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No. 431

microEndMill

ADVANCED TH60+ NANO-PVD COATING

EPSBE-TH Epoch Super Hard Ball Evolution

NEW

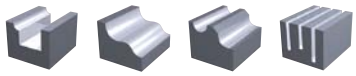
For Hardened Steels 55~72 HRC
Micro Grain Solid Carbide End Mill
Epoch New Advanced TH Ball Series

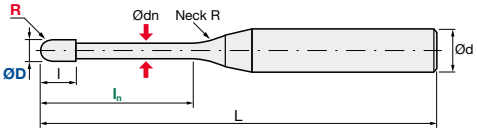
Hitachi Tool Engineering Europe GmbH
www.micro-mill.com

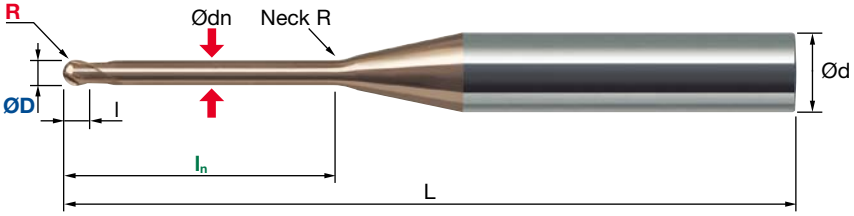
Ultra Micro Grain Solid Carbide End Mill

EPSBE | Epoch Super Hard Ball Evolution

V max	Semi-Finishing	Finishing	HRC	No. of Teeth
High Speed	▽▽	▽▽▽	72	2

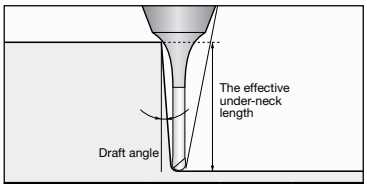






Carbide	TH60+	Rake Angle
Micro Grain	Nano-PVD Coating	Negative

D	(0 / -0.014 mm)
R	+0.003 / -0,007 mm
ød	h4
Helix angle	30°



Size											Inter-ference angle	Effective Underneck Using Length by Draft Angle				
ID Code	Item Code	Z	ØD	R	ln	l	dn	L	Ød	Neck R		0.5°	1°	1.5°	2°	3°
EP864	EPSBE-2001-0.15-TH	2	0.1	0.05	0.15	0.08	0.08	45	4	1	11.82	0.30	0.32	0.33	0.35	0.38
EP865	EPSBE-2001-0.3-TH				0.3						11.64	0.46	0.48	0.50	0.52	0.57
EP866	EPSBE-2001-0.75-TH				0.75						11.12	0.93	0.97	1.01	1.04	1.10
EP867	EPSBE-2002-0.3-TH		0.2	0.1	0.3	0.15	0.17				11.66	0.49	0.50	0.52	0.54	0.58
EP868	EPSBE-2002-0.6-TH				0.6						11.30	0.80	0.83	0.86	0.88	0.93
EP870	EPSBE-2002-1-TH				1						10.86	1.22	1.26	1.30	1.33	1.39
EP869	EPSBE-2002-1.5-TH				1.5						10.35	1.74	1.79	1.84	1.88	2.05
EP871	EPSBE-2002-2-TH				2						9.88	2.25	2.32	2.37	2.45	2.71
EP872	EPSBE-2003-0.45-TH		0.3	0.15	0.45	0.25	0.27			2	11.53	0.73	0.77	0.80	0.84	0.91
EP873	EPSBE-2003-0.9-TH				0.9						11.00	1.21	1.27	1.32	1.37	1.47
EP874	EPSBE-2003-1.5-TH				1.5						10.36	1.84	1.92	1.99	2.06	2.18
EP875	EPSBE-2003-2-TH				2						9.88	2.36	2.46	2.55	2.62	2.76
EP876	EPSBE-2003-3-TH				3						9.05	3.41	3.53	3.64	3.73	4.02
EP877	EPSBE-2004-0.6-TH		0.4	0.2	0.6	0.3	0.37				11.39	0.88	0.93	0.97	1.01	1.09
EP878	EPSBE-2004-1.2-TH				1.2						10.69	1.52	1.59	1.65	1.71	1.82
EP879	EPSBE-2004-2-TH				2						9.88	2.36	2.46	2.54	2.62	2.75
EP881	EPSBE-2004-3-TH				3						9.03	3.41	3.53	3.63	3.73	4.01
EP880	EPSBE-2004-3.5-TH				3.5						8.65	3.93	4.06	4.18	4.27	4.67
EP882	EPSBE-2004-4-TH				4						8.30	4.45	4.59	4.71	4.83	5.33
EP883	EPSBE-2005-0.75-TH		0.5	0.25	0.75	0.35	0.47				11.25	1.04	1.09	1.13	1.18	1.27
EP884	EPSBE-2005-1.5-TH				1.5						10.39	1.83	1.91	1.98	2.05	2.17
EP885	EPSBE-2005-3-TH				3						9.00	3.41	3.53	3.63	3.72	3.99
EP886	EPSBE-2005-5-TH				5						7.64	5.48	5.65	5.78	6.01	6.65
EP887	EPSBE-2006-0.9-TH		0.6	0.3	0.9	0.4	0.57				11.10	1.33	1.42	1.51	1.59	1.75
EP888	EPSBE-2006-1.8-TH				1.8						10.08	2.30	2.44	2.56	2.68	2.88
EP889	EPSBE-2006-3-TH				3						8.98	3.58	3.77	3.93	4.07	4.32
EP890	EPSBE-2006-5-TH				5						7.59	5.70	5.94	6.14	6.32	6.63
EP891	EPSBE-2006-6-TH				6						7.04	6.75	7.02	7.23	7.42	7.96
EP892	EPSBE-2008-1.2-TH		0.8	0.4	1.2	0.5	0.77				10.79	1.65	1.75	1.84	1.93	2.11
EP893	EPSBE-2008-2.4-TH				2.4						9.47	2.94	3.10	3.24	3.36	3.59
EP894	EPSBE-2010-1.5-TH		1	0.5	1.5	0.8	0.96		6	4	11.01	2.01	2.12	2.21	2.31	2.49
EP896	EPSBE-2010-3-TH				3						9.88	3.61	3.78	3.93	4.06	4.30
EP897	EPSBE-2010-6-TH				6						8.20	6.76	7.02	7.23	7.42	7.92
EP898	EPSBE-2010-8-TH				8						7.36	8.85	9.15	9.40	9.61	10.58
EP895	EPSBE-2010-10-TH				10			50			6.68	10.93	11.27	11.54	11.98	13.23
EP899	EPSBE-2012-1.8-TH		1.2	0.6	1.8	1.1	1.15	45			10.78	2.36	2.47	2.58	2.68	2.86
EP900	EPSBE-2012-3.6-TH				3.6						9.46	4.27	4.45	4.61	4.75	5.01
EP902	EPSBE-2015-2.25-TH		1.5	0.75	2.25	1.35	1.44				10.43	2.87	2.99	3.10	3.20	3.40
EP903	EPSBE-2015-4.5-TH				4.5						8.84	5.24	5.43	5.61	5.76	6.03
EP904	EPSBE-2015-8-TH				8						7.14	8.89	9.17	9.41	9.61	10.56
EP901	EPSBE-2015-12-TH				12			50			5.85	13.03	13.39	13.74	14.38	15.87
EP908	EPSBE-2020-3-TH		2	1	3	1.7	1.92	45			9.79	3.71	3.84	3.96	4.07	4.29
EP909	EPSBE-2020-6-TH				6						7.81	6.84	7.07	7.26	7.43	7.89
EP910	EPSBE-2020-8-TH				8						6.88	8.92	9.19	9.42	9.61	10.54
EP905	EPSBE-2020-12-TH				12			50			5.55	13.06	13.41	13.76	14.39	15.85
EP906	EPSBE-2020-16-TH				16						4.65	17.19	17.59	18.32	19.17	21.16
EP907	EPSBE-2020-20-TH				20			55			4.01	21.30	21.90	22.88	23.96	26.47

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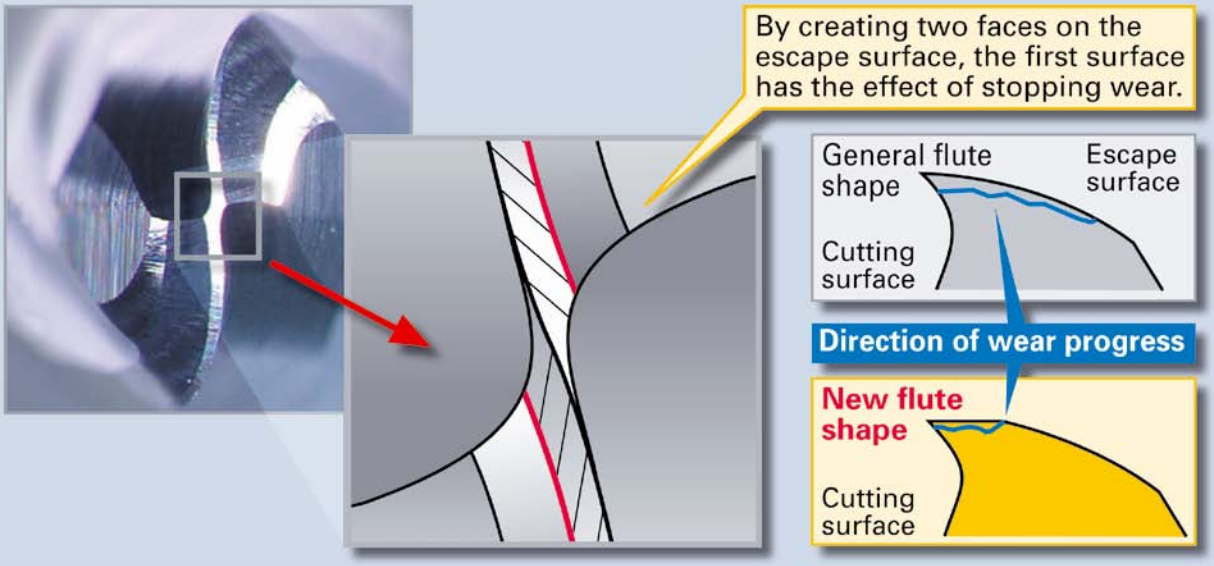
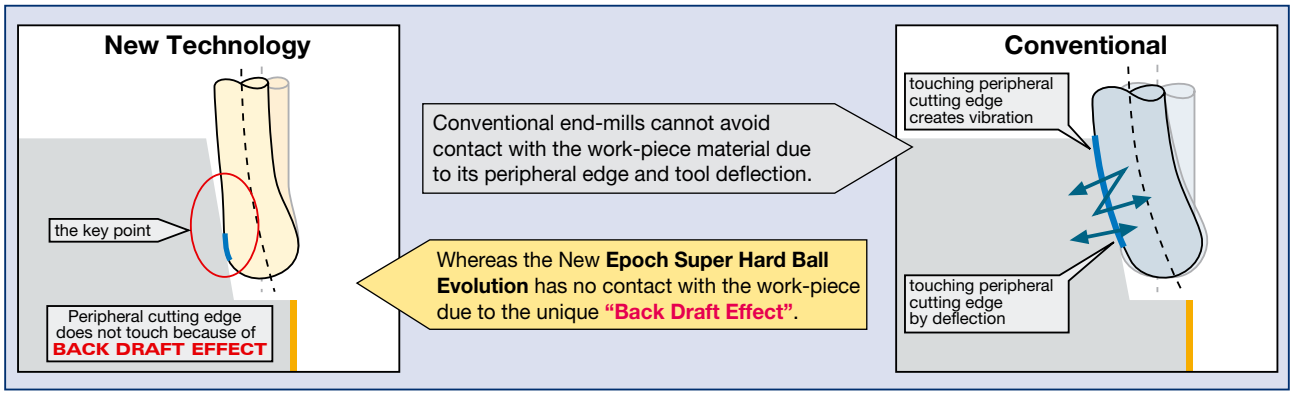
THE EFFECT OF FLUTE SHAPE, MATERIAL AND COATING:

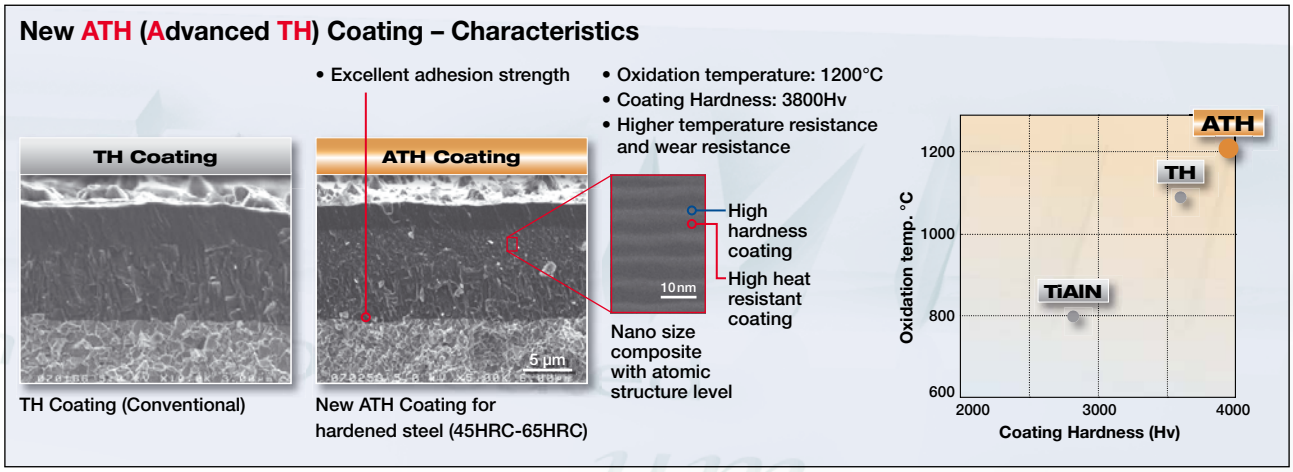
DOUBLE-FACE EFFECT OF NEW SHAPE PREVENTS SHAPE FROM DETERIORATING



Advanced Technology – Back Draft Effect



New ATH (Advanced TH) Coating – Characteristics



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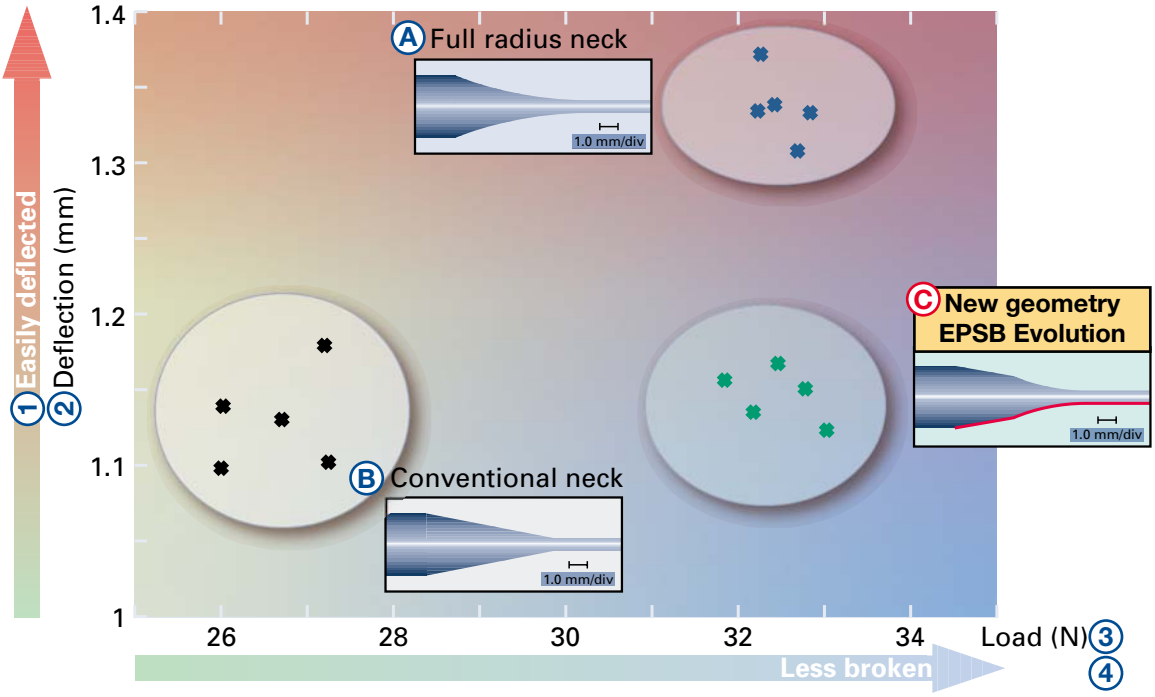
COMPARISON OF BREAKAGE IN NECK GEOMETRIES



VERGLEICH DER BIEGEBRUCHFESTIGKEIT BEI UNTERSCHIEDLICHEN SCHAFT-GEOMETRIEN

1) Höhere Biegeanfälligkeit
2) Biegung (mm)
3) Kraft (N)
4) Geringere Bruchanfälligkeit
A Voll-Radius Geometrie
B Konventionelle Geometrie
C Neue Geometrie der "Epoch Deep"-Serie

COMPARAZIONE TRA GEOMETRIE DI RASTREMAZIONE E ROTTURA

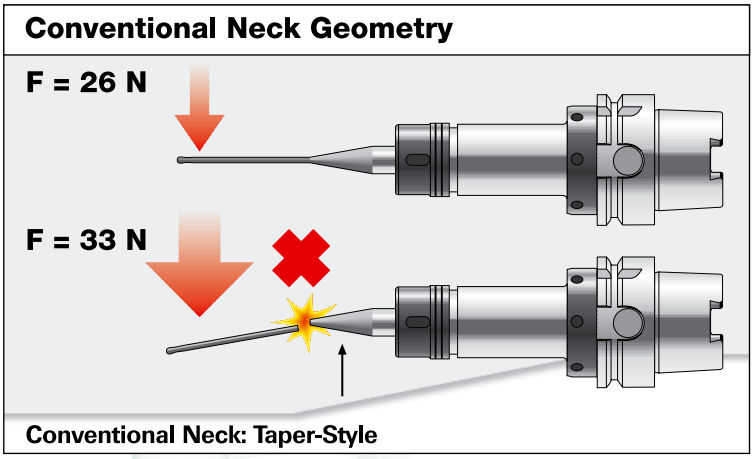
1) Alta resistenza alla flessione
2) Flessione
3) Carico (N)
4) Alta resistenza alla rottura
A Rastremazione raggiata
B Rastremazione convenzionale
C Nuova geometria

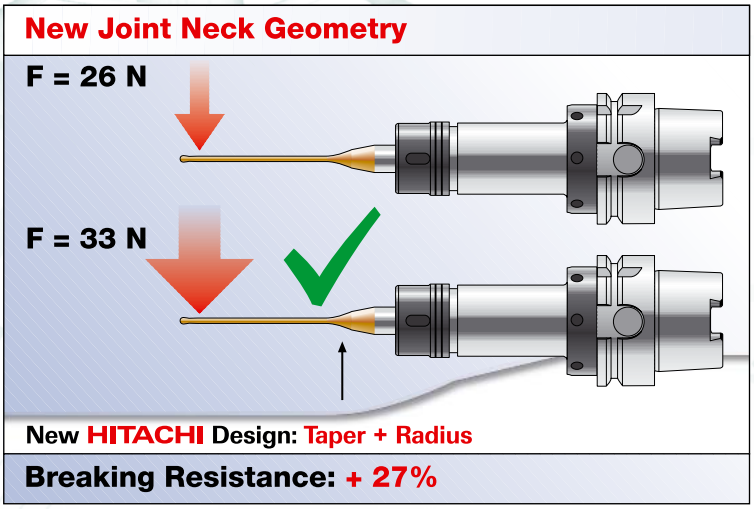
COMPARACIÓN DE LA ROTURA SEGÚN LA GEOMETRÍA DEL CUELLO

1) Flexa con facilidad
2) Flexión (mm)
3) Carga (N)
4) Menor rotura
A Cuello de radio
B Cuello convencional
C Nueva geometría

COMPARAISON DE BRIS DANS LA GÉOMÉTRIE DU DÉGAGEMENT

1) Facilement flexible
2) Battement (mm)
3) Charge (N)
4) Moins de bris
A Rayon renforcé
B Dégagement conventionnelle
C Nouvelle géométrie





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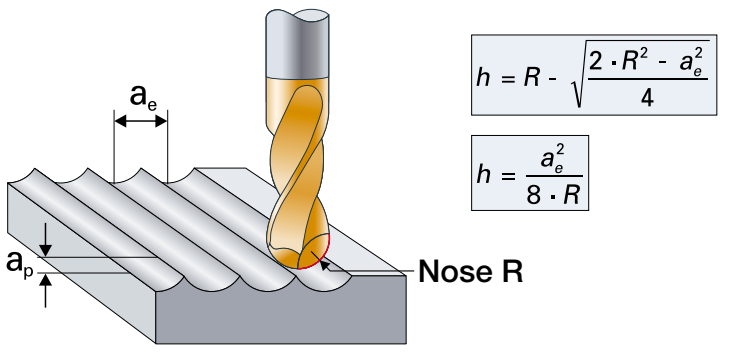
Ultra Micro Grain Solid Carbide End Mill

EPSBE | Recommended Cutting Conditions

Theoretical cusp height in end milling (µm) · Die theoretische Rautiefe in der Fräsbearbeitung (µm)
Calculo de altura de la cresta teórica en fresado (mm) · Cresta teórica de fresado (µm)
Hauteur de crête théorique en fraisage (µm)

		a_e (Pick feed) mm											
		0.005	0.01	0.015	0.02	0.03	0.04	0.05	0.075	0.1	0.15	0.2	0.3
Nose R (mm)	0.05	0.063	0.251	0.57	1.01	2.30	4.17	-	-	-	-	-	-
	0.1	0.031	0.125	0.28	0.50	1.13	2.02	3.18	-	-	-	-	-
	0.15	0.021	0.083	0.19	0.33	0.75	1.34	2.01	4.76	8.58	-	-	-
	0.2	0.016	0.063	0.14	0.25	0.56	1.00	1.57	3.55	6.35	14.60	-	-
	0.25	0.013	0.050	0.11	0.20	0.45	0.80	1.25	2.83	5.05	11.52	20.87	-
	0.3	0.011	0.042	0.09	0.17	0.38	0.67	1.04	2.35	4.20	9.53	17.18	-
	0.4	0.008	0.031	0.07	0.13	0.28	0.50	0.78	1.76	3.14	7.09	12.70	-
	0.5	0.006	0.025	0.06	0.10	0.23	0.40	0.63	1.41	2.51	5.66	10.10	-
	0.6	0.005	0.021	0.05	0.08	0.19	0.33	0.52	1.17	2.09	4.71	8.39	19.05
	0.75	0.004	0.017	0.04	0.07	0.15	0.27	0.42	0.94	1.67	3.76	6.70	15.15
	1	0.003	0.013	0.03	0.05	0.11	0.20	0.31	0.70	1.25	2.82	5.01	11.31



Feed pitch and cusp height
a_e (mm) Zeilensprung
Paso y altura de cresta
Relación Paso / Cresta
Pas et hauteur de crête

NOTE
1. Use a highly rigid and accurate machine as available.
2. The radial step over (a_e, pick feed) in the above table is for general information. Please select the conditions to suit your actual surface finish requirements, according to the cusp height stated.
3. The cutting conditions in the above table 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.
4. If the rpm speed available is lower, 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. Der in der Tabelle angegebene Zeilensprung ist eine generelle Empfehlung. Um die jeweiligen Anforderungen an die Oberflächengüte zu erreichen wählen Sie die Bedingungen entsprechend der angegebenen Rautiefe.
3. Die in der Tabelle angegebenen Schnittbedingungen stellen eine generelle Empfehlung dar. Die Werte sollten immer an die jeweilige Bearbeitung, deren Form und die verwendete Maschine angepasst werden.
4. 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. Gli indicazioni sul passo laterale (a_e) espresso nella tabella sopra riportata sono valori generali. Per ottimizzare il processo di lavoro usate le relazioni cresta/raggio più vicine alle Vostre esigenze.
3. Le condizioni di taglio indicate sono valori generali. Per ottimizzare il Vostro processo di lavoro analizzate i parametri in funzione delle geometrie che dovete generare e del centro di lavoro a disposizione.
4. Se i giri del mandrino della macchina disponibili sono più bassi rispetto al valore espresso regolate l´avanzamento con lo stesso rapporto.

OBSERVACIONES
1. Utilizar la máquina más rígida y precisa posible.
2. El paso radial (a_e, paso) de la tabla es una información general. Hay que utilizar el paso adecuado en función del acabado superficial que se pretenda obtener según la rugosidad máxima prevista (Altura de cresta).
3. 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.
4. Si las rpm de la maquina son inferiores, hay que ajustar el avance en proporción a las mismas.

NOTE
1. Utiliser une machine aussi fiable et rigide que possible .
2. SVP choisissez vos conditions en fonction de l'état de surface requis .
3. Les conditions de coupe du tableau sont indicatives. Pour votre application, ajuster cette base en fonction de votre machine .
4. Si le nombre de tours est insuffisant ajuster les avances dans la même proportion que la rotation disponible .

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Milling Chucks

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