

MINIATURE

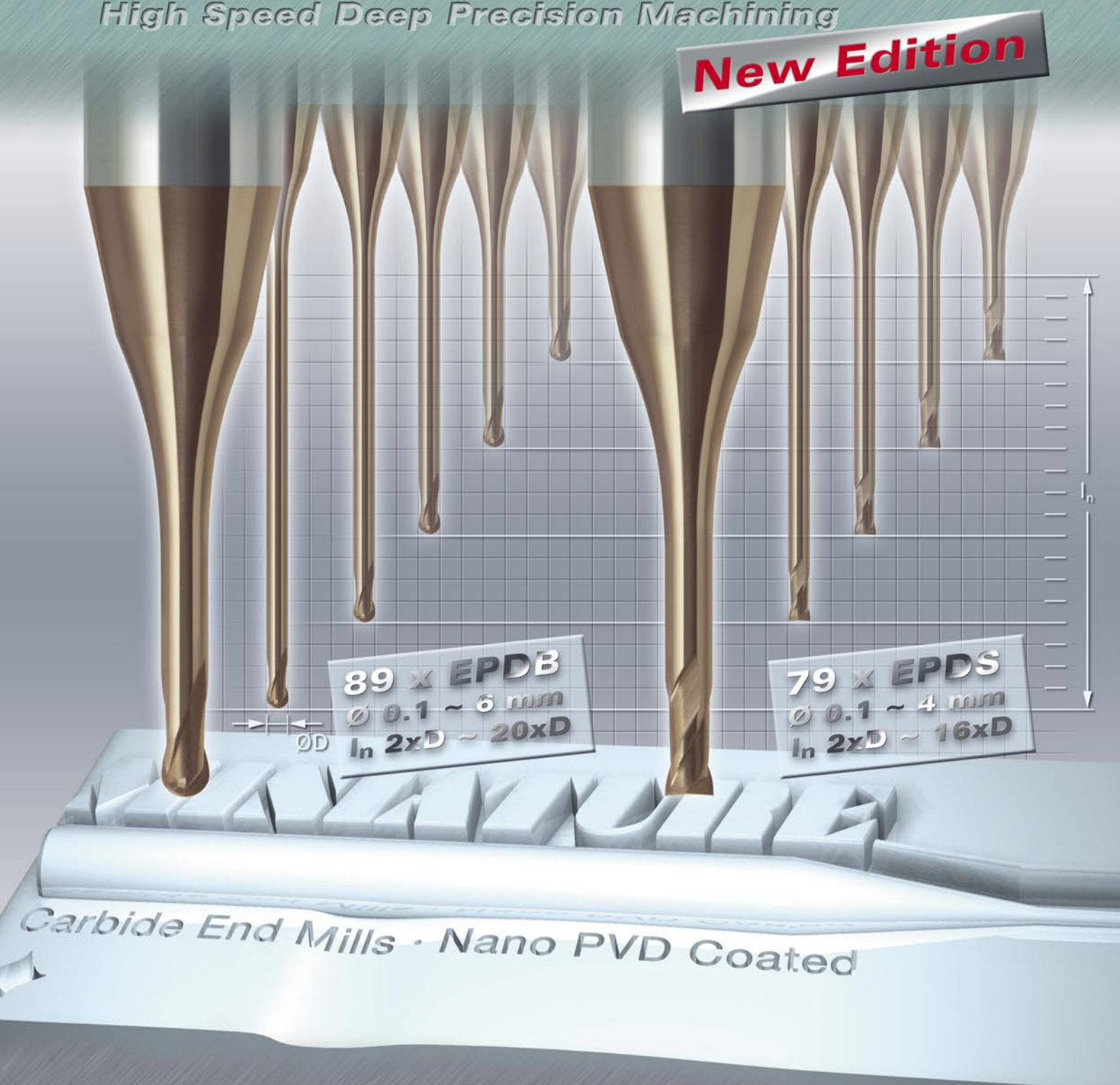
Nano-PVD Coating
TH45+

No. 418

EPDB Epoch Deep Ball EPDS Epoch Deep Square

High Speed Deep Precision Machining

New Edition



High Speed Deep Precision Machining

EPOCH DEEP BALL & DEEP SQUARE END MILL

This tool has been designed for the application of cutting deep ribs and the slotting of moulds, and also for machining deep corners and precision parts which has conventionally been carried out by EDM methods.

Due to the optimum length and new under-neck design, greater breakage resistance can be maintained when using High Speed Machining methods with the new "Epoch Deep" series carbide end mills.

FEATURES & APPLICATIONS

- **Newly developed combined neck geometry**
The risk of breakage is reduced and vibration minimized
- **Newly developed NANO PVD Coating TH45+**
Longer tool-life when cutting hardened steels, especially in dry machining conditions.
- **Wider line-up of under-neck lengths**
The optimum under-neck length is available as standard.
- **Newly developed cutting edge & flute geometry**
More stable cutting with less vibration in long overhang machining.

EPOCH DEEP BALL & DEEP SQUARE END MILL

Dieses Werkzeug wurde speziell entwickelt für die Bearbeitung tiefer Rippen und Nuten in Formen und die Bearbeitung tiefer Konturen in Präzisionsteilen, sprich Bearbeitungen, für die bislang zeitintensive Erodier-Prozesse notwendig waren.

Durch die optimale Länge und den neu entwickelten abgesetzten Schaft bieten die Fräser der neuen "Epoch Deep"-Serie eine höhere Biegebruchfestigkeit und geringere Vibrationen, speziell beim Einsatz in Hochgeschwindigkeits-Bearbeitungen (HSM).

BESONDERHEITEN & BEARBEITUNGEN

- **Die neu entwickelte Schaft-Geometrie**
Sie reduziert die Gefahr des Werkzeugbruchs und vermindert Vibrationen.
- **Die neu entwickelte NANO-Beschichtung TH45+**
Sie ermöglicht erheblich längere Standzeiten bei der Bearbeitung von gehärteten Materialien, besonders bei der Trocken-Bearbeitung.
- **Die vergrößerte Auswahl an Nutzlängen der abgesetzten Schäfte**
Geringere Lieferzeit, da alle Nutzlängen ab Lager lieferbar sind.
- **Die neu entwickelte Geometrie der Schneiden und der Schneidkanten**
Sie ermöglicht höhere Stabilität mit geringeren Vibrationen, speziell bei Bearbeitungen mit langen Auskraglängen.

EPOCH DEEP BALL & DEEP SQUARE END MILL

Questo utensile è stato sviluppato per applicazioni di nervatura profonda e per esecuzioni di cave. Ideale anche per lavorazioni di angoli profondi e parti precise effettuate fino ad ora con processi di erosione.

Grazie alla particolare geometria tra il collo e gambo dell' utensile (raggio + smusso), che rende l' utensile più resistente alla rottura ed in combinazione ad una vasta scelta di lunghezze utili è possibile utilizzare l' utensile più adatto per eseguire la lavorazione richiesta.

CARATTERISTICHE & APPLICAZIONI

- **Nuova geometria di rastremazione**
Vibrazioni e rotture sono ridotte al minimo.
- **Nuovo rivestimento brevettato NANO PVD Coating TH45+**
Maggiore durata dell' utensile nella lavorazione di acciai temprati a secco.
- **Vasta scelta di lunghezze utili per diametro.**
La lunghezza più adatta è disponibile come standard
- **Nuova geometria del tagliente e dell' elica**
Maggiore stabilità di taglio e minori vibrazioni in lavorazioni profonde.

FRESAS EPOCH DEEP BALL & EPOCH DEEP SQUARE

Esta herramienta ha sido diseñada para realizar las ranuras y los nervios profundos de los moldes y también para el mecanizado de los radios de fondo y piezas de alta precisión que habitualmente se están mecanizando por medio de la electroerosión.

El nuevo diseño del cuello así como la posibilidad de elegir siempre la longitud óptima, hacen que la nueva serie de fresas "Epoch Deep" tenga una mayor resistencia a la rotura mecanizando en alta velocidad.

CARACTERÍSTICAS & APLICACIONES

- **Nueva geometría de cuello mixta.**
El riesgo de rotura y la vibración se reducen.
- **Nuevo recubrimiento NANO PVD TH45+.**
Mayor vida de herramienta mecanizando aceros templados, especialmente en seco.
- **Amplio programa de longitudes de cuello útiles.**
La longitud útil óptima que Ud. necesita esta casi siempre disponible como producto estándar.
- **Geometría de Nuevo diseño.**
Menos vibraciones. El mecanizado es mas estable incluso en grandes voladizos.

EPOCH DEEP BALL & DEEP SQUARE END MILL

Ces outils ont été élaborés pour l' usinage et le rainurage profond des moules, de formes profondes rayonnées et de pièces de précisions qui sont normalement obtenues par procédé d' érosion " EDM ".

Grâce à la nouvelle géométrie du dégagement et une longueur optimisée ; une meilleure résistance à la rupture peut être obtenue durant l' usinage à grande vitesse, avec la nouvelle série de fraises carbure " EPOCH DEEP ".

CARACTÉRISTIQUES & APPLICATIONS

- **Toute nouvelle géométrie du dégagement**
Le risque de rupture réduit et vibrations minimisées
- **Tout nouveau revêtement NANO PVD TH45+**
Durée de vie plus longue dans les aciers traités; surtout en usinage à sec
- **Renforcement de la partie supérieure du dégagement**
L' optimum sous longueur, la longueur est comparable au standard
- **Toutes nouvelles arête de coupe et géométrie d' arête.**
Conditions de coupes plus stables avec moins de vibrations, même en usinage avec grand porte-à-faux



High Speed Deep Precision Machining

1

**DUE TO THE NEW NECK SHAPE GEOMETRY CONTACT AGAINST THE MOULD WALL IS ELIMINATED**

When the mould has a draft angle, the new neck shape of the „Epoch Deep” gives a longer effective reach length.

In the case of machining a draft angle of 1° using a Radius 0.5 mm end-mill with 10 mm under-neck length, the actual effective reach is 12.03 mm, whereas with the conventional neck shape only 10.8 mm reach is obtainable.

For the effective under-neck length of each item please see Pages 6 to 9.

**DURCH DIE NEUE GEOMETRIE DES ABGESETZTEN SCHAFTS WIRD EIN UNGEWOLLTER KONTAKT MIT DEM WERKSTÜCK VERHINDERT**

Bei einer eventuell vorhandenen Entformungs-Schräge erhöht sich, durch die neue Geometrie der „Epoch Deep“-Serie, die effektiv nutzbare Länge.

Im Falle der Bearbeitung eines Werkstücks mit einer Entformungs-Schräge von 1° mit einem Fräser Radius 0.5 und einer Nutzlänge von 10 mm, wäre die effektiv nutzbare Länge durch die neue Geometrie 12,03 mm.

Die konventionelle Geometrie hingegen ermöglicht lediglich eine nutzbare Länge von 10,8 mm.

Die effektiv nutzbaren Längen der einzelnen Werkzeuge erfahren Sie auf den Seiten 6-9.

**È STATA NOTEVOLMENTE RIDIMENSIONATA L'INTERFERENZA TRA IL RAPPORTO PROFONDITÀ E INCLINAZIONE DELLA PARETE.**

La nuova geometria ha aumentato la possibilità di raggiungere punti più profondi di stampi con pareti inclinate.

Nel caso di lavorazioni con angolo di inclinazione 1° utilizzando una fresa con raggio 0.5 mm e lunghezza utile 10 mm, con rastremazione convenzionale, il punto più profondo raggiungibile è di 10,8 mm. Con la nuova geometria HITACHI si raggiunge una profondità effettiva di 12,03 mm.

Per altre profondità raggiungibili in rapporto alla inclinazione vedi da pag. 6 alla pag. 9.

**GRACIAS AL NUEVO DISEÑO DEL CUELLO SE EVITA EL CONTACTO CON LA PARED DEL MOLDE.**

En los desmoldeos, con paredes casi verticales, la nueva geometría del cuello permite una longitud efectiva mayor.

Mecanizando una pared de 1° con una fresa de radio 0.5mm y 10mm de cuello rebajado, la longitud útil total es, con la nueva geometría, de 12,03mm, cuando con la geometría anterior era de solo 10,8mm.

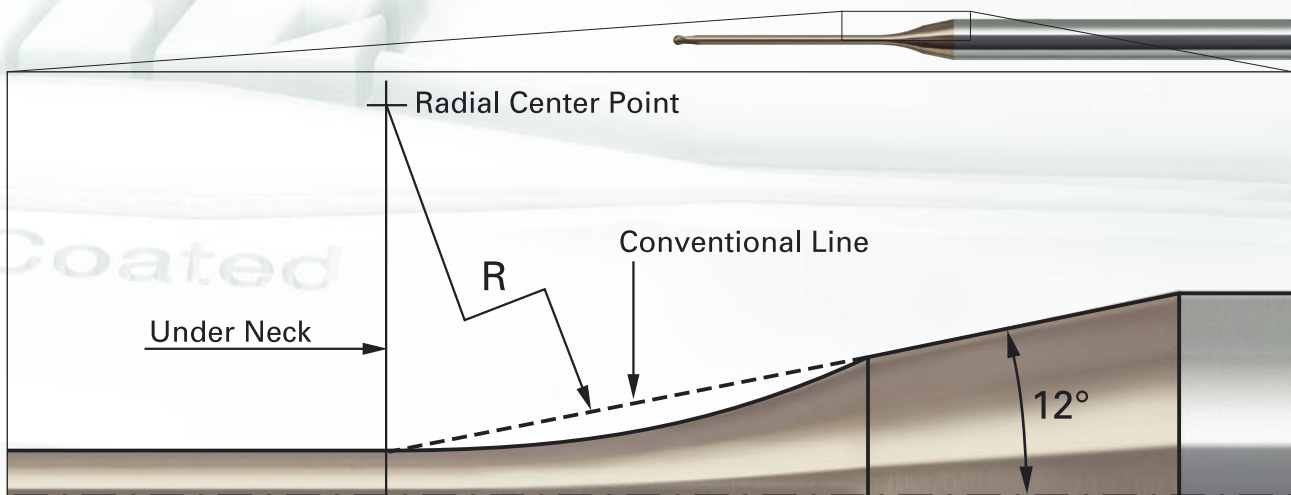
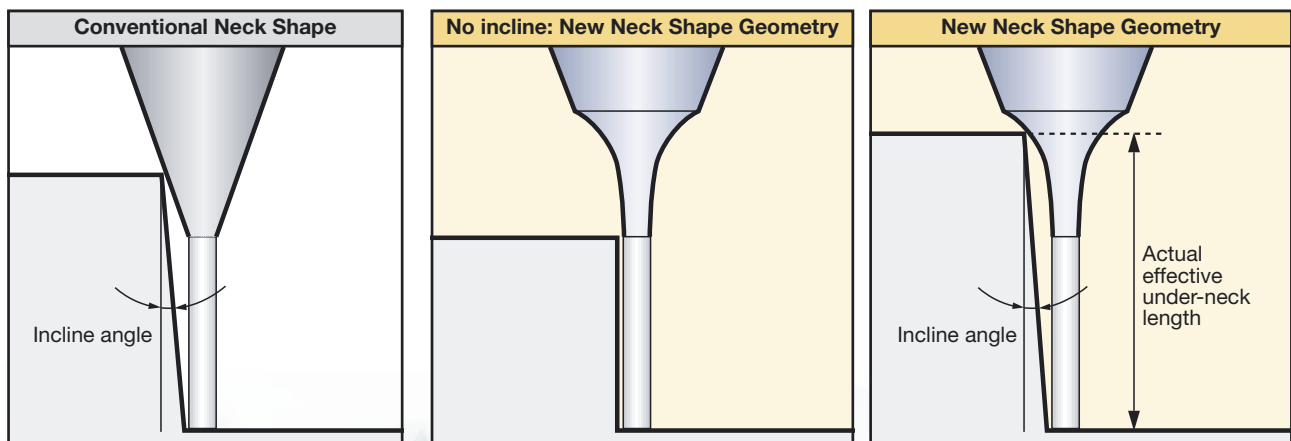
Para consultar la longitud efectiva del cuello rebajado de cada referencia ver paginas 6 a 9.

**GRÂCE À LA NOUVELLE GÉOMÉTRIE DU DÉGAGEMENT LE CONTACT AVEC LES PAROIS DANS UN MOULE EST SUPPRIMÉ**

Quand le moule a des angles difficiles, le nouveau dégagement de l' " EPOCH DEEP " procure une rigidité plus grande.

Dans le cas d'un usinage d'angle aigu de 1° , utiliser un rayon de 0,5mm avec une longueur de 10mm sous dépouille, la dimension effective de la nouvelle forme du dégagement est de 12,03mm, alors que la forme conventionnelle est seulement de 10,8mm au mieux.

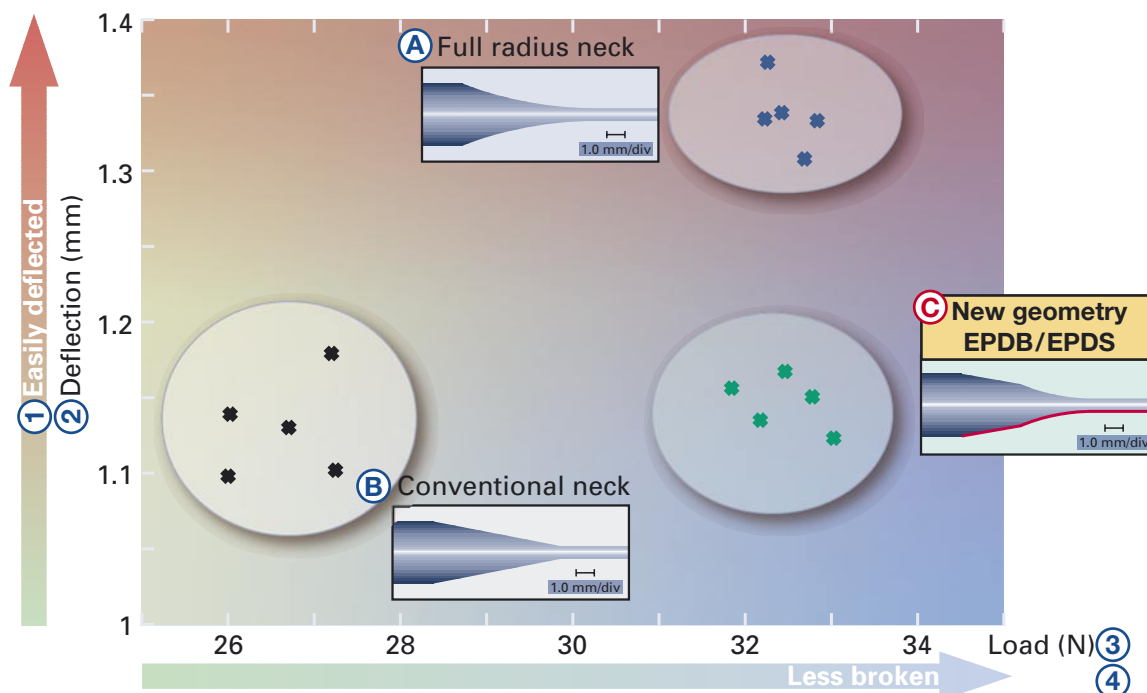
Pour les longueurs du dégagement de chaque référence, svpl voir pages 6 à 9.



High Speed Deep Precision Machining

2

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

© 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

© 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

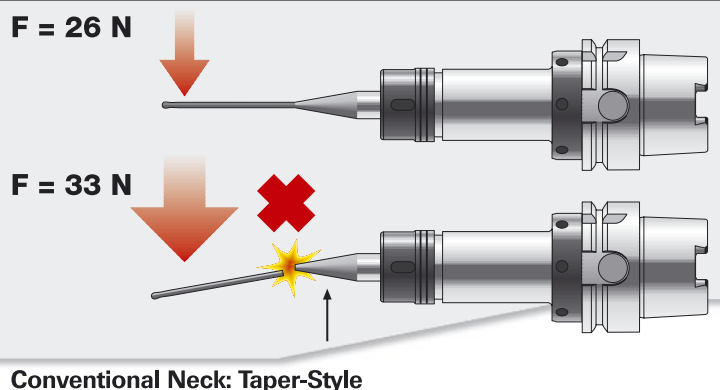
© Nueva geometría

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

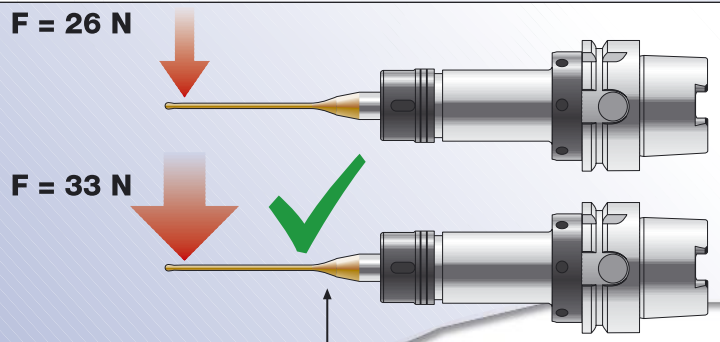
© Nouvelle géométrie

Conventional Neck Geometry



Conventional Neck: Taper-Style

New Joint Neck Geometry



New **HITACHI** Design: Taper + Radius

Breaking Resistance: + 27%

High Speed Deep Precision Machining

3

Feed Limit Test | Vorschub-Vergleichstest | Prova di rottura | Test de avance máximo | Teste des avances limites

EPDB-2010-12 · R 0.5 x 12 mm

1.2083 (52HRC)

$n = 20,000 \text{ min}^{-1}$

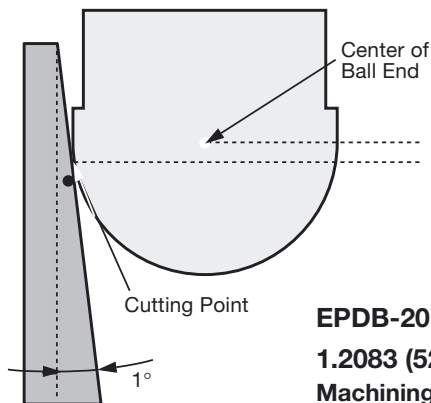
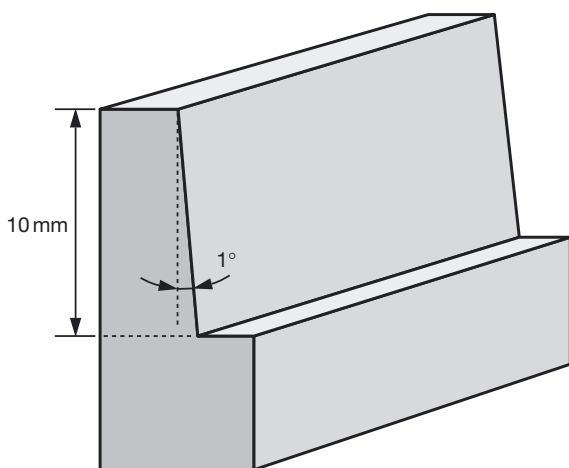
$a_p \times a_e = 0.1 \times 0.1 \text{ mm}$

Wet cutting

$V_f \text{ mm/min}$	800	1,000	1,200~1,600	1,800	2,000	2,200	2,400~4,800	5,000
EPDB			~				~	
A			~			Broken		
B		Broken						

4

Machining Test of Incline | Beispiel-Bearbeitung einer Seitenwand mit Entformungs-Schräge | Test su superficie inclinata | Test en paredes inclinadas | Teste d'usinage dans les pentes



EPDB-2010-12 · R 0.5 x 12 mm

1.2083 (52HRC)

Machining Test of Incline

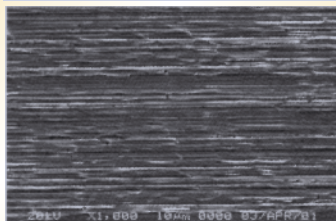
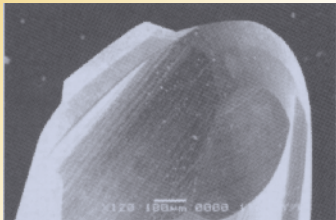
$n = 20,000 \text{ min}^{-1}$

$V_f = 400 \text{ mm/min}$

$a_p = 0.05 \text{ mm}$

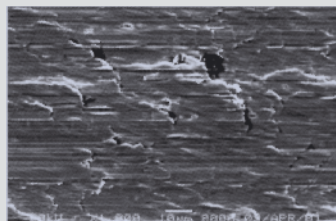
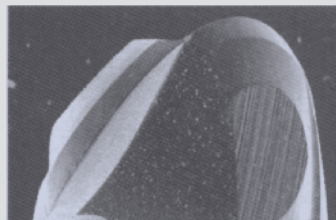
Wet cutting

EPDB Hitachi Tool



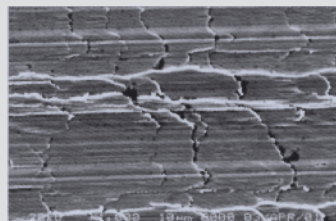
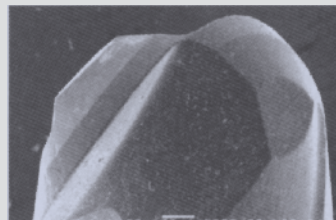
$R_y = 1.2 \mu\text{m}$

Company A



$R_y = 4.5 \mu\text{m}$

Company B

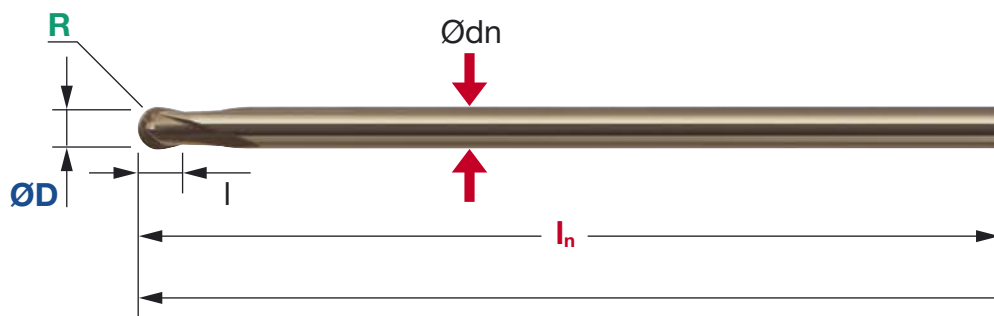
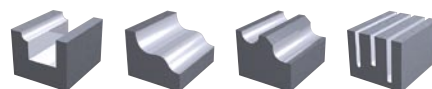


$R_y = 4.8 \mu\text{m}$

High Speed Deep Precision Machining

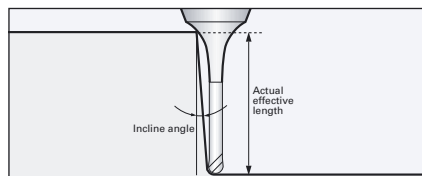
EPDB | Epoch Deep Ball

V max		HRC	No. of Teeth
High Speed		70	2



Carbide	TH45+	Rake Angle
Micro Grain	Nano-PVD Coating	Positive

Helix Angle 20°	
R 0.05 ~ 0.25	± 0.003
R 0.3 ~ 3.0	± 0.005
D 0.1 ~ 0.5	0/-0.006
D 0.6 ~ 6.0	0/-0.010
d	h5



Ø 0.1 – Ø 1.0 mm

ID Code	Item Code	Z	R	Size ØD	I _n	I	Ødn	L	Ød	Actual Effective Length in Incline angles				
										0.5°	1°	1.5°	2°	3°
EP 519	EPDB-2001-0.2	2	0.05	0.1	0.2	0.08	0.08	45	4	0.35	0.37	0.39	0.41	0.44
EP 520	EPDB-2001-0.3	2	0.05	0.1	0.3	0.08	0.08	45	4	0.46	0.48	0.5	0.53	0.57
EP 521	EPDB-2001-0.5	2	0.05	0.1	0.5	0.08	0.08	45	4	0.67	0.7	0.73	0.76	0.81
EP 317	EPDB-2002-0.5	2	0.1	0.2	0.5	0.15	0.17	50	4	1.2	1.35	1.52	1.68	2.01
EP 522	EPDB-2002-1	2	0.1	0.2	1	0.15	0.17	50	4	1.76	1.97	2.17	2.37	2.74
EP 318	EPDB-2002-1.5	2	0.1	0.2	1.5	0.15	0.17	50	4	2.32	2.57	2.8	3.02	3.44
EP 523	EPDB-2002-2	2	0.1	0.2	2	0.15	0.17	50	4	2.88	3.16	3.42	3.66	4.11
EP 319	EPDB-2003-1	2	0.15	0.3	1	0.25	0.27	50	4	1.76	1.96	2.16	2.35	2.72
EP 524	EPDB-2003-1.5	2	0.15	0.3	1.5	0.25	0.27	50	4	2.32	2.56	2.79	3.01	3.42
EP 320	EPDB-2003-2	2	0.15	0.3	2	0.25	0.27	50	4	2.88	3.16	3.41	3.65	4.09
EP 525	EPDB-2003-2.5	2	0.15	0.3	2.5	0.25	0.27	50	4	3.43	3.74	4.02	4.27	4.74
EP 526	EPDB-2003-3	2	0.15	0.3	3	0.25	0.27	50	4	3.98	4.32	4.62	4.89	5.39
EP 321	EPDB-2004-1	2	0.2	0.4	1	0.3	0.37	50	4	1.75	1.95	2.14	2.33	2.7
EP 527	EPDB-2004-2	2	0.2	0.4	2	0.3	0.37	50	4	2.87	3.15	3.4	3.63	4.07
EP 322	EPDB-2004-3	2	0.2	0.4	3	0.3	0.37	50	4	3.97	4.31	4.61	4.88	5.37
EP 528	EPDB-2004-4	2	0.2	0.4	4	0.3	0.37	50	4	5.07	5.45	5.79	6.09	6.63
EP 529	EPDB-2005-1	2	0.25	0.5	1	0.35	0.47	50	4	1.74	1.94	2.13	2.31	2.68
EP 530	EPDB-2005-2	2	0.25	0.5	2	0.35	0.47	50	4	2.86	3.14	3.39	3.62	4.06
EP 531	EPDB-2005-3	2	0.25	0.5	3	0.35	0.47	50	4	3.97	4.3	4.6	4.87	5.36
EP 323	EPDB-2005-4	2	0.25	0.5	4	0.35	0.47	50	4	5.06	5.45	5.78	6.08	6.61
EP 532	EPDB-2005-5	2	0.25	0.5	5	0.35	0.47	50	4	6.15	6.57	6.94	7.26	7.84
EP 324	EPDB-2005-6	2	0.25	0.5	6	0.35	0.47	50	4	7.23	7.69	8.08	8.43	9.05
EP 533	EPDB-2006-2	2	0.3	0.6	2	0.4	0.57	50	4	2.86	3.13	3.38	3.61	4.04
EP 325	EPDB-2006-4	2	0.3	0.6	4	0.4	0.57	50	4	5.06	5.44	5.77	6.07	6.6
EP 534	EPDB-2006-6	2	0.3	0.6	6	0.4	0.57	50	4	7.22	7.69	8.08	8.42	9.04
EP 326	EPDB-2006-8	2	0.3	0.6	8	0.4	0.57	50	4	9.36	9.9	10.34	10.72	11.4
EP 535	EPDB-2006-10	2	0.3	0.6	10	0.4	0.57	50	4	11.49	12.09	12.57	12.99	13.72
EP 327	EPDB-2008-2	2	0.4	0.8	2	0.5	0.77	50	4	2.85	3.11	3.35	3.58	4.01
EP 536	EPDB-2008-4	2	0.4	0.8	4	0.5	0.77	50	4	5.05	5.43	5.75	6.05	6.58
EP 328	EPDB-2008-6	2	0.4	0.8	6	0.5	0.77	50	4	7.21	7.68	8.06	8.41	9.02
EP 537	EPDB-2008-8	2	0.4	0.8	8	0.5	0.77	50	4	9.36	9.89	10.33	10.71	11.38
EP 329	EPDB-2008-10	2	0.4	0.8	10	0.5	0.77	50	4	11.49	12.08	12.56	12.98	13.7
EP 538	EPDB-2010-2	2	0.5	1	2	0.8	0.96	50	4	2.9	3.15	3.37	3.59	4.01
EP 330	EPDB-2010-3	2	0.5	1	3	0.8	0.96	50	4	4	4.31	4.59	4.84	5.32
EP 331	EPDB-2010-4	2	0.5	1	4	0.8	0.96	50	4	5.09	5.45	5.77	6.06	6.58
EP 332	EPDB-2010-6	2	0.5	1	6	0.8	0.96	50	4	7.25	7.7	8.08	8.41	9.02
EP 333	EPDB-2010-8	2	0.5	1	8	0.8	0.96	50	4	9.39	9.91	10.34	10.72	11.38
EP 334	EPDB-2010-10	2	0.5	1	10	0.8	0.96	50	4	11.52	12.09	12.57	12.98	13.7
EP 335	EPDB-2010-12	2	0.5	1	12	0.8	0.96	55	4	13.63	14.26	14.78	15.22	15.99
EP 539	EPDB-2010-14	2	0.5	1	14	0.8	0.96	55	4	15.74	16.42	16.97	17.44	18.54
EP 336	EPDB-2010-16	2	0.5	1	16	0.8	0.96	55	4	17.84	18.56	19.14	19.64	21.2
EP 540	EPDB-2010-18	2	0.5	1	18	0.8	0.96	60	4	19.93	20.7	21.31	21.83	23.85
EP 337	EPDB-2010-20	2	0.5	1	20	0.8	0.96	60	4	22.02	22.83	23.47	24.01	26.51

☉ = New Item

Milling Tools always on Stock in Germany

High Speed Deep Precision Machining



Ø 1.2 – Ø 6.0 mm

ID Code	Item Code	Z	R	Size ØD	I _n	I	Ø _{dn}	L	Ø _d	Actual Effective Length in Incline angles				
										0.5°	1°	1.5°	2°	3°
EP 338	EPDB-2012-8	2	0.6	1.2	8	1.1	1.15	50	4	9.42	9.93	10.35	10.72	11.38
EP 339	EPDB-2012-12	2	0.6	1.2	12	1.1	1.15	55	4	13.66	14.28	14.78	15.23	15.99
EP 340	EPDB-2014-8	2	0.7	1.4	8	1.3	1.34	50	4	9.45	9.94	10.36	10.73	11.38
EP 541	EPDB-2014-12	2	0.7	1.4	12	1.3	1.34	55	4	13.68	14.29	14.79	15.23	15.99
EP 341	EPDB-2014-16	2	0.7	1.4	16	1.3	1.34	55	4	17.88	18.59	19.16	19.65	21.2
EP 542	EPDB-2015-4	2	0.75	1.5	4	1.35	1.44	50	4	5.16	5.49	5.79	6.06	6.57
EP 342	EPDB-2015-8	2	0.75	1.5	8	1.35	1.44	50	4	9.45	9.94	10.35	10.72	11.37
EP 343	EPDB-2015-12	2	0.75	1.5	12	1.35	1.44	55	4	13.68	14.29	14.79	15.23	15.98
EP 543	EPDB-2015-16	2	0.75	1.5	16	1.35	1.44	55	4	17.88	18.59	19.16	19.65	21.18
EP 344	EPDB-2015-20	2	0.75	1.5	20	1.35	1.44	60	4	22.06	22.85	23.48	24.01	x
EP 544	EPDB-2016-8	2	0.8	1.6	8	1.4	1.54	50	4	9.44	9.93	10.35	10.71	11.37
EP 345	EPDB-2016-12	2	0.8	1.6	12	1.4	1.54	55	4	13.68	14.28	14.78	15.22	15.98
EP 545	EPDB-2016-16	2	0.8	1.6	16	1.4	1.54	55	4	17.88	18.58	19.15	19.64	21.16
EP 346	EPDB-2016-20	2	0.8	1.6	20	1.4	1.54	60	4	22.06	22.85	23.47	24.01	x
EP 546	EPDB-2018-8	2	0.9	1.8	8	1.6	1.73	50	4	9.47	9.95	10.36	10.72	11.37
EP 347	EPDB-2018-12	2	0.9	1.8	12	1.6	1.73	55	4	13.79	14.42	14.79	15.41	16.21
EP 547	EPDB-2018-16	2	0.9	1.8	16	1.6	1.73	55	4	18.1	18.87	19.16	20.05	21.16
EP 348	EPDB-2018-20	2	0.9	1.8	20	1.6	1.73	60	4	22.08	22.86	23.48	24.01	x
EP 548	EPDB-2020-3	2	1	2	3	1.7	1.92	50	4	4.16	4.4	4.64	4.86	5.29
EP 549	EPDB-2020-4	2	1	2	4	1.7	1.92	50	4	5.23	5.54	5.81	6.07	6.55
EP 349	EPDB-2020-6	2	1	2	6	1.7	1.92	50	4	7.38	7.77	8.11	8.43	9
EP 350	EPDB-2020-8	2	1	2	8	1.7	1.92	50	4	9.5	9.97	10.37	10.73	11.37
EP 351	EPDB-2020-10	2	1	2	10	1.7	1.92	50	4	11.62	12.15	12.6	12.99	13.69
EP 352	EPDB-2020-12	2	1	2	12	1.7	1.92	55	4	13.73	14.31	14.8	15.23	15.98
EP 353	EPDB-2020-16	2	1	2	16	1.7	1.92	55	4	17.92	18.61	19.17	19.65	x
EP 354	EPDB-2020-20	2	1	2	20	1.7	1.92	60	4	22.1	22.87	23.49	24.02	x
EP 355	EPDB-2020-25	2	1	2	25	1.7	1.92	65	4	27.3	28.16	28.84	x	x
EP 356	EPDB-2020-30	2	1	2	30	1.7	1.92	70	4	32.49	33.42	34.29	x	x
EP 550	EPDB-2020-35	2	1	2	35	1.7	1.92	75	4	37.65	38.67	x	x	x
EP 551	EPDB-2020-40	2	1	2	40	1.7	1.92	80	4	42.81	43.89	x	x	x
EP 552	EPDB-2030-8	2	1.5	3	8	2.5	2.88	55	6	9.61	10.03	10.4	10.74	11.35
EP 357	EPDB-2030-10	2	1.5	3	10	2.5	2.88	55	6	11.72	12.21	12.63	13	13.67
EP 553	EPDB-2030-16	2	1.5	3	16	2.5	2.88	60	6	18.01	18.65	19.19	19.66	21.13
EP 358	EPDB-2030-25	2	1.5	3	25	2.5	2.88	70	6	27.37	28.2	28.86	29.96	x
EP 554	EPDB-2030-30	2	1.5	3	30	2.5	2.88	75	6	32.55	33.46	34.32	35.94	x
EP 359	EPDB-2030-35	2	1.5	3	35	2.5	2.88	80	6	37.71	38.7	40.03	41.92	x
EP 555	EPDB-2040-10	2	2	4	10	3	3.9	55	6	11.63	12.11	12.53	12.9	13.57
EP 360	EPDB-2040-16	2	2	4	16	3	3.9	60	6	17.93	18.58	19.11	19.58	20.91
EP 556	EPDB-2040-25	2	2	4	25	3	3.9	70	6	27.31	28.14	28.8	29.81	x
EP 361	EPDB-2040-35	2	2	4	35	3	3.9	80	6	37.66	38.65	39.9	x	x
EP 557	EPDB-2050-40	2	2	4	40	3	3.9	80	6	42.82	43.87	x	x	x
EP 362	EPDB-2040-50	2	2	4	50	3	3.9	100	6	53.11	54.55	x	x	x
EP 363	EPDB-2050-25	2	2.5	5	25	3.5	4.9	70	6	27.29	28.11	x	x	x
EP 364	EPDB-2050-40	2	2.5	5	40	3.5	4.9	80	6	42.8	x	x	x	x
EP 365	EPDB-2060-30	2	3	6	30	6	5.9	75	6	x	x	x	x	x
EP 366	EPDB-2060-50	2	3	6	50	6	5.9	100	6	x	x	x	x	x

⊙ = New Item

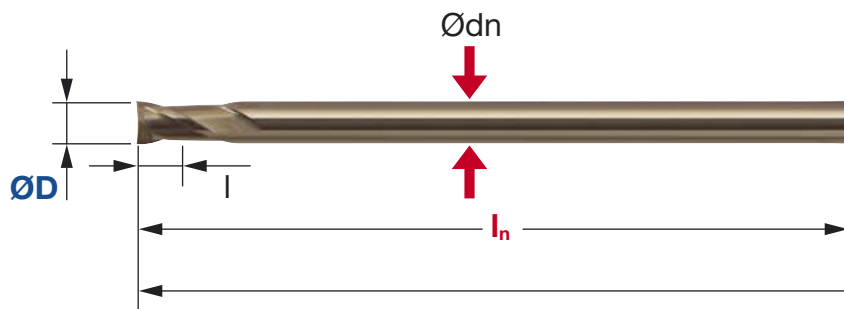
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x = no contact

High Speed Deep Precision Machining

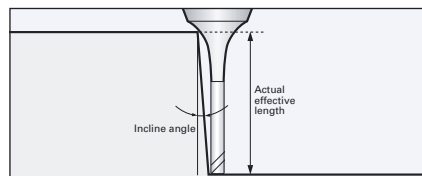
EPDS | Epoch Deep Square

V max	HRC	No. of Teeth
High Speed	70	2



Carbide	TH45+	Rake Angle
Micro Grain	Nano-PVD Coating	Positive

Helix Angle	30°
D 0.1 ~ 0.5	0/-0.007
D 0.6 ~ 0.9	0/-0.010
D 1.0 ~ 4.0	0/-0.015
d	h5



Ø 0.1 – Ø 1.0 mm

ID Code	Item Code	Z	Size ØD	In	L	Ødn	L	Ød	Actual Effective Length in Incline angles				
									0.5°	1°	1.5°	2°	3°
EP 558 ©	EPDS-2001-0,3	2	0.1	0.3	0.15	0.08	45	4	0.46	0.49	0.51	0.53	0.58
EP 559 ©	EPDS-2001-0,5	2	0.1	0.5	0.15	0.08	45	4	0.67	0.71	0.74	0.76	0.82
EP 560 ©	EPDS-2001-1	2	0.1	1	0.15	0.08	45	4	1.2	1.25	1.29	1.33	1.4
EP 267	EPDS-2002-0,5	2	0.2	0.5	0.3	0.17	50	4	1.21	1.38	1.55	1.72	2.06
EP 561 ©	EPDS-2002-1	2	0.2	1	0.3	0.17	50	4	1.78	1.99	2.2	2.4	2.78
EP 268	EPDS-2002-1,5	2	0.2	1.5	0.3	0.17	50	4	2.34	2.59	2.83	3.05	3.47
EP 562 ©	EPDS-2003-1	2	0.3	1	0.45	0.27	50	4	1.78	1.99	2.2	2.4	2.78
EP 269	EPDS-2003-1,5	2	0.3	1.5	0.45	0.27	50	4	2.34	2.59	2.83	3.05	3.47
EP 563 ©	EPDS-2003-2,5	2	0.3	2.5	0.45	0.27	50	4	3.44	3.76	4.05	4.31	4.79
EP 270	EPDS-2003-3	2	0.3	3	0.45	0.27	50	4	3.99	4.34	4.64	4.92	5.42
EP 565 ©	EPDS-2004-1	2	0.4	1	0.6	0.37	50	4	1.78	1.99	2.2	2.4	2.78
EP 271	EPDS-2004-1,5	2	0.4	1.5	0.6	0.37	50	4	2.34	2.59	2.83	3.05	3.47
EP 566 ©	EPDS-2004-2	2	0.4	2	0.6	0.37	50	4	2.89	3.18	3.44	3.69	4.14
EP 272	EPDS-2004-3	2	0.4	3	0.6	0.37	50	4	3.99	4.34	4.64	4.92	5.42
EP 588 ©	EPDS-2004-4	2	0.4	4	0.6	0.37	50	4	5.08	5.48	5.82	6.12	6.67
EP 273	EPDS-2004-5	2	0.4	5	0.6	0.37	50	4	6.17	6.6	6.97	7.3	7.89
EP 567 ©	EPDS-2005-1	2	0.5	1	0.75	0.47	50	4	1.78	1.99	2.2	2.4	2.78
EP 274	EPDS-2005-2	2	0.5	2	0.75	0.47	50	4	2.89	3.18	3.44	3.69	4.14
EP 568 ©	EPDS-2005-3	2	0.5	3	0.75	0.47	50	4	3.99	4.34	4.64	4.92	5.42
EP 275	EPDS-2005-4	2	0.5	4	0.75	0.47	50	4	5.08	5.48	5.82	6.12	6.67
EP 569 ©	EPDS-2005-5	2	0.5	5	0.75	0.47	50	4	6.17	6.6	6.97	7.3	7.89
EP 276	EPDS-2005-6	2	0.5	6	0.75	0.47	50	4	7.24	7.72	8.12	8.47	9.09
EP 570 ©	EPDS-2006-2	2	0.6	2	0.9	0.57	50	4	2.89	3.18	3.44	3.69	4.14
EP 277	EPDS-2006-4	2	0.6	4	0.9	0.57	50	4	5.08	5.48	5.82	6.12	6.67
EP 571 ©	EPDS-2006-6	2	0.6	6	0.9	0.57	50	4	7.24	7.72	8.12	8.47	9.09
EP 278	EPDS-2006-8	2	0.6	8	0.9	0.57	50	4	9.38	9.93	10.37	10.76	11.45
EP 279	EPDS-2007-4	2	0.7	4	1.05	0.67	50	4	5.08	5.48	5.82	6.12	6.67
EP 280	EPDS-2007-10	2	0.7	10	1.05	0.67	50	4	11.51	12.11	12.6	13.03	13.76
EP 281	EPDS-2008-4	2	0.8	4	1.2	0.77	50	4	5.08	5.48	5.82	6.12	6.67
EP 572 ©	EPDS-2008-6	2	0.8	6	1.2	0.77	50	4	7.24	7.72	8.12	8.47	9.09
EP 282	EPDS-2008-8	2	0.8	8	1.2	0.77	50	4	9.38	9.93	10.37	10.76	11.45
EP 283	EPDS-2008-12	2	0.8	12	1.2	0.77	55	4	13.63	14.28	14.81	15.26	16.04
EP 284	EPDS-2009-6	2	0.9	6	1.35	0.86	60	4	7.29	7.75	8.14	8.49	9.11
EP 285	EPDS-2009-12	2	0.9	12	1.35	0.86	55	4	13.66	14.3	14.82	15.28	16.06
EP 573 ©	EPDS-2010-2	2	1	2	1.5	0.96	50	4	2.95	3.23	3.48	3.72	4.17
EP 574 ©	EPDS-2010-4	2	1	4	1.5	0.96	50	4	5.13	5.52	5.85	6.15	6.69
EP 286	EPDS-2010-6	2	1	6	1.5	0.96	50	4	7.29	7.75	8.14	8.49	9.11
EP 287	EPDS-2010-8	2	1	8	1.5	0.96	50	4	9.42	9.95	10.4	10.78	11.46
EP 288	EPDS-2010-10	2	1	10	1.5	0.96	50	4	11.55	12.14	12.62	13.04	13.78
EP 289	EPDS-2010-12	2	1	12	1.5	0.96	55	4	13.66	14.3	14.82	15.28	16.06
EP 290	EPDS-2010-14	2	1	14	1.5	0.96	55	4	15.76	16.46	17.01	17.49	18.7
EP 291	EPDS-2010-16	2	1	16	1.5	0.96	55	4	17.86	18.6	19.19	19.69	21.36

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High Speed Deep Precision Machining



Ø 1.2 – Ø 4.0 mm

ID Code	Item Code	Z	Size		l	Ødn	L	Ød	Actual Effective Length in Incline angles				
			ØD	l _n					0.5°	1°	1.5°	2°	3°
EP 292	EPDS-2012-6	2	1.2	6	1.8	1.15	50	4	7.33	7.78	8.17	8.51	9.13
EP 293	EPDS-2012-12	2	1.2	12	1.8	1.15	55	4	13.69	14.33	14.84	15.29	16.08
EP 294	EPDS-2014-6	2	1.4	6	2.1	1.34	50	4	7.37	7.81	8.19	8.54	9.15
EP 295	EPDS-2014-10	2	1.4	10	2.1	1.34	50	4	11.61	12.19	12.66	13.08	13.8
EP 296	EPDS-2014-16	2	1.4	16	2.1	1.34	55	4	17.92	18.64	19.22	19.72	21.42
EP 575	EPDS-2015-4	2	1.5	4	2.25	1.44	50	4	5.22	5.59	5.91	6.2	6.74
EP 297	EPDS-2015-6	2	1.5	6	2.25	1.44	50	4	7.37	7.81	8.19	8.54	9.15
EP 576	EPDS-2015-10	2	1.5	10	2.25	1.44	50	4	11.61	12.19	12.66	13.08	13.8
EP 298	EPDS-2015-12	2	1.5	12	2.25	1.44	55	4	13.72	14.35	14.86	15.31	16.11
EP 577	EPDS-2015-16	2	1.5	16	2.25	1.44	55	4	17.92	18.64	19.22	19.72	x
EP 299	EPDS-2015-18	2	1.5	18	2.25	1.44	60	4	20.01	20.77	21.38	21.9	x
EP 300	EPDS-2015-25	2	1.5	25	2.25	1.44	65	4	27.3	28.18	28.88	30.08	x
EP 301	EPDS-2016-6	2	1.6	6	2.4	1.54	50	4	7.37	7.81	8.19	8.54	9.15
EP 302	EPDS-2016-12	2	1.6	12	2.4	1.54	55	4	13.72	14.35	14.86	15.31	16.11
EP 303	EPDS-2016-20	2	1.6	20	2.4	1.54	60	4	22.09	22.9	23.53	24.1	x
EP 304	EPDS-2018-8	2	1.8	8	2.7	1.73	50	4	9.53	10.04	10.46	10.84	11.51
EP 305	EPDS-2018-14	2	1.8	14	2.7	1.73	55	4	15.85	16.52	17.06	17.54	18.8
EP 306	EPDS-2018-20	2	1.8	20	2.7	1.73	60	4	22.12	22.91	23.55	24.12	x
EP 578	EPDS-2020-4	2	2	4	3	1.92	50	4	5.31	5.66	5.97	6.25	6.78
EP 579	EPDS-2020-6	2	2	6	3	1.92	50	4	7.44	7.87	8.24	8.58	9.18
EP 307	EPDS-2020-8	2	2	8	3	1.92	50	4	9.56	10.06	10.48	10.86	11.53
EP 580	EPDS-2020-10	2	2	10	3	1.92	50	4	11.67	12.23	12.7	13.11	13.83
EP 308	EPDS-2020-12	2	2	12	3	1.92	55	4	13.78	14.39	14.9	15.34	16.17
EP 309	EPDS-2020-16	2	2	16	3	1.92	55	4	17.97	18.68	19.25	19.75	x
EP 310	EPDS-2020-20	2	2	20	3	1.92	60	4	22.14	22.93	23.56	24.15	x
EP 582	EPDS-2020-25	2	2	25	3	1.92	65	4	27.34	28.22	28.91	x	x
EP 311	EPDS-2020-30	2	2	30	3	1.92	70	4	32.52	33.47	34.43	x	x
EP 312	EPDS-2025-12	2	2.5	12	3.75	2.4	55	4	13.84	14.43	14.93	15.37	x
EP 313	EPDS-2025-20	2	2.5	20	3.75	2.4	60	4	22.19	22.96	23.59	x	x
EP 583	EPDS-2030-8	2	3	8	4.5	2.88	60	6	9.69	10.16	10.57	10.94	11.59
EP 314	EPDS-2030-12	2	3	12	4.5	2.88	60	6	13.89	14.48	14.97	15.4	16.3
EP 315	EPDS-2030-20	2	3	20	4.5	2.88	70	6	22.24	23	23.62	24.26	26.92
EP 316	EPDS-2030-30	2	3	30	4.5	2.88	80	6	32.6	33.53	34.53	36.23	x
EP 584	EPDS-2040-12	2	4	12	6	3.85	60	6	13.97	14.54	15.02	15.45	16.39
EP 585	EPDS-2040-20	2	4	20	6	3.85	70	6	22.3	23.05	23.66	24.35	x
EP 586	EPDS-2040-30	2	4	30	6	3.85	80	6	32.65	33.57	34.61	x	x
EP 587	EPDS-2040-40	2	4	40	6	3.85	90	6	42.96	44.01	x	x	x

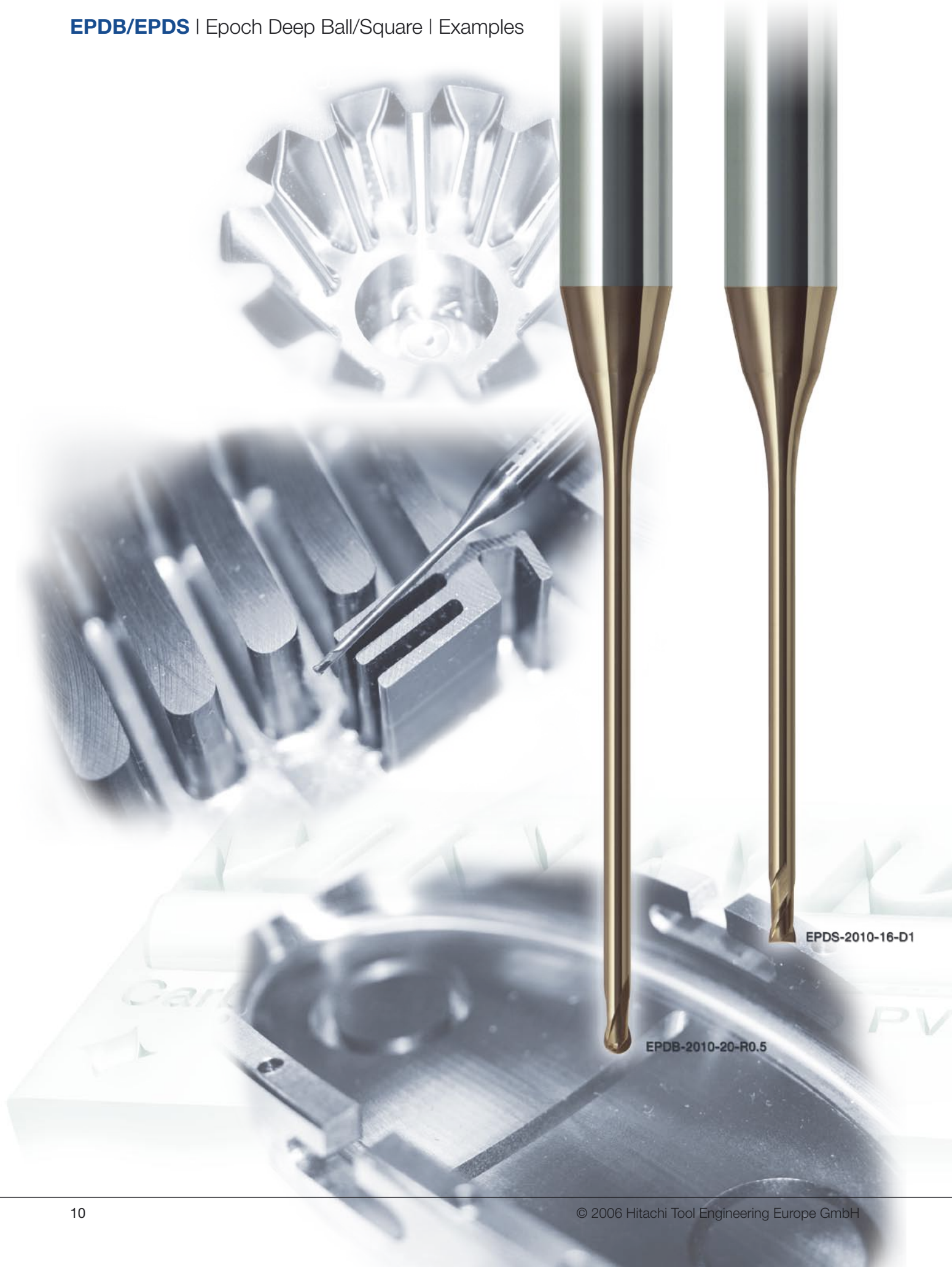
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High Speed Deep Precision Machining

EPDB/EPDS | Epoch Deep Ball/Square | Examples



EPDS-2010-16-D1

EPDB-2010-20-R0.5

High Speed Deep Precision Machining

EPDB/EPDS | Epoch Deep Ball/Square | Recommended Cutting Conditions

**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.

**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.

**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.

**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.

**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.



Ø D mm	l _n mm	Ball EPDB	Catalogue ID Code	Square EPDS	Catalogue ID Code
0.1	0.2	●	EP 519		
	0.3	●	EP 520	●	EP 558
	0.5	●	EP 521	●	EP 559
	1			●	EP 560
0.2	0.5	●	EP 317	●	EP 267
	1	●	EP 522	●	EP 561
	1.5	●	EP 318	●	EP 268
	2	●	EP 523		
0.3	1	●	EP 319	●	EP 562
	1.5	●	EP 524	●	EP 269
	2	●	EP 320		
	2.5	●	EP 525	●	EP 563
0.4	3	●	EP 526	●	EP 270
	1	●	EP 321	●	EP 565
	1.5			●	EP 271
	2	●	EP 527	●	EP 566
0.5	3	●	EP 322	●	EP 272
	4	●	EP 528	●	EP 588
	5			●	EP 273
	1	●	EP 529	●	EP 567
0.6	2	●	EP 530	●	EP 274
	3	●	EP 531	●	EP 568
	4	●	EP 323	●	EP 275
	5	●	EP 532	●	EP 569
0.7	6	●	EP 324	●	EP 276
	2	●	EP 533	●	EP 570
	4	●	EP 325	●	EP 277
	6	●	EP 534	●	EP 571
0.8	8	●	EP 326	●	EP 278
	10	●	EP 535		
	4			●	EP 279
	10			●	EP 280
0.9	2	●	EP 327		
	4	●	EP 536	●	EP 281
	6	●	EP 328	●	EP 572
	8	●	EP 537	●	EP 282
1	10	●	EP 329		
	12			●	EP 283
	6			●	EP 284
	12			●	EP 285
1.2	2	●	EP 538	●	EP 573
	3	●	EP 330		
	4	●	EP 331	●	EP 574
	6	●	EP 332	●	EP 286
1.4	8	●	EP 333	●	EP 287
	10	●	EP 334	●	EP 288
	12	●	EP 335	●	EP 289
	14	●	EP 539	●	EP 290
1.6	16	●	EP 336	●	EP 291
	18	●	EP 540		
	20	●	EP 337		
	6			●	EP 292
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	12	●	EP 339	●	EP 293
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	8	●	EP 340		
2	10			●	EP 295
	12	●	EP 541		
	16	●	EP 341	●	EP 296

Ø D mm	l _n mm	Ball EPDB	Catalogue ID Code	Square EPDS	Catalogue ID Code
1.5	4	●	EP 542	●	EP 575
	6			●	EP 297
	8	●	EP 342		
	10			●	EP 576
1.6	12	●	EP 343	●	EP 298
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	18			●	EP 299
	20	●	EP 344		
1.8	25			●	EP 300
	6			●	EP 301
	8	●	EP 544		
	12	●	EP 345	●	EP 302
2	16	●	EP 545		
	20	●	EP 346	●	EP 303
	8	●	EP 546	●	EP 304
	12	●	EP 347		
2.5	14			●	EP 305
	16	●	EP 547		
	20	●	EP 348	●	EP 306
	3	●	EP 548		
3	4	●	EP 549	●	EP 578
	6	●	EP 349	●	EP 579
	8	●	EP 350	●	EP 307
	10	●	EP 351	●	EP 580
4	12	●	EP 352	●	EP 308
	16	●	EP 353	●	EP 309
	20	●	EP 354	●	EP 310
	25	●	EP 355	●	EP 582
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	35	●	EP 550		
	40	●	EP 551		
	12			●	EP 312
6	20			●	EP 313
	8	●	EP 552	●	EP 583
	10	●	EP 357		
	12			●	EP 314
7	16	●	EP 553		
	20			●	EP 315
	25	●	EP 358		
	30	●	EP 554	●	EP 316
8	35	●	EP 359		
	10	●	EP 555		
	12			●	EP 584
	16	●	EP 360		
9	20			●	EP 585
	25	●	EP 556		
	30			●	EP 586
	35	●	EP 361		
10	40	●	EP 557	●	EP 587
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Ball Type

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EPDB

Ø 0.1 ~ 6 mm

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Square Type

Page

EPDS

Ø 0.1 ~ 4 mm

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Product Range

Solid Carbide End Mills



Indexable Milling Tools

ESM Speed End Mills
EMC Power Drills

Milling Chucks



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