	4.06
DC057	D-EPDR-2004-1-002		0.4		1	0.6	0.37	40.53				1.32	1.39	1.45	1.51	1.62
DC058	D-EPDR-2004-2-002				2			39.53				2.37	2.47	2.56	2.64	2.78
DC059	D-EPDR-2004-4-002				4			37.53				4.46	4.60	4.73	4.86	5.39
DC060	D-EPDR-2004-6-002				6			35.53				6.53	6.71	6.92	7.26	8.05
DC061	D-EPDR-2005-1-005		0.5	0.05	1	0.75	0.47	40.77				1.32	1.39	1.45	1.50	1.61
DC062	D-EPDR-2005-2-005				2			39.77				2.37	2.47	2.56	2.64	2.77
DC063	D-EPDR-2005-4-005				4			37.77				4.45	4.60	4.72	4.86	5.38
DC064	D-EPDR-2005-6-005				6			35.77				6.53	6.71	6.91	7.25	8.04
DC065	D-EPDR-2005-8-005				8			33.77				8.59	8.80	9.19	9.64	10.69
DC066	D-EPDR-2005-10-005				10			31.77				10.64	10.96	11.47	12.04	13.35
DC067	D-EPDR-2006-2-005		0.6		2	0.9	0.57	40.00	4			2.54	2.69	2.83	2.95	3.18
DC068	D-EPDR-2006-4-005				4			38.00				4.66	4.88	5.07	5.23	5.52
DC069	D-EPDR-2006-6-005				6			36.00				6.76	7.03	7.26	7.45	8.04
DC070	D-EPDR-2006-10-005				10			32.00				10.93	11.28	11.55	12.04	13.35
DC071	D-EPDR-2008-2-005		0.8		2	1.2	0.77	40.47				2.54	2.69	2.83	2.95	3.18
DC072	D-EPDR-2008-4-005				4			38.47				4.66	4.88	5.07	5.23	5.52
DC073	D-EPDR-2008-6-005				6			36.47				6.76	7.03	7.26	7.45	8.04
DC074	D-EPDR-2008-8-005				8			34.47				8.85	9.16	9.41	9.64	10.69
DC075	D-EPDR-2008-12-005				12			30.47				13.00	13.38	13.75	14.43	16.00
DC076	D-EPDR-2008-16-005				16			31.47		55		17.13	17.56	18.32	19.22	21.31
DC105	D-EPDR-2010-5-01		1	0.1	5	1.5	0.95	47.94		60		5.76	6.00	6.20	6.37	6.76
DC024	D-EPDR-2010-5-02			0.2								5.76	5.99	6.19	6.36	6.72
DC106	D-EPDR-2010-10-01			0.1	10			42.94				10.79	11.31	11.58	12.08	13.39
DC021	D-EPDR-2010-10-02			0.2								10.96	11.30	11.57	12.06	13.36
DC107	D-EPDR-2010-15-01			0.1	15			37.94	6			16.40	16.92	17.34	18.07	20.03
DC108	D-EPDR-2010-15-02			0.2								16.40	16.92	17.33	18.05	20.00
DC109	D-EPDR-2010-20-01			0.1	20			32.94				21.58	22.18	22.93	24.05	26.66
DC022	D-EPDR-2010-20-02			0.2								21.57	22.17	22.91	24.03	26.63
DC023	D-EPDR-2010-30-02				30			42.94		80		31.87	32.79	34.32	35.99	-

- = no contact

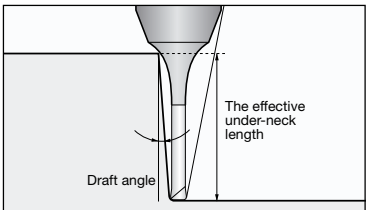
HD – High Adhesion Diamond Coated Solid Carbide End Mill

D-EPDR | Epoch HD Coated Deep Radius End Mill





Helix angle	30°
CR	+/- 0.005 mm
Shank tolerance	h5
D	(0/-0.01 mm)



Size											Effective Underneck Using Length by Draft Angle				
ID Code	Item Code	Z	D	CR	l_n	l	dn	L_s	NeckR	L	d	0.5°	1°	1.5°	2°	3°
DC110	**D-EPDR-2015-5-02**	2	1.5	0.2	5	2.25	1.4	49.12	4	60	4	5.88	6.09	6.27	6.43	6.88
DC111	**D-EPDR-2015-10-02**				10			44.12				11.06	11.37	11.64	12.20	13.52
DC025	**D-EPDR-2015-15-02**				15			39.12				16.21	16.60	17.34	18.19	20.15
DC112	**D-EPDR-2015-20-02**				20			34.12	6			21.67	22.24	23.05	24.17	-
DC026	**D-EPDR-2015-30-02**				30			44.12		80		31.95	32.92	34.45	-	-
DC113	**D-EPDR-2020-5-02**		2		5	3	1.9	50.30	4	60		5.88	6.09	6.27	6.43	6.88
DC027	**D-EPDR-2020-10-02**				10			45.30				11.06	11.37	11.64	12.20	13.52
DC114	**D-EPDR-2020-15-02**				15			40.30				16.21	16.60	17.34	18.19	-
DC028	**D-EPDR-2020-20-02**				20			35.30				21.34	22.02	23.05	24.17	-
DC029	**D-EPDR-2020-30-02**				30			45.30	6	80		31.95	32.92	34.45	-	-
DC030	**D-EPDR-2020-40-02**				40			35.30				42.19	43.81	-	-	-
DC115	**D-EPDR-2030-10-02**		3		10	4.5	2.9	42.94	4	60	6	11.06	11.37	11.64	12.20	13.52
DC116	**D-EPDR-2030-20-02**				20			32.94				21.34	22.02	23.05	24.17	26.79
DC031	**D-EPDR-2030-30-02**				30			42.94		80		31.57	32.92	34.45	36.14	-
DC032	**D-EPDR-2030-60-02**				60			32.94	6	100		62.80	65.60	-	-	-
DC117	**D-EPDR-2040-10-05**		4	0.5	10	8	3.8	65.30	4	80		11.22	11.50	11.87	12.43	13.73
DC118	**D-EPDR-2040-20-05**				20			55.30				21.47	22.25	23.27	24.39	-
DC119	**D-EPDR-2040-30-05**				30			45.30				31.75	33.15	34.68	-	-
DC033	**D-EPDR-2040-40-05**				40			35.30				42.18	44.04	-	-	-
DC034	**D-EPDR-2040-80-05**				80			45.30	6	130		83.89	-	-	-	-
DC120	**D-EPDR-2060-20-05**		6		20	12	5.7	60.00	-	80		-	-	-	-	-
DC121	**D-EPDR-2060-40-05**				40			40.00				-	-	-	-	-
DC122	**D-EPDR-2060-60-05**				60			60.00		120		-	-	-	-	-
DC035	**D-EPDR-4060-20-10**	4		1	20			100.00				-	-	-	-	-
DC036	**D-EPDR-4060-60-10**				60			60.00				-	-	-	-	-
DC037	**D-EPDR-4080-25-10**		8		25	16	7.6	115.00		140	8	-	-	-	-	-
DC038	**D-EPDR-4080-80-10**				80			60.00				-	-	-	-	-
DC040	**D-EPDR-4100-30-10**		10		30	20	9.5	120.00		150	10	-	-	-	-	-
DC039	**D-EPDR-4100-100-10**				100			50.00				-	-	-	-	-

- = no contact

HD – High Adhesion Diamond Coated Solid Carbide End Mill

D-EPDB | Epoch HD Coated Deep Ball End Mill

PLEASE NOTE: In Finishing application, please use the same V_c and keep f_z bigger than Graphite grain size, and please adjust a_p and a_e based on the required surface quality.

BITTE BEACHTEN SIE: Zum Schlichten behalten Sie bitte die V_c bei. Der f_z sollte größer als die Graphit-Korngröße sein. Passen Sie a_p und a_e entsprechend der erforderlichen Oberflächenqualität an.

NOTA BENE: In finitura si consiglia di usare lo stesso V_c e tenere un f_z più alto rispetto alla dimensione del grano di Grafite, impostare a_p e a_e a seconda della qualità superficiale richiesta.

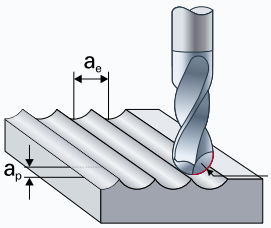
NOTA: En operaciones de acabado, por favor, utilizar la misma V_c y mantener una f_z más grande que el tamaño de grano del grafito, y ajuste a_p y a_e en base a la calidad superficial requerida.

VEUILLEZ NOTER : Lors d'opérations de finition, utiliser la même V_c et veillez à avoir une f_z supérieure à la taille des grains. Veuillez aussi adapter les a_p et a_e à la qualité surfacique désirée.

POR FAVOR NOTE: Em aplicações de acabamento, por favor, use a mesma V_c e manter f_z maior que o tamanho do grão do grafite por favor ajustar o a_p e a_e com base na qualidade da superfície pretendida.

Theoretical cusp height (µm)
Die theoretische Rautiefe (µm)
Cresta teorica (µm)

Cálculo de altura de la cresta teórica (mm)
Hauteur de crête théorique (µm)
Altura da crista teórica (µm)



Feed pitch and cusp height
a_e (mm) Zeilensprung
Passo di avanzamento / Cresta
Paso y altura de cresta
Pas et hauteur de crête
Passo lateral x/ Altura da crista

$$h = R - \sqrt{\frac{(2 \cdot R)^2 - a_{p,e}^2}{4}} \qquad h = \frac{a_e^2}{8 \cdot R}$$

		a_e (mm)							
		0.05	0.075	0.1	0.15	0.2	0.3	0.4	0.5
R (mm)	0.5	0.63	1.41	2.51	5.66	10.10	23.03	41.74	66.99
	1.0	0.31	0.70	1.25	2.82	5.01	11.31	20.20	31.75
	2.0	0.16	0.35	0.63	1.41	2.50	5.63	10.03	15.69
	3.0	0.10	0.23	0.42	0.94	1.67	3.75	6.67	10.43
	4.0	0.08	0.18	0.31	0.70	1.25	2.81	5.00	7.82
	5.0	0.06	0.14	0.25	0.56	1.00	2.25	4.00	6.25
	6.0	0.05	0.12	0.21	0.47	0.83	1.88	3.33	5.21
	8.0	0.04	0.09	0.16	0.35	0.63	1.41	2.50	3.91
	10.0	0.03	0.07	0.13	0.28	0.50	1.13	2.0	3.13

NOTE

1. Use a highly rigid and accurate machine as available.
2. The cutting conditions in P50 QuickFinder are a general guide. For your actual work piece adjust the conditions according to the machining shape, purpose and the machine tool to be used.
3. If your available rpm is lower than in our recommendation, adjust the feed rate to the same ratio with the rpm.

ANMERKUNG

1. Nutzen Sie für die Bearbeitungen die Maschine mit der höchsten Genauigkeit und der höchsten Steifigkeit.
2. Die Schnittdaten im P50 QuickFinder stellen eine generelle Empfehlung dar. Die Werte sollten immer an die jeweilige Bearbeitung, deren Form und die verwendete Maschine angepasst werden.
3. Sollte die Ihnen verfügbare Drehzahl niedriger als der in der Tabelle angegebene Wert sein, sollte der Vorschub im gleichen Verhältnis reduziert werden.

NOTA

1. Usate centri di lavoro più precisi e rigidi possibile.
2. Le condizioni di taglio espresse nel P50 Quickfinder sono da considerare per utilizzo generale. Per la lavorazione sul vostro pezzo modificare tali condizioni in funzione della morfologia del pezzo stesso, della tipologia di lavorazione e della macchina utensile a disposizione
3. In caso la disponibilità dei giri mandrino sia inferiore a quella raccomandata ricordarsi di abbassare della stessa percentuale anche la velocità di avanzamento

OBSERVACIONES

1. Utilizar la máquina más rígida y precisa posible.
2. Las condiciones de corte que aparecen en el P50 QuickFinder son una orientación general. Estas condiciones deben adaptarse al perfil de la pieza a mecanizar, al tipo de proceso y a la máquina con la que vayamos a realizar el trabajo.
3. Si las rpm disponibles son menores a las recomendadas, reducir también el avance en la misma proporción.

NOTE

1. Utiliser une machine aussi fiable et rigide que possible .
2. Les conditions de coupe du P50 QuickFinder sont des conditions d'usage général. Pour le travail que vous avez à réaliser, ajustez ces paramètres en fonction de la géométrie, de la fonctionnalité de la pièce et de la machine utilisée.
3. Si le nombre de tours est insuffisant ajuster les avances dans la même proportion que la rotation disponible .

NOTA

1. Use a máquina disponível mais rígida e precisa possível.
2. As condições de corte no P50 QuickFinder são um guia geral. Para a sua peça de trabalho real ajustar as condições à máquina de acordo com forma da peça, finalidade e em que máquinas-ferramenta deverá ser utilizada.
3. Se a sua rpm disponível é menor do que o recomendado, ajuste o avanço para a mesma relação com a rpm.

Graphite Classes

Material Class	1	2	3	4	5
Grain Size (µm)	1–3	4–6	7–9	10–12	13–15

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