

**Richiedete il nostro
catalogo completo!**

Utensili EXPERT **OTTONE**



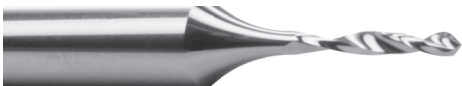
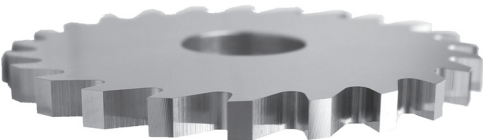
Utensili EXPERT raccomandati per la lavorazione dell'ottone

Materia dell'utensile : **METALLO DURO**

Rivestimento consigliato : Nessuno per le applicazioni normali.

SOLO per le applicazioni ad alta produttività o per l'ottone senza piombo.

Gli utensili in PCD possono essere utilizzati anche nella lavorazione del ottone e del ottone senza piombo con dei risultati eccellenti.

Operazione	Rif.	Foto	Pagina
Perforazione	375		4
Fresatura	1820		5
Tagli	223/223-1/223-2		6/11/17
Filettare	5200		22
Incisione	119-3		23
Utensili con profilo speciale	Hélicoïdale		A richiesta

Questa tabella presenta unicamente un utensile ottimale per tipo d'operazione, troverete altri utensili adattati alla lavorazione degli ottone nel nostro catalogo.

Index - Ottone

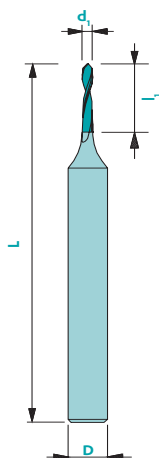
N° Wsn	DIN	AFNOR	Gr.	N° Wsn	DIN	AFNOR	Gr.
2.0025	CuZn20		a	2.1080	CuSn6Zn6		b
2.0205	CuZn0.5		a	2.1160	CuPb1P		a
2.0220	CuZn5		a	2.1191	CuAg0.1P		a
2.0230	CuZn10		a	2.1203	CuAg0.1		a
2.0240	CuZn15		a	2.1245	CuBe1.7		b
2.0250	CuZn20		a	2.1247	CuBe2		b
2.0261	CuZn28		a	2.1248	CuBe2Pb		b
2.0265	CuZn30	CuZn30 (UZ30)	a	2.1265	CuCd0.5		a
2.0280	CuZn33		a	2.1266	CuCd1		a
2.0321	CuZn37		a	2.1285	CuCo2Be		b
2.0330	CuZn36Pb1		a	2.1293	CuCrZr		b
2.0331	CuZn36Pb0.5		a	2.1310	CuFe2P		b
2.0332	CuZn37Pb0.5		a	2.1322	CuMg0.4		a
2.0335	CuZn36	Ms63	a	2.1323	CuMg0.7		a
2.0360	CuZn40	Ms60	a	2.1356	CuMn3		a
2.0371	CuZn38Pb1.5		a	2.1363	CuMn2		a
2.0372	CuZn39Pb0.5		a	2.1366	CuMn5		a
2.0375	CuZn36Pb3	CuZn36Pb3	a	2.1491	CuAsP		a
2.0380	CuZn39Pb2		a	2.1498	CuSP		a
2.0401	CuZn39Pb3		a	2.1522	CuSuMnF34		a
2.0402	CuZn40Pb2	CuZn40Pb3	a	2.1522	CuSi2Mn		a
2.0410	CuZn44Pb2		a	2.1525	CuSi3Mn		a
2.0460	CuZn20Al2		a	2.1546	CuTeP		a
2.0470	CuZn28Sn1		a	2.1580	CuZr		b
2.0490	CuZn31Si1		a				
2.0500	CuZn23Al6Mn4Fe3		a				
2.0510	CuZn37Al1		a				
2.0525	CuZn38SnAl		a				
2.0530	CuZn38Sn1		a				
2.0540	CuZn35Ni2		a				
2.0550	CuZn40Al2		a				
2.0561	CuZn40Al1		a				
2.0572	CuZn40Mn1		a				
2.0580	CuZn40Mn1Pb		a				
2.0730	CuNi12Zn24	Maillechort	b				
2.0740	CuNi18Zn20	Maillechort	b				
2.0742	CuNi18Zn27	Maillechort	b				
2.0771	CuNi7Zn39Mn5Pb3		b				
2.0780	CuNi12Zn30Pb1		b				
2.0790	CuNi18Zn19Pb1		b				
2.0830	CuNi25		b				
2.0842	CuNi44Mn1		b				
2.0850	CuNi2Be		b				
2.0853	CuNi1.5Si		b				
2.0855	CuNi2Si		b				
2.0857	CuNi3Si		b				
2.0872	CuNi10Fe1Mn		b				
2.0875	CuNi9Sn2		b				
2.0882	CuNi30Mn1Fe		b				
2.0883	CuNi30Fe2Mn2		b				
2.0918	CuAl5As		a				
2.0920	CuAl8		a				
2.0932	CuAl8Fe3		b				
2.0936	CuAl10Fe3Mn2		b				
2.0960	CuAl9Mn2		b				
2.0966	CuAl10Ni5Fe4		b				
2.0971	CuAl9Ni3Fe2		b				
2.0978	CuAl11Ni6Fe5		b				
2.1016	CuSn4		b				
2.1020	CuSn6	CuSn6P	b				
2.1030	CuSn8	CuSn8P	b				



Disponibile con o
senza rivestimento



90°

Z2
 λ
Variable
CARB**Gruppo materia (vedi pagina 3)**

	a	b
Rivestimento consigliato	Solo	Solo
V_c non rivestito [m/min]	115	55
V_c rivestito [m/min]	130	60
F [mm]	$\emptyset/40$	$\emptyset/80$
Sblocco	-	-

Tolleranze
 d_1 : -0.002/-0.004
 l_1 : 0.1/-0
D: h5

Art. n°

 d_1 l_1

D

L

375d#.#

0.20-0.29

1.0

3

38

375d#.#

0.30-0.34

1.5

3

38

375d#.#

0.35-0.39

2.0

3

38

375d#.#

0.40-0.49

3.0

3

38

375d#.#

0.50-0.79

4.0

3

38

375d#.#

0.80-1.19

6.0

3

38

375d#.#

1.20-1.50

8.0

3

38

Formule

$$F = F_z \cdot Z$$

$$V_f = F_z \cdot Z \cdot n$$

$$n = \frac{V_c \cdot 1000}{\pi \cdot d_1}$$

$$V_c = \frac{\pi \cdot d_1 \cdot n}{1000}$$

$$f_z = \frac{V_f}{Z \cdot n}$$

Leggenda

F [mm]: Avanzamento per giro

FZ [mm]: Avanzamento per dente

Z: Numero di denti

n: Numero di giri al minuto

Vf [mm/min]: Velocità d'avanzamento

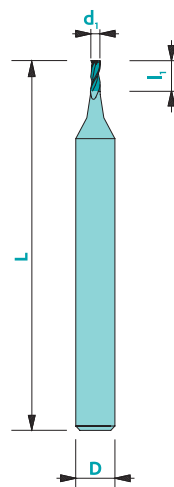
Fraisa EXPERT per ottone - denti elicoidali



1820

Gruppo materia (vedi pagina 3)	a	b
Rivestimento consigliato	Solo	Solo
V_c non rivestito [m/min]	130	110
V_c rivestito [m/min]	160	130
$F_z \varnothing 0.25$ [mm]	0.002	0.002
$F_z \varnothing 0.50$ [mm]	0.003	0.003
$F_z \varnothing 1.00$ [mm]	0.005	0.005
$F_z \varnothing 2.00$ [mm]	0.010	0.010
$F_z \varnothing 4.00$ [mm]	0.020	0.020
$F_z \varnothing 6.00$ [mm]	0.030	0.030
$F_z \varnothing 8.00$ [mm]	0.040	0.040
$F_z \varnothing 10.00$ [mm]	0.050	0.050
$F_z \varnothing 12.00$ [mm]	0.070	0.070
$F_z \varnothing 16.00$ [mm]	0.090	0.090
$F_z \varnothing 20.00$ [mm]	0.120	0.120

Tolleranze $d_1 \leq 1 \text{ mm} \rightarrow +0/-0.01$ $D: h5$
 $d_1 > 1 \text{ mm} \rightarrow +0/-0.02$



Disponibile con o senza rivestimento

Art. n°	d_1	l_1	D	L
1820d0.50	0.50	1.00	4	38
1820d0.80	0.80	1.60	4	38
1820d1.00	1.00	2.00	4	38
1820d1.50	1.50	3.00	4	38
1820d2.00	2.00	4.00	4	38
1820d3.00	3.00	5.00	4	38

Altre dimensioni a richiesta



Z3



λ
30°

CARB



$ap=0.35xd_1$



$ae=0.5xd_1$
 $ap=0.5xd_1$

Formule

$$F = F_z \cdot Z$$

$$V_f = F_z \cdot Z \cdot n$$

$$n = \frac{V_c \cdot 1000}{\pi \cdot d_1}$$

$$V_c = \frac{\pi \cdot d_1 \cdot n}{1000}$$

$$f_z = \frac{V_f}{Z \cdot n}$$

Leggenda

F [mm]: Avanzamento per giro

FZ [mm]: Avanzamento per dente

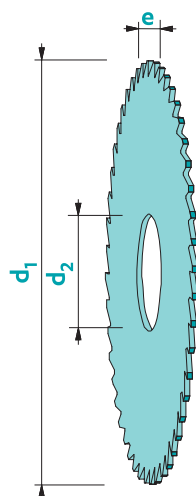
Z: Numero di denti

n: Numero di giri al minuto

Vf [mm/min]: Velocità d'avanzamento



Disponibile con o
senza rivestimento



Gruppo materia (vedi pagina 3)

	a	b
Rivestimento consigliato	Solo	Solo
V_c non rivestito [m/min]	300	160
V_c rivestito [m/min]	400	250
F_z [mm]	$\varnothing/10000$	$\varnothing/10000$

Tolleranze e: +0/-0.01
d₂: H7

	Z 20-80
λ 0°	γ 8°
CARB	

Formule

$$F = F_z \cdot Z$$

$$V_f = F_z \cdot Z \cdot n$$

$$n = \frac{V_c \cdot 1000}{\pi \cdot d_1}$$

$$V_c = \frac{\pi \cdot d_1 \cdot n}{1000}$$

$$f_z = \frac{V_f}{Z \cdot n}$$

Leggenda

F [mm]: Avanzamento per giro

FZ [mm]: Avanzamento per dente

Z: Numero di denti

n: Numero di giri al minuto

Vf [mm/min]: Velocità d'avanzamento

Art. n°	d ₁	e	d ₂	Z
223d15e0.20a5Z20	15	0.20	5	20
223d15e0.25a5Z20	15	0.25	5	20
223d15e0.30a5Z20	15	0.30	5	20
223d15e0.35a5Z20	15	0.35	5	20
223d15e0.40a5Z20	15	0.40	5	20
223d15e0.45a5Z20	15	0.45	5	20
223d15e0.50a5Z20	15	0.50	5	20
223d15e0.60a5Z20	15	0.60	5	20
223d15e0.70a5Z20	15	0.70	5	20
223d15e0.80a5Z20	15	0.80	5	20
223d15e0.90a5Z20	15	0.90	5	20
223d15e1.00a5Z20	15	1.00	5	20
223d15e1.10a5Z20	15	1.10	5	20
223d15e1.20a5Z20	15	1.20	5	20
223d15e1.30a5Z20	15	1.30	5	20
223d15e1.40a5Z20	15	1.40	5	20
223d15e1.50a5Z20	15	1.50	5	20
223d15e1.60a5Z20	15	1.60	5	20
223d15e1.70a5Z20	15	1.70	5	20
223d15e1.80a5Z20	15	1.80	5	20
223d15e1.90a5Z20	15	1.90	5	20
223d15e2.00a5Z20	15	2.00	5	20
223d15e2.10a5Z20	15	2.10	5	20
223d15e2.20a5Z20	15	2.20	5	20
223d15e2.30a5Z20	15	2.30	5	20
223d15e2.40a5Z20	15	2.40	5	20
223d15e2.50a5Z20	15	2.50	5	20
223d15e2.60a5Z20	15	2.60	5	20
223d15e2.70a5Z20	15	2.70	5	20
223d15e2.80a5Z20	15	2.80	5	20
223d15e2.90a5Z20	15	2.90	5	20
223d15e3.00a5Z20	15	3.00	5	20

Art. n°	d ₁	e	d ₂	Z
223d15e3.10a5Z20	15	3.10	5	20
223d15e3.20a5Z20	15	3.20	5	20
223d15e3.30a5Z20	15	3.30	5	20
223d15e3.40a5Z20	15	3.40	5	20
223d15e3.50a5Z20	15	3.50	5	20
223d15e3.60a5Z20	15	3.60	5	20
223d15e3.70a5Z20	15	3.70	5	20
223d15e3.80a5Z20	15	3.80	5	20
223d15e3.90a5Z20	15	3.90	5	20
223d15e4.00a5Z20	15	4.00	5	20
223d15e4.50a5Z20	15	4.50	5	20
223d15e5.00a5Z20	15	5.00	5	20
223d15e5.50a5Z20	15	5.50	5	20
223d15e6.00a5Z20	15	6.00	5	20
223d20e0.20a5Z20	20	0.20	5	20
223d20e0.25a5Z20	20	0.25	5	20
223d20e0.30a5Z20	20	0.30	5	20
223d20e0.35a5Z20	20	0.35	5	20
223d20e0.40a5Z20	20	0.40	5	20
223d20e0.45a5Z20	20	0.45	5	20
223d20e0.50a5Z20	20	0.50	5	20
223d20e0.60a5Z20	20	0.60	5	20
223d20e0.70a5Z20	20	0.70	5	20
223d20e0.80a5Z20	20	0.80	5	20
223d20e0.90a5Z20	20	0.90	5	20
223d20e1.00a5Z20	20	1.00	5	20
223d20e1.10a5Z20	20	1.10	5	20
223d20e1.20a5Z20	20	1.20	5	20
223d20e1.30a5Z20	20	1.30	5	20
223d20e1.40a5Z20	20	1.40	5	20
223d20e1.50a5Z20	20	1.50	5	20
223d20e1.60a5Z20	20	1.60	5	20

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Continuazione

Art. n°	d ₁	e	d ₂	Z
223d20e1.70a5Z20	20	1.70	5	20
223d20e1.80a5Z20	20	1.80	5	20
223d20e1.90a5Z20	20	1.90	5	20
223d20e2.00a5Z20	20	2.00	5	20
223d20e2.10a5Z20	20	2.10	5	20
223d20e2.20a5Z20	20	2.20	5	20
223d20e2.30a5Z20	20	2.30	5	20
223d20e2.40a5Z20	20	2.40	5	20
223d20e2.50a5Z20	20	2.50	5	20
223d20e2.60a5Z20	20	2.60	5	20
223d20e2.70a5Z20	20	2.70	5	20
223d20e2.80a5Z20	20	2.80	5	20
223d20e2.90a5Z20	20	2.90	5	20
223d20e3.00a5Z20	20	3.00	5	20
223d20e3.10a5Z20	20	3.10	5	20
223d20e3.20a5Z20	20	3.20	5	20
223d20e3.30a5Z20	20	3.30	5	20
223d20e3.40a5Z20	20	3.40	5	20
223d20e3.50a5Z20	20	3.50	5	20
223d20e3.60a5Z20	20	3.60	5	20
223d20e3.70a5Z20	20	3.70	5	20
223d20e3.80a5Z20	20	3.80	5	20
223d20e3.90a5Z20	20	3.90	5	20
223d20e4.00a5Z20	20	4.00	5	20
223d20e4.50a5Z20	20	4.50	5	20
223d20e5.00a5Z20	20	5.00	5	20
223d20e5.50a5Z20	20	5.50	5	20
223d20e6.00a5Z20	20	6.00	5	20
223d25e0.20a8Z20	25	0.20	8	20
223d25e0.25a8Z20	25	0.25	8	20
223d25e0.30a8Z20	25	0.30	8	20
223d25e0.35a8Z20	25	0.35	8	20
223d25e0.40a8Z20	25	0.40	8	20
223d25e0.45a8Z20	25	0.45	8	20
223d25e0.50a8Z20	25	0.50	8	20
223d25e0.60a8Z20	25	0.60	8	20
223d25e0.70a8Z20	25	0.70	8	20
223d25e0.80a8Z20	25	0.80	8	20
223d25e0.90a8Z20	25	0.90	8	20
223d25e1.00a8Z20	25	1.00	8	20
223d25e1.10a8Z20	25	1.10	8	20
223d25e1.20a8Z20	25	1.20	8	20
223d25e1.30a8Z20	25	1.30	8	20
223d25e1.40a8Z20	25	1.40	8	20
223d25e1.50a8Z20	25	1.50	8	20
223d25e1.60a8Z20	25	1.60	8	20
223d25e1.70a8Z20	25	1.70	8	20

Art. n°	d ₁	e	d ₂	Z
223d25e1.80a8Z20	25	1.80	8	20
223d25e1.90a8Z20	25	1.90	8	20
223d25e2.00a8Z20	25	2.00	8	20
223d25e2.10a8Z20	25	2.10	8	20
223d25e2.20a8Z20	25	2.20	8	20
223d25e2.30a8Z20	25	2.30	8	20
223d25e2.40a8Z20	25	2.40	8	20
223d25e2.50a8Z20	25	2.50	8	20
223d25e2.60a8Z20	25	2.60	8	20
223d25e2.70a8Z20	25	2.70	8	20
223d25e2.80a8Z20	25	2.80	8	20
223d25e2.90a8Z20	25	2.90	8	20
223d25e3.00a8Z20	25	3.00	8	20
223d25e3.10a8Z20	25	3.10	8	20
223d25e3.20a8Z20	25	3.20	8	20
223d25e3.30a8Z20	25	3.30	8	20
223d25e3.40a8Z20	25	3.40	8	20
223d25e3.50a8Z20	25	3.50	8	20
223d25e3.60a8Z20	25	3.60	8	20
223d25e3.70a8Z20	25	3.70	8	20
223d25e3.80a8Z20	25	3.80	8	20
223d25e3.90a8Z20	25	3.90	8	20
223d25e4.00a8Z20	25	4.00	8	20
223d25e4.50a8Z20	25	4.50	8	20
223d25e5.00a8Z20	25	5.00	8	20
223d25e5.50a8Z20	25	5.50	8	20
223d25e6.00a8Z20	25	6.00	8	20
223d30e0.20a8Z30	30	0.20	8	30
223d30e0.25a8Z30	30	0.25	8	30
223d30e0.30a8Z30	30	0.30	8	30
223d30e0.35a8Z30	30	0.35	8	30
223d30e0.40a8Z30	30	0.40	8	30
223d30e0.45a8Z30	30	0.45	8	30
223d30e0.50a8Z30	30	0.50	8	30
223d30e0.60a8Z30	30	0.60	8	30
223d30e0.70a8Z30	30	0.70	8	30
223d30e0.80a8Z24	30	0.80	8	24
223d30e0.90a8Z24	30	0.90	8	24
223d30e1.00a8Z24	30	1.00	8	24
223d30e1.10a8Z24	30	1.10	8	24
223d30e1.20a8Z24	30	1.20	8	24
223d30e1.30a8Z24	30	1.30	8	24
223d30e1.40a8Z24	30	1.40	8	24
223d30e1.50a8Z24	30	1.50	8	24
223d30e1.60a8Z24	30	1.60	8	24
223d30e1.70a8Z24	30	1.70	8	24
223d30e1.80a8Z24	30	1.80	8	24



Disponibile con o senza rivestimento



Z
20-80



λ
0°

γ
8°

CARB

Fresa circolare DIN 1838 dentatura grossa



Disponibile con o
senza rivestimento



Z
20-80

λ
0°

γ
8°

CARB

Art. n°	d ₁	e	d ₂	Z
223d30e1.90a8Z24	30	1.90	8	24
223d30e2.00a8Z24	30	2.00	8	24
223d30e2.10a8Z24	30	2.10	8	24
223d30e2.20a8Z24	30	2.20	8	24
223d30e2.30a8Z24	30	2.30	8	24
223d30e2.40a8Z24	30	2.40	8	24
223d30e2.50a8Z24	30	2.50	8	24
223d30e2.60a8Z24	30	2.60	8	24
223d30e2.70a8Z24	30	2.70	8	24
223d30e2.80a8Z24	30	2.80	8	24
223d30e2.90a8Z24	30	2.90	8	24
223d30e3.00a8Z24	30	3.00	8	24
223d30e3.10a8Z24	30	3.10	8	24
223d30e3.20a8Z24	30	3.20	8	24
223d30e3.30a8Z24	30	3.30	8	24
223d30e3.40a8Z24	30	3.40	8	24
223d30e3.50a8Z24	30	3.50	8	24
223d30e3.60a8Z24	30	3.60	8	24
223d30e3.70a8Z24	30	3.70	8	24
223d30e3.80a8Z24	30	3.80	8	24
223d30e3.90a8Z24	30	3.90	8	24
223d30e4.00a8Z24	30	4.00	8	24
223d30e4.50a8Z24	30	4.50	8	24
223d30e5.00a8Z24	30	5.00	8	24
223d30e5.50a8Z24	30	5.50	8	24
223d30e6.00a8Z24	30	6.00	8	24
223d40e0.20a10Z40	40	0.20	10	40
223d40e0.25a10Z40	40	0.25	10	40
223d40e0.30a10Z40	40	0.30	10	40
223d40e0.35a10Z40	40	0.35	10	40
223d40e0.40a10Z40	40	0.40	10	40
223d40e0.45a10Z40	40	0.45	10	40
223d40e0.50a10Z40	40	0.50	10	40
223d40e0.60a10Z40	40	0.60	10	40
223d40e0.70a10Z40	40	0.70	10	40
223d40e0.80a10Z32	40	0.80	10	32
223d40e0.90a10Z32	40	0.90	10	32
223d40e1.00a10Z32	40	1.00	10	32
223d40e1.10a10Z32	40	1.10	10	32
223d40e1.20a10Z32	40	1.20	10	32
223d40e1.30a10Z32	40	1.30	10	32
223d40e1.40a10Z32	40	1.40	10	32
223d40e1.50a10Z32	40	1.50	10	32
223d40e1.60a10Z32	40	1.60	10	32
223d40e1.70a10Z24	40	1.70	10	24
223d40e1.80a10Z24	40	1.80	10	24
223d40e1.90a10Z24	40	1.90	10	24

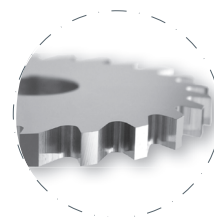
Art. n°	d ₁	e	d ₂	Z
223d40e2.00a10Z24	40	2.00	10	24
223d40e2.10a10Z24	40	2.10	10	24
223d40e2.20a10Z24	40	2.20	10	24
223d40e2.30a10Z24	40	2.30	10	24
223d40e2.40a10Z24	40	2.40	10	24
223d40e2.50a10Z24	40	2.50	10	24
223d40e2.60a10Z24	40	2.60	10	24
223d40e2.70a10Z24	40	2.70	10	24
223d40e2.80a10Z24	40	2.80	10	24
223d40e2.90a10Z24	40	2.90	10	24
223d40e3.00a10Z24	40	3.00	10	24
223d40e3.10a10Z20	40	3.10	10	20
223d40e3.20a10Z20	40	3.20	10	20
223d40e3.30a10Z20	40	3.30	10	20
223d40e3.40a10Z20	40	3.40	10	20
223d40e3.50a10Z20	40	3.50	10	20
223d40e3.60a10Z20	40	3.60	10	20
223d40e3.70a10Z20	40	3.70	10	20
223d40e3.80a10Z20	40	3.80	10	20
223d40e3.90a10Z20	40	3.90	10	20
223d40e4.00a10Z20	40	4.00	10	20
223d40e4.50a10Z20	40	4.50	10	20
223d40e5.00a10Z20	40	5.00	10	20
223d40e5.50a10Z20	40	5.50	10	20
223d40e6.00a10Z20	40	6.00	10	20
223d50e0.40a13Z48	50	0.40	13	48
223d50e0.45a13Z48	50	0.45	13	48
223d50e0.50a13Z48	50	0.50	13	48
223d50e0.60a13Z40	50	0.60	13	40
223d50e0.70a13Z40	50	0.70	13	40
223d50e0.80a13Z40	50	0.80	13	40
223d50e0.90a13Z40	50	0.90	13	40
223d50e1.00a13Z40	50	1.00	13	40
223d50e1.10a13Z40	50	1.10	13	40
223d50e1.20a13Z40	50	1.20	13	40
223d50e1.30a13Z32	50	1.30	13	32
223d50e1.40a13Z32	50	1.40	13	32
223d50e1.50a13Z32	50	1.50	13	32
223d50e1.60a13Z32	50	1.60	13	32
223d50e1.70a13Z32	50	1.70	13	32
223d50e1.80a13Z32	50	1.80	13	32
223d50e1.90a13Z32	50	1.90	13	32
223d50e2.00a13Z32	50	2.00	13	32
223d50e2.10a13Z32	50	2.10	13	32
223d50e2.20a13Z32	50	2.20	13	32
223d50e2.30a13Z32	50	2.30	13	32
223d50e2.40a13Z32	50	2.40	13	32

Fresa circolare DIN 1838 dentatura grossa

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Continuazione

Art. n°	d ₁	e	d ₂	Z	Art. n°	d ₁	e	d ₂	Z
223d50e2.50a13Z32	50	2.50	13	32	223d63e3.00a16Z32	63	3.00	16	32
223d50e2.60a13Z24	50	2.60	13	24	223d63e3.10a16Z32	63	3.10	16	32
223d50e2.70a13Z24	50	2.70	13	24	223d63e3.20a16Z32	63	3.20	16	32
223d50e2.80a13Z24	50	2.80	13	24	223d63e3.30a16Z32	63	3.30	16	32
223d50e2.90a13Z24	50	2.90	13	24	223d63e3.40a16Z32	63	3.40	16	32
223d50e3.00a13Z24	50	3.00	13	24	223d63e3.50a16Z32	63	3.50	16	32
223d50e3.10a13Z24	50	3.10	13	24	223d63e3.60a16Z32	63	3.60	16	32
223d50e3.20a13Z24	50	3.20	13	24	223d63e3.70a16Z32	63	3.70	16	32
223d50e3.30a13Z24	50	3.30	13	24	223d63e3.80a16Z32	63	3.80	16	32
223d50e3.40a13Z24	50	3.40	13	24	223d63e3.90a16Z32	63	3.90	16	32
223d50e3.50a13Z24	50	3.50	13	24	223d63e4.00a16Z32	63	4.00	16	32
223d50e3.60a13Z24	50	3.60	13	24	223d63e4.50a16Z24	63	4.50	16	24
223d50e3.70a13Z24	50	3.70	13	24	223d63e5.00a16Z24	63	5.00	16	24
223d50e3.80a13Z24	50	3.80	13	24	223d63e5.50a16Z24	63	5.50	16	24
223d50e3.90a13Z24	50	3.90	13	24	223d63e6.00a16Z24	63	6.00	16	24
223d50e4.00a13Z24	50	4.00	13	24	223d80e0.60a22Z64	80	0.60	22	64
223d50e4.50a13Z24	50	4.50	13	24	223d80e0.70a22Z64	80	0.70	22	64
223d50e5.00a13Z24	50	5.00	13	24	223d80e0.80a22Z64	80	0.80	22	64
223d50e5.50a13Z20	50	5.50	13	20	223d80e0.90a22Z48	80	0.90	22	48
223d50e6.00a13Z20	50	6.00	13	20	223d80e1.00a22Z48	80	1.00	22	48
223d63e0.40a16Z64	63	0.40	16	64	223d80e1.10a22Z48	80	1.10	22	48
223d63e0.45a16Z64	63	0.45	16	64	223d80e1.20a22Z48	80	1.20	22	48
223d63e0.50a16Z64	63	0.50	16	64	223d80e1.30a22Z48	80	1.30	22	48
223d63e0.60a16Z48	63	0.60	16	48	223d80e1.40a22Z48	80	1.40	22	48
223d63e0.70a16Z48	63	0.70	16	48	223d80e1.50a22Z48	80	1.50	22	48
223d63e0.80a16Z48	63	0.80	16	48	223d80e1.60a22Z48	80	1.60	22	48
223d63e0.90a16Z48	63	0.90	16	48	223d80e1.70a22Z40	80	1.70	22	40
223d63e1.00a16Z40	63	1.00	16	40	223d80e1.80a22Z40	80	1.80	22	40
223d63e1.10a16Z40	63	1.10	16	40	223d80e1.90a22Z40	80	1.90	22	40
223d63e1.20a16Z40	63	1.20	16	40	223d80e2.00a22Z40	80	2.00	22	40
223d63e1.30a16Z40	63	1.30	16	40	223d80e2.10a22Z40	80	2.10	22	40
223d63e1.40a16Z40	63	1.40	16	40	223d80e2.20a22Z40	80	2.20	22	40
223d63e1.50a16Z40	63	1.50	16	40	223d80e2.30a22Z40	80	2.30	22	40
223d63e1.60a16Z40	63	1.60	16	40	223d80e2.40a22Z40	80	2.40	22	40
223d63e1.70a16Z40	63	1.70	16	40	223d80e2.50a22Z40	80	2.50	22	40
223d63e1.80a16Z40	63	1.80	16	40	223d80e2.60a22Z40	80	2.60	22	40
223d63e1.90a16Z40	63	1.90	16	40	223d80e2.70a22Z40	80	2.70	22	40
223d63e2.00a16Z40	63	2.00	16	40	223d80e2.80a22Z40	80	2.80	22	40
223d63e2.10a16Z32	63	2.10	16	32	223d80e2.90a22Z40	80	2.90	22	40
223d63e2.20a16Z32	63	2.20	16	32	223d80e3.00a22Z40	80	3.00	22	40
223d63e2.30a16Z32	63	2.30	16	32	223d80e3.10a22Z32	80	3.10	22	32
223d63e2.40a16Z32	63	2.40	16	32	223d80e3.20a22Z32	80	3.20	22	32
223d63e2.50a16Z32	63	2.50	16	32	223d80e3.30a22Z32	80	3.30	22	32
223d63e2.60a16Z32	63	2.60	16	32	223d80e3.40a22Z32	80	3.40	22	32
223d63e2.70a16Z32	63	2.70	16	32	223d80e3.50a22Z32	80	3.50	22	32
223d63e2.80a16Z32	63	2.80	16	32	223d80e3.60a22Z32	80	3.60	22	32
223d63e2.90a16Z32	63	2.90	16	32	223d80e3.70a22Z32	80	3.70	22	32



Disponibile con o
senza rivestimento



Z
20-80



λ
0°

γ
8°

CARB

Fresa circolare DIN 1838 dentatura grossa



Disponibile con o
senza rivestimento



Z
20-80



λ
0°

γ
8°

CARB

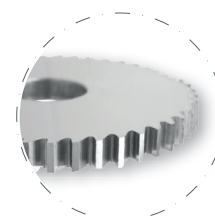
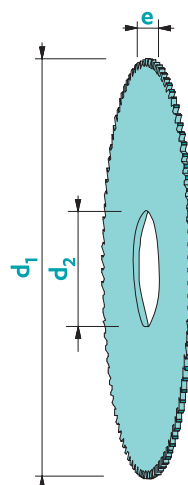
Art. n°	d ₁	e	d ₂	Z	Art. n°	d ₁	e	d ₂	Z
223d80e3.80a22Z32	80	3.80	22	32	223d125e0.90a22Z80	125	0.90	22	80
223d80e3.90a22Z32	80	3.90	22	32	223d125e1.00a22Z80	125	1.00	22	80
223d80e4.00a22Z32	80	4.00	22	32	223d125e1.10a22Z64	125	1.10	22	64
223d80e4.50a22Z32	80	4.50	22	32	223d125e1.20a22Z64	125	1.20	22	64
223d80e5.00a22Z32	80	5.00	22	32	223d125e1.30a22Z64	125	1.30	22	64
223d80e5.50a22Z32	80	5.50	22	32	223d125e1.40a22Z64	125	1.40	22	64
223d80e6.00a22Z32	80	6.00	22	32	223d125e1.50a22Z64	125	1.50	22	64
223d100e0.60a22Z80	100	0.60	22	80	223d125e1.60a22Z64	125	1.60	22	64
223d100e0.70a22Z64	100	0.70	22	64	223d125e1.70a22Z64	125	1.70	22	64
223d100e0.80a22Z64	100	0.80	22	64	223d125e1.80a22Z64	125	1.80	22	64
223d100e0.90a22Z64	100	0.90	22	64	223d125e1.90a22Z64	125	1.90	22	64
223d100e1.00a22Z64	100	1.00	22	64	223d125e2.00a22Z64	125	2.00	22	64
223d100e1.10a22Z64	100	1.10	22	64	223d125e2.10a22Z48	125	2.10	22	48
223d100e1.20a22Z64	100	1.20	22	64	223d125e2.20a22Z48	125	2.20	22	48
223d100e1.30a22Z48	100	1.30	22	48	223d125e2.30a22Z48	125	2.30	22	48
223d100e1.40a22Z48	100	1.40	22	48	223d125e2.40a22Z48	125	2.40	22	48
223d100e1.50a22Z48	100	1.50	22	48	223d125e2.50a22Z48	125	2.50	22	48
223d100e1.60a22Z48	100	1.60	22	48	223d125e2.60a22Z48	125	2.60	22	48
223d100e1.70a22Z48	100	1.70	22	48	223d125e2.70a22Z48	125	2.70	22	48
223d100e1.80a22Z48	100	1.80	22	48	223d125e2.80a22Z48	125	2.80	22	48
223d100e1.90a22Z48	100	1.90	22	48	223d125e2.90a22Z48	125	2.90	22	48
223d100e2.00a22Z48	100	2.00	22	48	223d125e3.00a22Z48	125	3.00	22	48
223d100e2.10a22Z48	100	2.10	22	48	223d125e3.10a22Z48	125	3.10	22	48
223d100e2.20a22Z48	100	2.20	22	48	223d125e3.20a22Z48	125	3.20	22	48
223d100e2.30a22Z48	100	2.30	22	48	223d125e3.30a22Z48	125	3.30	22	48
223d100e2.40a22Z48	100	2.40	22	48	223d125e3.40a22Z48	125	3.40	22	48
223d100e2.50a22Z48	100	2.50	22	48	223d125e3.50a22Z48	125	3.50	22	48
223d100e2.60a22Z40	100	2.60	22	40	223d125e3.60a22Z48	125	3.60	22	48
223d100e2.70a22Z40	100	2.70	22	40	223d125e3.70a22Z48	125	3.70	22	48
223d100e2.80a22Z40	100	2.80	22	40	223d125e3.80a22Z48	125	3.80	22	48
223d100e2.90a22Z40	100	2.90	22	40	223d125e3.90a22Z48	125	3.90	22	48
223d100e3.00a22Z40	100	3.00	22	40	223d125e4.00a22Z48	125	4.00	22	48
223d100e3.10a22Z40	100	3.10	22	40	223d125e4.50a22Z40	125	4.50	22	40
223d100e3.20a22Z40	100	3.20	22	40	223d125e5.00a22Z40	125	5.00	22	40
223d100e3.30a22Z40	100	3.30	22	40	223d125e5.50a22Z40	125	5.50	22	40
223d100e3.40a22Z40	100	3.40	22	40	223d125e6.00a22Z40	125	6.00	22	40
223d100e3.50a22Z40	100	3.50	22	40	223d160e1.00a32Z80	160	1.00	32	80
223d100e3.60a22Z40	100	3.60	22	40	223d160e1.20a32Z80	160	1.20	32	80
223d100e3.70a22Z40	100	3.70	22	40	223d160e1.50a32Z80	160	1.50	32	80
223d100e3.80a22Z40	100	3.80	22	40	223d160e2.00a32Z80	160	2.00	32	80
223d100e3.90a22Z40	100	3.90	22	40	223d160e2.50a32Z80	160	2.50	32	80
223d100e4.00a22Z40	100	4.00	22	40	223d160e3.00a32Z64	160	3.00	32	64
223d100e4.50a22Z40	100	4.50	22	40					
223d100e5.00a22Z40	100	5.00	22	40					
223d100e5.50a22Z32	100	5.50	22	32					
223d100e6.00a22Z32	100	6.00	22	32					
223d125e0.80a22Z80	125	0.80	22	80					

Fresa circolare DIN 1837 dentatura fine

Gruppo materia (vedi pagina 3)

	a	b
Rivestimento consigliato	Solo	Solo
V_c non rivestito [m/min]	300	160
V_c rivestito [m/min]	400	250
F_z [mm]	Ø/10000	Ø/10000

Tolleranze
 e : ± 0.01
 d_2 : H7



Disponibile con o
 senza rivestimento
 (vedi pagina 61)

Art. n°	d_1	e	d_2	Z	Art. n°	d_1	e	d_2	Z
223-1d15e0.10A5Z64	15	0.10	5	64	223-1d15e2.70A5Z40	15	2.70	5	40
223-1d15e0.15A5Z64	15	0.15	5	64	223-1d15e2.80A5Z40	15	2.80	5	40
223-1d15e0.20A5Z64	15	0.20	5	64	223-1d15e2.90A5Z40	15	2.90	5	40
223-1d15e0.25A5Z64	15	0.25	5	64	223-1d15e3.00A5Z40	15	3.00	5	40
223-1d15e0.30A5Z64	15	0.30	5	64	223-1d15e3.10A5Z24	15	3.10	5	24
223-1d15e0.35A5Z64	15	0.35	5	64	223-1d15e3.20A5Z24	15	3.20	5	24
223-1d15e0.40A5Z64	15	0.40	5	64	223-1d15e3.30A5Z24	15	3.30	5	24
223-1d15e0.45A5Z48	15	0.45	5	48	223-1d15e3.40A5Z24	15	3.40	5	24
223-1d15e0.50A5Z48	15	0.50	5	48	223-1d15e3.50A5Z24	15	3.50	5	24
223-1d15e0.60A5Z48	15	0.60	5	48	223-1d15e3.60A5Z24	15	3.60	5	24
223-1d15e0.70A5Z48	15	0.70	5	48	223-1d15e3.70A5Z24	15	3.70	5	24
223-1d15e0.80A5Z40	15	0.80	5	40	223-1d15e3.80A5Z24	15	3.80	5	24
223-1d15e0.90A5Z40	15	0.90	5	40	223-1d15e3.90A5Z24	15	3.90	5	24
223-1d15e1.00A5Z40	15	1.00	5	40	223-1d15e4.00A5Z24	15	4.00	5	24
223-1d15e1.10A5Z40	15	1.10	5	40	223-1d15e4.50A5Z24	15	4.50	5	24
223-1d15e1.20A5Z40	15	1.20	5	40	223-1d15e5.00A5Z24	15	5.00	5	24
223-1d15e1.30A5Z40	15	1.30	5	40	223-1d15e5.50A5Z24	15	5.50	5	24
223-1d15e1.40A5Z40	15	1.40	5	40	223-1d15e6.00A5Z24	15	6.00	5	24
223-1d15e1.50A5Z40	15	1.50	5	40	223-1d20e0.10A5Z80	20	0.10	5	80
223-1d15e1.60A5Z40	15	1.60	5	40	223-1d20e0.15A5Z80	20	0.15	5	80
223-1d15e1.70A5Z40	15	1.70	5	40	223-1d20e0.20A5Z80	20	0.20	5	80
223-1d15e1.80A5Z40	15	1.80	5	40	223-1d20e0.25A5Z64	20	0.25	5	64
223-1d15e1.90A5Z40	15	1.90	5	40	223-1d20e0.30A5Z64	20	0.30	5	64
223-1d15e2.00A5Z40	15	2.00	5	40	223-1d20e0.35A5Z64	20	0.35	5	64
223-1d15e2.10A5Z40	15	2.10	5	40	223-1d20e0.40A5Z64	20	0.40	5	64
223-1d15e2.20A5Z40	15	2.20	5	40	223-1d20e0.45A5Z48	20	0.45	5	48
223-1d15e2.30A5Z40	15	2.30	5	40	223-1d20e0.50A5Z48	20	0.50	5	48
223-1d15e2.40A5Z40	15	2.40	5	40	223-1d20e0.60A5Z48	20	0.60	5	48
223-1d15e2.50A5Z40	15	2.50	5	40	223-1d20e0.70A5Z48	20	0.70	5	48
223-1d15e2.60A5Z40	15	2.60	5	40	223-1d20e0.80A5Z40	20	0.80	5	40

Z
24-160

λ
0°

γ
8°

CARB

Formule

$$F = F_z \cdot Z$$

$$V_f = F_z \cdot Z \cdot n$$

$$n = \frac{V_c \cdot 1000}{\pi \cdot d_1}$$

$$V_c = \frac{\pi \cdot d_1 \cdot n}{1000}$$

$$f_z = \frac{V_f}{Z \cdot n}$$

Leggenda

F [mm]: Avanzamento per giro

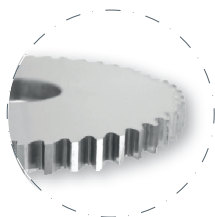
F_z [mm]: Avanzamento per dente

Z : Numero di denti

n : Numero di giri al minuto

V_f [mm/min]: Velocità d'avanzamento

Fresa circolare DIN 1837 dentatura fine



Disponibile con o
senza rivestimento
(vedi pagina 61)



Z
24-160



λ
0°

γ
8°

CARB

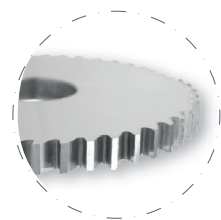
Art. n°	d ₁	e	d ₂	Z	Art. n°	d ₁	e	d ₂	Z
223-1d20e0.90A5Z40	20	0.90	5	40	223-1d25e0.60A8Z64	25	0.60	8	64
223-1d20e1.00A5Z40	20	1.00	5	40	223-1d25e0.70A8Z48	25	0.70	8	48
223-1d20e1.10A5Z40	20	1.10	5	40	223-1d25e0.80A8Z48	25	0.80	8	48
223-1d20e1.20A5Z40	20	1.20	5	40	223-1d25e0.90A8Z48	25	0.90	8	48
223-1d20e1.30A5Z40	20	1.30	5	40	223-1d25e1.00A8Z48	25	1.00	8	48
223-1d20e1.40A5Z40	20	1.40	5	40	223-1d25e1.10A8Z48	25	1.10	8	48
223-1d20e1.50A5Z40	20	1.50	5	40	223-1d25e1.20A8Z48	25	1.20	8	48
223-1d20e1.60A5Z40	20	1.60	5	40	223-1d25e1.30A8Z40	25	1.30	8	40
223-1d20e1.70A5Z32	20	1.70	5	32	223-1d25e1.40A8Z40	25	1.40	8	40
223-1d20e1.80A5Z32	20	1.80	5	32	223-1d25e1.50A8Z40	25	1.50	8	40
223-1d20e1.90A5Z32	20	1.90	5	32	223-1d25e1.60A8Z40	25	1.60	8	40
223-1d20e2.00A5Z32	20	2.00	5	32	223-1d25e1.70A8Z40	25	1.70	8	40
223-1d20e2.10A5Z32	20	2.10	5	32	223-1d25e1.80A8Z40	25	1.80	8	40
223-1d20e2.20A5Z32	20	2.20	5	32	223-1d25e1.90A8Z40	25	1.90	8	40
223-1d20e2.30A5Z32	20	2.30	5	32	223-1d25e2.00A8Z40	25	2.00	8	40
223-1d20e2.40A5Z32	20	2.40	5	32	223-1d25e2.10A8Z40	25	2.10	8	40
223-1d20e2.50A5Z32	20	2.50	5	32	223-1d25e2.20A8Z40	25	2.20	8	40
223-1d20e2.60A5Z32	20	2.60	5	32	223-1d25e2.30A8Z40	25	2.30	8	40
223-1d20e2.70A5Z32	20	2.70	5	32	223-1d25e2.40A8Z40	25	2.40	8	40
223-1d20e2.80A5Z32	20	2.80	5	32	223-1d25e2.50A8Z40	25	2.50	8	40
223-1d20e2.90A5Z32	20	2.90	5	32	223-1d25e2.60A8Z32	25	2.60	8	32
223-1d20e3.00A5Z32	20	3.00	5	32	223-1d25e2.70A8Z32	25	2.70	8	32
223-1d20e3.10A5Z24	20	3.10	5	24	223-1d25e2.80A8Z32	25	2.80	8	32
223-1d20e3.20A5Z24	20	3.20	5	24	223-1d25e2.90A8Z32	25	2.90	8	32
223-1d20e3.30A5Z24	20	3.30	5	24	223-1d25e3.00A8Z32	25	3.00	8	32
223-1d20e3.40A5Z24	20	3.40	5	24	223-1d25e3.10A8Z32	25	3.10	8	32
223-1d20e3.50A5Z24	20	3.50	5	24	223-1d25e3.20A8Z32	25	3.20	8	32
223-1d20e3.60A5Z24	20	3.60	5	24	223-1d25e3.30A8Z32	25	3.30	8	32
223-1d20e3.70A5Z24	20	3.70	5	24	223-1d25e3.40A8Z32	25	3.40	8	32
223-1d20e3.80A5Z24	20	3.80	5	24	223-1d25e3.50A8Z32	25	3.50	8	32
223-1d20e3.90A5Z24	20	3.90	5	24	223-1d25e3.60A8Z32	25	3.60	8	32
223-1d20e4.00A5Z24	20	4.00	5	24	223-1d25e3.70A8Z32	25	3.70	8	32
223-1d20e4.50A5Z24	20	4.50	5	24	223-1d25e3.80A8Z32	25	3.80	8	32
223-1d20e5.00A5Z24	20	5.00	5	24	223-1d25e3.90A8Z32	25	3.90	8	32
223-1d20e5.50A5Z24	20	5.50	5	24	223-1d25e4.00A8Z32	25	4.00	8	32
223-1d20e6.00A5Z24	20	6.00	5	24	223-1d25e4.50A8Z32	25	4.50	8	32
223-1d25e0.10A8Z80	25	0.10	8	80	223-1d25e5.00A8Z32	25	5.00	8	32
223-1d25e0.15A8Z80	25	0.15	8	80	223-1d25e5.50A8Z24	25	5.50	8	24
223-1d25e0.20A8Z80	25	0.20	8	80	223-1d25e6.00A8Z24	25	6.00	8	24
223-1d25e0.25A8Z80	25	0.25	8	80	--> Ref. 223-2	30	0.10	8	100
223-1d25e0.30A8Z80	25	0.30	8	80	--> Ref. 223-2	30	0.15	8	100
223-1d25e0.35A8Z64	25	0.35	8	64	--> Ref. 223-2	30	0.20	8	100
223-1d25e0.40A8Z64	25	0.40	8	64	--> Ref. 223-2	30	0.25	8	100
223-1d25e0.45A8Z64	25	0.45	8	64	223-1d30e0.30A8Z80	30	0.30	8	80
223-1d25e0.50A8Z64	25	0.50	8	64	223-1d30e0.35A8Z80	30	0.35	8	80

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Continuazione

Art. n°	d ₁	e	d ₂	Z	Art. n°	d ₁	e	d ₂	Z
223-1d30e0.40A8Z80	30	0.40	8	80	--> Ref. 223-2	40	0.25	10	100
223-1d30e0.45A8Z80	30	0.45	8	80	--> Ref. 223-2	40	0.30	10	100
223-1d30e0.50A8Z80	30	0.50	8	80	--> Ref. 223-2	40	0.35	10	100
223-1d30e0.60A8Z64	30	0.60	8	64	--> Ref. 223-2	40	0.40	10	100
223-1d30e0.70A8Z64	30	0.70	8	64	223-1d40e0.45A10Z80	40	0.45	10	80
223-1d30e0.80A8Z64	30	0.80	8	64	223-1d40e0.50A10Z80	40	0.50	10	80
223-1d30e0.90A8Z64	30	0.90	8	64	223-1d40e0.60A10Z80	40	0.60	10	80
223-1d30e1.00A8Z64	30	1.00	8	64	223-1d40e0.70A10Z80	40	0.70	10	80
223-1d30e1.10A8Z48	30	1.10	8	48	223-1d40e0.80A10Z80	40	0.80	10	80
223-1d30e1.20A8Z48	30	1.20	8	48	223-1d40e0.90A10Z64	40	0.90	10	64
223-1d30e1.30A8Z48	30	1.30	8	48	223-1d40e1.00A10Z64	40	1.00	10	64
223-1d30e1.40A8Z48	30	1.40	8	48	223-1d40e1.10A10Z64	40	1.10	10	64
223-1d30e1.50A8Z48	30	1.50	8	48	223-1d40e1.20A10Z64	40	1.20	10	64
223-1d30e1.60A8Z48	30	1.60	8	48	223-1d40e1.30A10Z64	40	1.30	10	64
223-1d30e1.70A8Z48	30	1.70	8	48	223-1d40e1.40A10Z64	40	1.40	10	64
223-1d30e1.80A8Z48	30	1.80	8	48	223-1d40e1.50A10Z64	40	1.50	10	64
223-1d30e1.90A8Z48	30	1.90	8	48	223-1d40e1.60A10Z64	40	1.60	10	64
223-1d30e2.00A8Z48	30	2.00	8	48	223-1d40e1.70A10Z48	40	1.70	10	48
223-1d30e2.10A8Z40	30	2.10	8	40	223-1d40e1.80A10Z48	40	1.80	10	48
223-1d30e2.20A8Z40	30	2.20	8	40	223-1d40e1.90A10Z48	40	1.90	10	48
223-1d30e2.30A8Z40	30	2.30	8	40	223-1d40e2.00A10Z48	40	2.00	10	48
223-1d30e2.40A8Z40	30	2.40	8	40	223-1d40e2.10A10Z48	40	2.10	10	48
223-1d30e2.50A8Z40	30	2.50	8	40	223-1d40e2.20A10Z48	40	2.20	10	48
223-1d30e2.60A8Z40	30	2.60	8	40	223-1d40e2.30A10Z48	40	2.30	10	48
223-1d30e2.70A8Z40	30	2.70	8	40	223-1d40e2.40A10Z48	40	2.40	10	48
223-1d30e2.80A8Z40	30	2.80	8	40	223-1d40e2.50A10Z48	40	2.50	10	48
223-1d30e2.90A8Z40	30	2.90	8	40	223-1d40e2.60A10Z48	40	2.60	10	48
223-1d30e3.00A8Z40	30	3.00	8	40	223-1d40e2.70A10Z48	40	2.70	10	48
223-1d30e3.10A8Z40	30	3.10	8	40	223-1d40e2.80A10Z48	40	2.80	10	48
223-1d30e3.20A8Z40	30	3.20	8	40	223-1d40e2.90A10Z48	40	2.90	10	48
223-1d30e3.30A8Z40	30	3.30	8	40	223-1d40e3.00A10Z48	40	3.00	10	48
223-1d30e3.40A8Z40	30	3.40	8	40	223-1d40e3.10A10Z40	40	3.10	10	40
223-1d30e3.50A8Z40	30	3.50	8	40	223-1d40e3.20A10Z40	40	3.20	10	40
223-1d30e3.60A8Z40	30	3.60	8	40	223-1d40e3.30A10Z40	40	3.30	10	40
223-1d30e3.70A8Z40	30	3.70	8	40	223-1d40e3.40A10Z40	40	3.40	10	40
223-1d30e3.80A8Z40	30	3.80	8	40	223-1d40e3.50A10Z40	40	3.50	10	40
223-1d30e3.90A8Z40	30	3.90	8	40	223-1d40e3.60A10Z40	40	3.60	10	40
223-1d30e4.00A8Z40	30	4.00	8	40	223-1d40e3.70A10Z40	40	3.70	10	40
223-1d30e4.50A8Z32	30	4.50	8	32	223-1d40e3.80A10Z40	40	3.80	10	40
223-1d30e5.00A8Z32	30	5.00	8	32	223-1d40e3.90A10Z40	40	3.90	10	40
223-1d30e5.50A8Z32	30	5.50	8	32	223-1d40e4.00A10Z40	40	4.00	10	40
223-1d30e6.00A8Z32	30	6.00	8	32	223-1d40e4.50A10Z40	40	4.50	10	40
223-1d40e0.10A10Z128	40	0.10	10	128	223-1d40e5.00A10Z40	40	5.00	10	40
223-1d40e0.15A10Z128	40	0.15	10	128	223-1d40e5.50A10Z40	40	5.50	10	40
223-1d40e0.20A10Z128	40	0.20	10	128	223-1d40e6.00A10Z40	40	6.00	10	40



Disponibile con o
senza rivestimento
(vedi pagina 61)

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24-160

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CARB

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Disponibile con o
senza rivestimento
(vedi pagina 61)

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Art. n°	d ₁	e	d ₂	Z	Art. n°	d ₁	e	d ₂	Z
223-1d50e0.20A13Z128	50	0.20	13	128	223-1d50e6.00A13Z40	50	6.00	13	40
223-1d50e0.25A13Z128	50	0.25	13	128	223-1d63e0.20A16Z160	63	0.20	16	160
223-1d50e0.30A13Z128	50	0.30	13	128	223-1d63e0.25A16Z128	63	0.25	16	128
223-1d50e0.35A13Z100	50	0.35	13	100	223-1d63e0.30A16Z128	63	0.30	16	128
223-1d50e0.40A13Z100	50	0.40	13	100	223-1d63e0.35A16Z128	63	0.35	16	128
223-1d50e0.45A13Z100	50	0.45	13	100	223-1d63e0.40A16Z128	63	0.40	16	128
223-1d50e0.50A13Z100	50	0.50	13	100	223-1d63e0.45A16Z128	63	0.45	16	128
223-1d50e0.60A13Z100	50	0.60	13	100	223-1d63e0.50A16Z128	63	0.50	16	128
223-1d50e0.70A13Z80	50	0.70	13	80	223-1d63e0.60A16Z100	63	0.60	16	100
223-1d50e0.80A13Z80	50	0.80	13	80	223-1d63e0.70A16Z100	63	0.70	16	100
223-1d50e0.90A13Z80	50	0.90	13	80	223-1d63e0.80A16Z100	63	0.80	16	100
223-1d50e1.00A13Z80	50	1.00	13	80	223-1d63e0.90A16Z100	63	0.90	16	100
223-1d50e1.10A13Z80	50	1.10	13	80	223-1d63e1.00A16Z100	63	1.00	16	100
223-1d50e1.20A13Z80	50	1.20	13	80	223-1d63e1.10A16Z80	63	1.10	16	80
223-1d50e1.30A13Z64	50	1.30	13	64	223-1d63e1.20A16Z80	63	1.20	16	80
223-1d50e1.40A13Z64	50	1.40	13	64	223-1d63e1.30A16Z80	63	1.30	16	80
223-1d50e1.50A13Z64	50	1.50	13	64	223-1d63e1.40A16Z80	63	1.40	16	80
223-1d50e1.60A13Z64	50	1.60	13	64	223-1d63e1.50A16Z80	63	1.50	16	80
223-1d50e1.70A13Z64	50	1.70	13	64	223-1d63e1.60A16Z80	63	1.60	16	80
223-1d50e1.80A13Z64	50	1.80	13	64	223-1d63e1.70A16Z80	63	1.70	16	80
223-1d50e1.90A13Z64	50	1.90	13	64	223-1d63e1.80A16Z80	63	1.80	16	80
223-1d50e2.00A13Z64	50	2.00	13	64	223-1d63e1.90A16Z80	63	1.90	16	80
223-1d50e2.10A13Z64	50	2.10	13	64	223-1d63e2.00A16Z80	63	2.00	16	80
223-1d50e2.20A13Z64	50	2.20	13	64	223-1d63e2.10A16Z64	63	2.10	16	64
223-1d50e2.30A13Z64	50	2.30	13	64	223-1d63e2.20A16Z64	63	2.20	16	64
223-1d50e2.40A13Z64	50	2.40	13	64	223-1d63e2.30A16Z64	63	2.30	16	64
223-1d50e2.50A13Z64	50	2.50	13	64	223-1d63e2.40A16Z64	63	2.40	16	64
223-1d50e2.60A13Z48	50	2.60	13	48	223-1d63e2.50A16Z64	63	2.50	16	64
223-1d50e2.70A13Z48	50	2.70	13	48	223-1d63e2.60A16Z64	63	2.60	16	64
223-1d50e2.80A13Z48	50	2.80	13	48	223-1d63e2.70A16Z64	63	2.70	16	64
223-1d50e2.90A13Z48	50	2.90	13	48	223-1d63e2.80A16Z64	63	2.80	16	64
223-1d50e3.00A13Z48	50	3.00	13	48	223-1d63e2.90A16Z64	63	2.90	16	64
223-1d50e3.10A13Z48	50	3.10	13	48	223-1d63e3.00A16Z64	63	3.00	16	64
223-1d50e3.20A13Z48	50	3.20	13	48	223-1d63e3.10A16Z64	63	3.10	16	64
223-1d50e3.30A13Z48	50	3.30	13	48	223-1d63e3.20A16Z64	63	3.20	16	64
223-1d50e3.40A13Z48	50	3.40	13	48	223-1d63e3.30A16Z64	63	3.30	16	64
223-1d50e3.50A13Z48	50	3.50	13	48	223-1d63e3.40A16Z64	63	3.40	16	64
223-1d50e3.60A13Z48	50	3.60	13	48	223-1d63e3.50A16Z64	63	3.50	16	64
223-1d50e3.70A13Z48	50	3.70	13	48	223-1d63e3.60A16Z64	63	3.60	16	64
223-1d50e3.80A13Z48	50	3.80	13	48	223-1d63e3.70A16Z64	63	3.70	16	64
223-1d50e3.90A13Z48	50	3.90	13	48	223-1d63e3.80A16Z64	63	3.80	16	64
223-1d50e4.00A13Z48	50	4.00	13	48	223-1d63e3.90A16Z64	63	3.90	16	64
223-1d50e4.50A13Z48	50	4.50	13	48	223-1d63e4.00A16Z64	63	4.00	16	64
223-1d50e5.00A13Z48	50	5.00	13	48	223-1d63e4.50A16Z48	63	4.50	16	48
223-1d50e5.50A13Z40	50	5.50	13	40	223-1d63e5.00A16Z48	63	5.00	16	48

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Continuazione

Art. n°	d ₁	e	d ₂	Z	Art. n°	d ₁	e	d ₂	Z
223-1d63e5.50A16Z48	63	5.50	16	48	223-1d80e5.50A22Z64	80	5.50	22	64
223-1d63e6.00A16Z48	63	6.00	16	48	223-1d80e6.00A22Z64	80	6.00	22	64
223-1d80e0.25A22Z160	80	0.25	22	160	223-1d100e0.50A22Z160	100	0.50	22	160
223-1d80e0.30A22Z160	80	0.30	22	160	223-1d100e0.60A22Z160	100	0.60	22	160
223-1d80e0.35A22Z160	80	0.35	22	160	223-1d100e0.70A22Z128	100	0.70	22	128
223-1d80e0.40A22Z160	80	0.40	22	160	223-1d100e0.80A22Z128	100	0.80	22	128
223-1d80e0.45A22Z128	80	0.45	22	128	223-1d100e0.90A22Z128	100	0.90	22	128
223-1d80e0.50A22Z128	80	0.50	22	128	223-1d100e1.00A22Z128	100	1.00	22	128
223-1d80e0.60A22Z128	80	0.60	22	128	223-1d100e1.10A22Z128	100	1.10	22	128
223-1d80e0.70A22Z128	80	0.70	22	128	223-1d100e1.20A22Z128	100	1.20	22	128
223-1d80e0.80A22Z128	80	0.80	22	128	223-1d100e1.30A22Z100	100	1.30	22	100
223-1d80e0.90A22Z100	80	0.90	22	100	223-1d100e1.40A22Z100	100	1.40	22	100
223-1d80e1.00A22Z100	80	1.00	22	100	223-1d100e1.50A22Z100	100	1.50	22	100
223-1d80e1.10A22Z100	80	1.10	22	100	223-1d100e1.60A22Z100	100	1.60	22	100
223-1d80e1.20A22Z100	80	1.20	22	100	223-1d100e1.70A22Z100	100	1.70	22	100
223-1d80e1.30A22Z100	80	1.30	22	100	223-1d100e1.80A22Z100	100	1.80	22	100
223-1d80e1.40A22Z100	80	1.40	22	100	223-1d100e1.90A22Z100	100	1.90	22	100
223-1d80e1.50A22Z100	80	1.50	22	100	223-1d100e2.00A22Z100	100	2.00	22	100
223-1d80e1.60A22Z100	80	1.60	22	100	223-1d100e2.10A22Z100	100	2.10	22	100
223-1d80e1.70A22Z80	80	1.70	22	80	223-1d100e2.20A22Z100	100	2.20	22	100
223-1d80e1.80A22Z80	80	1.80	22	80	223-1d100e2.30A22Z100	100	2.30	22	100
223-1d80e1.90A22Z80	80	1.90	22	80	223-1d100e2.40A22Z100	100	2.40	22	100
223-1d80e2.00A22Z80	80	2.00	22	80	223-1d100e2.50A22Z100	100	2.50	22	100
223-1d80e2.10A22Z80	80	2.10	22	80	223-1d100e2.60A22Z80	100	2.60	22	80
223-1d80e2.20A22Z80	80	2.20	22	80	223-1d100e2.70A22Z80	100	2.70	22	80
223-1d80e2.30A22Z80	80	2.30	22	80	223-1d100e2.80A22Z80	100	2.80	22	80
223-1d80e2.40A22Z80	80	2.40	22	80	223-1d100e2.90A22Z80	100	2.90	22	80
223-1d80e2.50A22Z80	80	2.50	22	80	223-1d100e3.00A22Z80	100	3.00	22	80
223-1d80e2.60A22Z80	80	2.60	22	80	223-1d100e3.10A22Z80	100	3.10	22	80
223-1d80e2.70A22Z80	80	2.70	22	80	223-1d100e3.20A22Z80	100	3.20	22	80
223-1d80e2.80A22Z80	80	2.80	22	80	223-1d100e3.30A22Z80	100	3.30	22	80
223-1d80e2.90A22Z80	80	2.90	22	80	223-1d100e3.40A22Z80	100	3.40	22	80
223-1d80e3.00A22Z80	80	3.00	22	80	223-1d100e3.50A22Z80	100	3.50	22	80
223-1d80e3.10A22Z64	80	3.10	22	64	223-1d100e3.60A22Z80	100	3.60	22	80
223-1d80e3.20A22Z64	80	3.20	22	64	223-1d100e3.70A22Z80	100	3.70	22	80
223-1d80e3.30A22Z64	80	3.30	22	64	223-1d100e3.80A22Z80	100	3.80	22	80
223-1d80e3.40A22Z64	80	3.40	22	64	223-1d100e3.90A22Z80	100	3.90	22	80
223-1d80e3.50A22Z64	80	3.50	22	64	223-1d100e4.00A22Z80	100	4.00	22	80
223-1d80e3.60A22Z64	80	3.60	22	64	223-1d100e4.50A22Z80	100	4.50	22	80
223-1d80e3.70A22Z64	80	3.70	22	64	223-1d100e5.00A22Z80	100	5.00	22	80
223-1d80e3.80A22Z64	80	3.80	22	64	223-1d100e5.50A22Z64	100	5.50	22	64
223-1d80e3.90A22Z64	80	3.90	22	64	223-1d100e6.00A22Z64	100	6.00	22	64
223-1d80e4.00A22Z64	80	4.00	22	64	223-1d125e0.60A22Z160	125	0.60	22	160
223-1d80e4.50A22Z64	80	4.50	22	64	223-1d125e0.70A22Z160	125	0.70	22	160
223-1d80e5.00A22Z64	80	5.00	22	64	223-1d125e0.80A22Z160	125	0.80	22	160



Disponibile con o
senza rivestimento
(vedi pagina 61)



Z
24-160



λ
0°

γ
8°

CARB

Fresa circolare DIN 1837 dentatura fine



Disponibile con o
senza rivestimento



Z
24-160



λ
0°

γ
8°

CARB

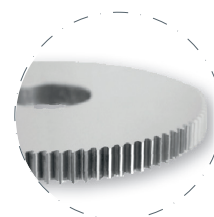
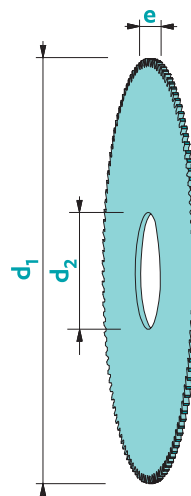
Art. n°	d_1	e	d_2	Z
223-1d125e0.90A22Z160	125	0.90	22	160
223-1d125e1.00A22Z160	125	1.00	22	160
223-1d125e1.10A22Z128	125	1.10	22	128
223-1d125e1.20A22Z128	125	1.20	22	128
223-1d125e1.30A22Z128	125	1.30	22	128
223-1d125e1.40A22Z128	125	1.40	22	128
223-1d125e1.50A22Z128	125	1.50	22	128
223-1d125e1.60A22Z128	125	1.60	22	128
223-1d125e1.70A22Z128	125	1.70	22	128
223-1d125e1.80A22Z128	125	1.80	22	128
223-1d125e1.90A22Z128	125	1.90	22	128
223-1d125e2.00A22Z128	125	2.00	22	128
223-1d125e2.10A22Z100	125	2.10	22	100
223-1d125e2.20A22Z100	125	2.20	22	100
223-1d125e2.30A22Z100	125	2.30	22	100
223-1d125e2.40A22Z100	125	2.40	22	100
223-1d125e2.50A22Z100	125	2.50	22	100
223-1d125e2.60A22Z100	125	2.60	22	100
223-1d125e2.70A22Z100	125	2.70	22	100
223-1d125e2.80A22Z100	125	2.80	22	100
223-1d125e2.90A22Z100	125	2.90	22	100
223-1d125e3.00A22Z100	125	3.00	22	100
223-1d125e3.10A22Z100	125	3.10	22	100
223-1d125e3.20A22Z100	125	3.20	22	100
223-1d125e3.30A22Z100	125	3.30	22	100
223-1d125e3.40A22Z100	125	3.40	22	100
223-1d125e3.50A22Z100	125	3.50	22	100
223-1d125e3.60A22Z100	125	3.60	22	100
223-1d125e3.70A22Z100	125	3.70	22	100
223-1d125e3.80A22Z100	125	3.80	22	100
223-1d125e3.90A22Z100	125	3.90	22	100
223-1d125e4.00A22Z100	125	4.00	22	100
223-1d125e4.50A22Z100	125	4.50	22	100
223-1d125e5.00A22Z100	125	5.00	22	100
223-1d125e5.50A22Z100	125	5.50	22	100
223-1d125e6.00A22Z100	125	6.00	22	100
223-1d160e1.00A32Z160	160	1.00	32	160
223-1d160e1.20A32Z160	160	1.20	32	160
223-1d160e1.50A32Z160	160	1.50	32	160
223-1d160e1.60A32Z160	160	1.60	32	160
223-1d160e1.80A32Z128	160	1.80	32	128
223-1d160e2.00A32Z128	160	2.00	32	128
223-1d160e2.50A32Z128	160	2.50	32	128
223-1d160e3.00A32Z128	160	3.00	32	128

Fresa circolare dentatura extra fine

223-2

Gruppo materia (vedi pagina 3)	a	b
Rivestimento consigliato	Solo	Solo
V _c non rivestito [m/min]	300	160
V _c rivestito [m/min]	400	250
F _z [mm]	Ø/10000	Ø/10000

Tolleranze e: +/-0.01
d₂: H7



Disponibile con o senza rivestimento

Art. n°	d ₁	e	d ₂	Z	Art. n°	d ₁	e	d ₂	Z
223-2d8e0.10A3Z48	8	0.10	3	48	223-2d12e0.30A5Z64	12	0.30	5	64
223-2d8e0.15A3Z48	8	0.15	3	48	223-2d12e0.35A5Z64	12	0.35	5	64
223-2d8e0.20A3Z48	8	0.20	3	48	223-2d12e0.40A5Z64	12	0.40	5	64
223-2d8e0.25A3Z48	8	0.25	3	48	223-2d12e0.50A5Z64	12	0.50	5	64
223-2d8e0.30A3Z48	8	0.30	3	48	223-2d12e0.60A5Z64	12	0.60	5	64
223-2d8e0.35A3Z48	8	0.35	3	48	223-2d12e0.70A5Z64	12	0.70	5	64
223-2d8e0.40A3Z48	8	0.40	3	48	223-2d12e0.80A5Z64	12	0.80	5	64
223-2d8e0.50A3Z48	8	0.50	3	48	223-2d12e0.90A5Z64	12	0.90	5	64
223-2d8e0.60A3Z48	8	0.60	3	48	223-2d12e1.00A5Z64	12	1.00	5	64
223-2d8e0.70A3Z48	8	0.70	3	48	223-2d15e0.10A5Z80	15	0.10	5	80
223-2d8e0.80A3Z48	8	0.80	3	48	223-2d15e0.15A5Z80	15	0.15	5	80
223-2d8e0.90A3Z48	8	0.90	3	48	223-2d15e0.20A5Z80	15	0.20	5	80
223-2d8e1.00A3Z48	8	1.00	3	48	223-2d15e0.25A5Z80	15	0.25	5	80
223-2d10e0.10A3Z64	10	0.10	3	64	223-2d15e0.30A5Z80	15	0.30	5	80
223-2d10e0.15A3Z64	10	0.15	3	64	223-2d15e0.35A5Z80	15	0.35	5	80
223-2d10e0.20A3Z64	10	0.20	3	64	223-2d15e0.40A5Z80	15	0.40	5	80
223-2d10e0.25A3Z64	10	0.25	3	64	223-2d15e0.50A5Z80	15	0.50	5	80
223-2d10e0.30A3Z64	10	0.30	3	64	223-2d15e0.60A5Z80	15	0.60	5	80
223-2d10e0.35A3Z64	10	0.35	3	64	223-2d15e0.70A5Z80	15	0.70	5	80
223-2d10e0.40A3Z64	10	0.40	3	64	223-2d15e0.80A5Z80	15	0.80	5	80
223-2d10e0.50A3Z64	10	0.50	3	64	223-2d15e0.90A5Z80	15	0.90	5	80
223-2d10e0.60A3Z64	10	0.60	3	64	223-2d15e1.00A5Z80	15	1.00	5	80
223-2d10e0.70A3Z64	10	0.70	3	64	223-2d15e1.10A5Z80	15	1.10	5	80
223-2d10e0.80A3Z64	10	0.80	3	64	223-2d15e1.20A5Z80	15	1.20	5	80
223-2d10e0.90A3Z64	10	0.90	3	64	223-2d15e1.30A5Z80	15	1.30	5	80
223-2d10e1.00A3Z64	10	1.00	3	64	223-2d15e1.40A5Z80	15	1.40	5	80
223-2d12e0.10A5Z64	12	0.10	5	64	223-2d15e1.50A5Z80	15	1.50	5	80
223-2d12e0.15A5Z64	12	0.15	5	64	223-2d15e2.00A5Z80	15	2.00	5	80
223-2d12e0.20A5Z64	12	0.20	5	64	223-2d15e2.50A5Z80	15	2.50	5	80
223-2d12e0.25A5Z64	12	0.25	5	64	223-2d15e3.00A5Z80	15	3.00	5	80

Z 48-160

λ 0° γ 6°

CARB

Formule

$$F = F_z \cdot Z$$

$$V_f = F_z \cdot Z \cdot n$$

$$n = \frac{V_c \cdot 1000}{\pi \cdot d_1}$$

$$V_c = \frac{\pi \cdot d_1 \cdot n}{1000}$$

$$f_z = \frac{V_f}{Z \cdot n}$$

Leggenda

F [mm]: Avanzamento per giro

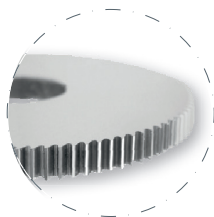
FZ [mm]: Avanzamento per dente

Z: Numero di denti

n: Numero di giri al minuto

Vf [mm/min]: Velocità d'avanzamento

Fresa circolare dentatura extra fine



Disponibile con o
senza rivestimento



Z
48-160



λ
0°

γ
6°

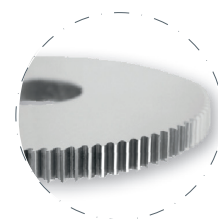
CARB

Art. n°	d ₁	e	d ₂	Z	Art. n°	d ₁	e	d ₂	Z
223-2d20e0.10A5Z100	20	0.10	5	100	223-2d20e3.00A5Z80	20	3.00	5	80
223-2d20e0.10A6Z80	20	0.10	6	80	223-2d20e3.00A6Z80	20	3.00	6	80
223-2d20e0.15A5Z100	20	0.15	5	100	223-2d25e0.10A5Z80	25	0.10	5	80
223-2d20e0.15A6Z80	20	0.15	6	80	223-2d25e0.15A5Z80	25	0.15	5	80
223-2d20e0.20A5Z100	20	0.20	5	100	223-2d25e0.15A6Z100	25	0.15	6	100
223-2d20e0.20A6Z80	20	0.20	6	80	223-2d25e0.15A8Z100	25	0.15	8	100
223-2d20e0.25A5Z80	20	0.25	5	80	223-2d25e0.20A5Z80	25	0.20	5	80
223-2d20e0.25A5Z100	20	0.25	5	100	223-2d25e0.20A6Z100	25	0.20	6	100
223-2d20e0.25A6Z80	20	0.25	6	80	223-2d25e0.20A8Z100	25	0.20	8	100
223-2d20e0.30A5Z80	20	0.30	5	80	223-2d25e0.25A5Z80	25	0.25	5	80
223-2d20e0.30A5Z100	20	0.30	5	100	223-2d25e0.25A6Z100	25	0.25	6	100
223-2d20e0.30A6Z80	20	0.30	6	80	223-2d25e0.25A8Z100	25	0.25	8	100
223-2d20e0.35A5Z80	20	0.35	5	80	223-2d25e0.30A5Z80	25	0.30	5	80
223-2d20e0.35A5Z100	20	0.35	5	100	223-2d25e0.30A6Z100	25	0.30	6	100
223-2d20e0.35A6Z80	20	0.35	6	80	223-2d25e0.30A8Z100	25	0.30	8	100
223-2d20e0.40A5Z80	20	0.40	5	80	223-2d25e0.35A5Z80	25	0.35	5	80
223-2d20e0.40A5Z100	20	0.40	5	100	223-2d25e0.35A6Z100	25	0.35	6	100
223-2d20e0.40A6Z80	20	0.40	6	80	223-2d25e0.35A8Z100	25	0.35	8	100
223-2d20e0.50A5Z80	20	0.50	5	80	223-2d25e0.40A5Z80	25	0.40	5	80
223-2d20e0.50A5Z100	20	0.50	5	100	223-2d25e0.40A6Z100	25	0.40	6	100
223-2d20e0.50A6Z80	20	0.50	6	80	223-2d25e0.40A8Z100	25	0.40	8	100
223-2d20e0.60A5Z80	20	0.60	5	80	223-2d25e0.50A5Z80	25	0.50	5	80
223-2d20e0.60A6Z80	20	0.60	6	80	223-2d25e0.50A6Z100	25	0.50	6	100
223-2d20e0.70A5Z80	20	0.70	5	80	223-2d25e0.50A8Z100	25	0.50	8	100
223-2d20e0.70A6Z80	20	0.70	6	80	223-2d25e0.60A5Z80	25	0.60	5	80
223-2d20e0.80A5Z80	20	0.80	5	80	223-2d25e0.60A6Z100	25	0.60	6	100
223-2d20e0.80A6Z80	20	0.80	6	80	223-2d25e0.60A8Z100	25	0.60	8	100
223-2d20e0.90A5Z80	20	0.90	5	80	223-2d25e0.70A5Z80	25	0.70	5	80
223-2d20e0.90A6Z80	20	0.90	6	80	223-2d25e0.70A6Z100	25	0.70	6	100
223-2d20e1.00A5Z80	20	1.00	5	80	223-2d25e0.70A8Z100	25	0.70	8	100
223-2d20e1.00A6Z80	20	1.00	6	80	223-2d25e0.80A5Z80	25	0.80	5	80
223-2d20e1.10A5Z80	20	1.10	5	80	223-2d25e0.80A6Z100	25	0.80	6	100
223-2d20e1.10A6Z80	20	1.10	6	80	223-2d25e0.80A8Z100	25	0.80	8	100
223-2d20e1.20A5Z80	20	1.20	5	80	223-2d25e0.90A5Z80	25	0.90	5	80
223-2d20e1.20A6Z80	20	1.20	6	80	223-2d25e0.90A6Z100	25	0.90	6	100
223-2d20e1.30A5Z80	20	1.30	5	80	223-2d25e0.90A8Z100	25	0.90	8	100
223-2d20e1.30A6Z80	20	1.30	6	80	223-2d25e1.00A5Z80	25	1.00	5	80
223-2d20e1.40A5Z80	20	1.40	5	80	223-2d25e1.00A6Z100	25	1.00	6	100
223-2d20e1.40A6Z80	20	1.40	6	80	223-2d25e1.00A8Z100	25	1.00	8	100
223-2d20e1.50A5Z80	20	1.50	5	80	223-2d25e1.10A5Z80	25	1.10	5	80
223-2d20e1.50A6Z80	20	1.50	6	80	223-2d25e1.10A6Z100	25	1.10	6	100
223-2d20e2.00A5Z80	20	2.00	5	80	223-2d25e1.10A8Z100	25	1.10	8	100
223-2d20e2.00A6Z80	20	2.00	6	80	223-2d25e1.20A5Z80	25	1.20	5	80
223-2d20e2.50A5Z80	20	2.50	5	80	223-2d25e1.20A6Z100	25	1.20	6	100
223-2d20e2.50A6Z80	20	2.50	6	80	223-2d25e1.20A8Z100	25	1.20	8	100

Fresa circolare dentatura extra fine

223-2

Continuazione



Disponibile con o
senza rivestimento



Z
48-160



λ
0°

γ
6°

CARB

Art. n°	d ₁	e	d ₂	Z	Art. n°	d ₁	e	d ₂	Z
223-2d25e1.30A5Z80	25	1.30	5	80	223-2d32e0.50A8Z80	32	0.50	8	80
223-2d25e1.30A6Z100	25	1.30	6	100	223-2d32e0.60A8Z80	32	0.60	8	80
223-2d25e1.30A8Z100	25	1.30	8	100	223-2d32e0.70A8Z80	32	0.70	8	80
223-2d25e1.40A5Z80	25	1.40	5	80	223-2d32e0.80A8Z80	32	0.80	8	80
223-2d25e1.40A6Z100	25	1.40	6	100	223-2d32e0.90A8Z80	32	0.90	8	80
223-2d25e1.40A8Z100	25	1.40	8	100	223-2d32e1.00A8Z80	32	1.00	8	80
223-2d25e1.50A5Z80	25	1.50	5	80	223-2d32e1.10A8Z80	32	1.10	8	80
223-2d25e1.50A6Z100	25	1.50	6	100	223-2d32e1.20A8Z80	32	1.20	8	80
223-2d25e1.50A8Z100	25	1.50	8	100	223-2d32e1.30A8Z80	32	1.30	8	80
223-2d25e2.00A5Z80	25	2.00	5	80	223-2d32e1.40A8Z80	32	1.40	8	80
223-2d25e2.00A6Z100	25	2.00	6	100	223-2d32e1.50A8Z80	32	1.50	8	80
223-2d25e2.00A8Z100	25	2.00	8	100	223-2d32e2.00A8Z80	32	2.00	8	80
223-2d25e2.50A5Z80	25	2.50	5	80	223-2d32e2.50A8Z80	32	2.50	8	80
223-2d25e2.50A6Z100	25	2.50	6	100	223-2d32e3.00A8Z80	32	3.00	8	80
223-2d25e2.50A8Z100	25	2.50	8	100	223-2d35e0.15A8Z96	35	0.15	8	96
223-2d25e3.00A5Z80	25	3.00	5	80	223-2d35e0.20A8Z96	35	0.20	8	96
223-2d25e3.00A6Z100	25	3.00	6	100	223-2d35e0.25A8Z96	35	0.25	8	96
223-2d25e3.00A8Z100	25	3.00	8	100	223-2d35e0.30A8Z96	35	0.30	8	96
223-2d30e0.10A8Z100	30	0.10	8	100	223-2d35e0.35A8Z96	35	0.35	8	96
223-2d30e0.15A8Z100	30	0.15	8	100	223-2d35e0.40A8Z96	35	0.40	8	96
223-2d30e0.20A8Z100	30	0.20	8	100	223-2d35e0.50A8Z96	35	0.50	8	96
223-2d30e0.25A8Z100	30	0.25	8	100	223-2d35e0.60A8Z96	35	0.60	8	96
223-2d30e0.30A8Z100	30	0.30	8	100	223-2d35e0.70A8Z96	35	0.70	8	96
223-2d30e0.35A8Z100	30	0.35	8	100	223-2d35e0.80A8Z96	35	0.80	8	96
223-2d30e0.40A8Z100	30	0.40	8	100	223-2d35e0.90A8Z96	35	0.90	8	96
223-2d30e0.50A8Z100	30	0.50	8	100	223-2d35e1.00A8Z96	35	1.00	8	96
223-2d30e0.60A8Z100	30	0.60	8	100	223-2d35e1.10A8Z96	35	1.10	8	96
223-2d30e0.70A8Z100	30	0.70	8	100	223-2d35e1.20A8Z96	35	1.20	8	96
223-2d30e0.80A8Z100	30	0.80	8	100	223-2d35e1.30A8Z96	35	1.30	8	96
223-2d30e0.90A8Z100	30	0.90	8	100	223-2d35e1.40A8Z96	35	1.40	8	96
223-2d30e1.00A8Z100	30	1.00	8	100	223-2d35e1.50A8Z96	35	1.50	8	96
223-2d30e1.10A8Z100	30	1.10	8	100	223-2d35e2.00A8Z96	35	2.00	8	96
223-2d30e1.20A8Z100	30	1.20	8	100	223-2d35e2.50A8Z96	35	2.50	8	96
223-2d30e1.30A8Z100	30	1.30	8	100	223-2d35e3.00A8Z96	35	3.00	8	96
223-2d30e1.40A8Z100	30	1.40	8	100	223-2d40e0.15A8Z100	40	0.15	8	100
223-2d30e1.50A8Z100	30	1.50	8	100	223-2d40e0.15A8Z160	40	0.15	8	160
223-2d30e2.00A8Z100	30	2.00	8	100	223-2d40e0.15A10Z100	40	0.15	10	100
223-2d30e2.50A8Z100	30	2.50	8	100	223-2d40e0.15A10Z160	40	0.15	10	160
223-2d30e3.00A8Z100	30	3.00	8	100	223-2d40e0.20A8Z100	40	0.20	8	100
223-2d32e0.15A8Z80	32	0.15	8	80	223-2d40e0.20A8Z160	40	0.20	8	160
223-2d32e0.20A8Z80	32	0.20	8	80	223-2d40e0.20A10Z100	40	0.20	10	100
223-2d32e0.25A8Z80	32	0.25	8	80	223-2d40e0.20A10Z160	40	0.20	10	160
223-2d32e0.30A8Z80	32	0.30	8	80	223-2d40e0.25A8Z100	40	0.25	8	100
223-2d32e0.35A8Z80	32	0.35	8	80	223-2d40e0.25A8Z160	40	0.25	8	160
223-2d32e0.40A8Z80	32	0.40	8	80	223-2d40e0.25A10Z100	40	0.25	10	100

Fresa circolare dentatura extra fine



Disponibile con o
senza rivestimento

Z
48-160



λ
0°

γ
6°

CARB

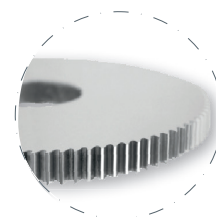
Art. n°	d ₁	e	d ₂	Z	Art. n°	d ₁	e	d ₂	Z
223-2d40e0.25A10Z160	40	0.25	10	160	223-2d40e1.30A8Z100	40	1.30	8	100
223-2d40e0.30A8Z100	40	0.30	8	100	223-2d40e1.30A8Z160	40	1.30	8	160
223-2d40e0.30A8Z160	40	0.30	8	160	223-2d40e1.30A10Z100	40	1.30	10	100
223-2d40e0.30A10Z100	40	0.30	10	100	223-2d40e1.30A10Z160	40	1.30	10	160
223-2d40e0.30A10Z160	40	0.30	10	160	223-2d40e1.40A8Z100	40	1.40	8	100
223-2d40e0.35A8Z100	40	0.35	8	100	223-2d40e1.40A8Z160	40	1.40	8	160
223-2d40e0.35A8Z160	40	0.35	8	160	223-2d40e1.40A10Z100	40	1.40	10	100
223-2d40e0.35A10Z100	40	0.35	10	100	223-2d40e1.40A10Z160	40	1.40	10	160
223-2d40e0.35A10Z160	40	0.35	10	160	223-2d40e1.50A8Z100	40	1.50	8	100
223-2d40e0.40A8Z100	40	0.40	8	100	223-2d40e1.50A8Z160	40	1.50	8	160
223-2d40e0.40A8Z160	40	0.40	8	160	223-2d40e1.50A10Z100	40	1.50	10	100
223-2d40e0.40A10Z100	40	0.40	10	100	223-2d40e1.50A10Z160	40	1.50	10	160
223-2d40e0.40A10Z160	40	0.40	10	160	223-2d40e2.00A8Z100	40	2.00	8	100
223-2d40e0.50A8Z100	40	0.50	8	100	223-2d40e2.00A8Z160	40	2.00	8	160
223-2d40e0.50A8Z160	40	0.50	8	160	223-2d40e2.00A10Z100	40	2.00	10	100
223-2d40e0.50A10Z100	40	0.50	10	100	223-2d40e2.00A10Z160	40	2.00	10	160
223-2d40e0.50A10Z160	40	0.50	10	160	223-2d40e2.50A8Z100	40	2.50	8	100
223-2d40e0.60A8Z100	40	0.60	8	100	223-2d40e2.50A8Z160	40	2.50	8	160
223-2d40e0.60A8Z160	40	0.60	8	160	223-2d40e2.50A10Z100	40	2.50	10	100
223-2d40e0.60A10Z100	40	0.60	10	100	223-2d40e2.50A10Z160	40	2.50	10	160
223-2d40e0.60A10Z160	40	0.60	10	160	223-2d40e3.00A8Z100	40	3.00	8	100
223-2d40e0.70A8Z100	40	0.70	8	100	223-2d40e3.00A8Z160	40	3.00	8	160
223-2d40e0.70A8Z160	40	0.70	8	160	223-2d40e3.00A10Z100	40	3.00	10	100
223-2d40e0.70A10Z100	40	0.70	10	100	223-2d40e3.00A10Z160	40	3.00	10	160
223-2d40e0.70A10Z160	40	0.70	10	160	223-2d45e0.15A8Z100	45	0.15	8	100
223-2d40e0.80A8Z100	40	0.80	8	100	223-2d45e0.15A8Z160	45	0.15	8	160
223-2d40e0.80A8Z160	40	0.80	8	160	223-2d45e0.20A8Z100	45	0.20	8	100
223-2d40e0.80A10Z100	40	0.80	10	100	223-2d45e0.20A8Z160	45	0.20	8	160
223-2d40e0.80A10Z160	40	0.80	10	160	223-2d45e0.25A8Z100	45	0.25	8	100
223-2d40e0.90A8Z100	40	0.90	8	100	223-2d45e0.25A8Z160	45	0.25	8	160
223-2d40e0.90A8Z160	40	0.90	8	160	223-2d45e0.30A8Z100	45	0.30	8	100
223-2d40e0.90A10Z100	40	0.90	10	100	223-2d45e0.30A8Z160	45	0.30	8	160
223-2d40e0.90A10Z160	40	0.90	10	160	223-2d45e0.35A8Z100	45	0.35	8	100
223-2d40e1.00A8Z100	40	1.00	8	100	223-2d45e0.35A8Z160	45	0.35	8	160
223-2d40e1.00A8Z160	40	1.00	8	160	223-2d45e0.40A8Z100	45	0.40	8	100
223-2d40e1.00A10Z100	40	1.00	10	100	223-2d45e0.40A8Z160	45	0.40	8	160
223-2d40e1.00A10Z160	40	1.00	10	160	223-2d45e0.50A8Z100	45	0.50	8	100
223-2d40e1.10A8Z100	40	1.10	8	100	223-2d45e0.50A8Z160	45	0.50	8	160
223-2d40e1.10A8Z160	40	1.10	8	160	223-2d45e0.60A8Z100	45	0.60	8	100
223-2d40e1.10A10Z100	40	1.10	10	100	223-2d45e0.60A8Z160	45	0.60	8	160
223-2d40e1.10A10Z160	40	1.10	10	160	223-2d45e0.70A8Z100	45	0.70	8	100
223-2d40e1.20A8Z100	40	1.20	8	100	223-2d45e0.70A8Z160	45	0.70	8	160
223-2d40e1.20A8Z160	40	1.20	8	160	223-2d45e0.80A8Z100	45	0.80	8	100
223-2d40e1.20A10Z100	40	1.20	10	100	223-2d45e0.80A8Z160	45	0.80	8	160
223-2d40e1.20A10Z160	40	1.20	10	160	223-2d45e0.90A8Z100	45	0.90	8	100

Fresa circolare dentatura extra fine

223-2

Continuazione

Art. n°	d ₁	e	d ₂	Z	Art. n°	d ₁	e	d ₂	Z
223-2d45e0.90A8Z160	45	0.90	8	160	223-2d50e1.30A13Z120	50	1.30	13	120
223-2d45e1.00A8Z100	45	1.00	8	100	223-2d50e1.40A10Z100	50	1.40	10	100
223-2d45e1.00A8Z160	45	1.00	8	160	223-2d50e1.40A13Z120	50	1.40	13	120
223-2d45e1.10A8Z100	45	1.10	8	100	223-2d50e1.50A10Z100	50	1.50	10	100
223-2d45e1.10A8Z160	45	1.10	8	160	223-2d50e1.50A13Z120	50	1.50	13	120
223-2d45e1.20A8Z100	45	1.20	8	100	223-2d50e2.00A10Z100	50	2.00	10	100
223-2d45e1.20A8Z160	45	1.20	8	160	223-2d50e2.00A13Z120	50	2.00	13	120
223-2d45e1.30A8Z100	45	1.30	8	100	223-2d50e2.50A10Z100	50	2.50	10	100
223-2d45e1.30A8Z160	45	1.30	8	160	223-2d50e2.50A13Z120	50	2.50	13	120
223-2d45e1.40A8Z100	45	1.40	8	100	223-2d50e3.00A10Z100	50	3.00	10	100
223-2d45e1.40A8Z160	45	1.40	8	160	223-2d50e3.00A13Z120	50	3.00	13	120
223-2d45e1.50A8Z100	45	1.50	8	100	223-2d63e0.25A16Z120	63	0.25	16	120
223-2d45e1.50A8Z160	45	1.50	8	160	223-2d63e0.30A16Z120	63	0.30	16	120
223-2d45e2.00A8Z100	45	2.00	8	100	223-2d63e0.35A16Z120	63	0.35	16	120
223-2d45e2.00A8Z160	45	2.00	8	160	223-2d63e0.40A16Z120	63	0.40	16	120
223-2d45e2.50A8Z100	45	2.50	8	100	223-2d63e0.50A16Z120	63	0.50	16	120
223-2d45e2.50A8Z160	45	2.50	8	160	223-2d63e0.60A16Z120	63	0.60	16	120
223-2d45e3.00A8Z100	45	3.00	8	100	223-2d63e0.70A16Z120	63	0.70	16	120
223-2d45e3.00A8Z160	45	3.00	8	160	223-2d63e0.80A16Z120	63	0.80	16	120
223-2d50e0.20A10Z100	50	0.20	10	100	223-2d63e0.90A16Z120	63	0.90	16	120
223-2d50e0.25A10Z100	50	0.25	10	100	223-2d63e1.00A16Z120	63	1.00	16	120
223-2d50e0.25A13Z120	50	0.25	13	120	223-2d63e1.10A16Z120	63	1.10	16	120
223-2d50e0.30A10Z100	50	0.30	10	100	223-2d63e1.20A16Z120	63	1.20	16	120
223-2d50e0.30A13Z120	50	0.30	13	120	223-2d63e1.30A16Z120	63	1.30	16	120
223-2d50e0.35A10Z100	50	0.35	10	100	223-2d63e1.40A16Z120	63	1.40	16	120
223-2d50e0.35A13Z120	50	0.35	13	120	223-2d63e1.50A16Z120	63	1.50	16	120
223-2d50e0.40A10Z100	50	0.40	10	100	223-2d63e2.00A16Z120	63	2.00	16	120
223-2d50e0.40A13Z120	50	0.40	13	120	223-2d63e2.50A16Z120	63	2.50	16	120
223-2d50e0.50A10Z100	50	0.50	10	100	223-2d63e3.00A16Z120	63	3.00	16	120
223-2d50e0.50A13Z120	50	0.50	13	120	223-2d80e0.50A16Z128	80	0.50	16	128
223-2d50e0.60A10Z100	50	0.60	10	100	223-2d80e0.60A16Z128	80	0.60	16	128
223-2d50e0.60A13Z120	50	0.60	13	120	223-2d80e0.70A16Z128	80	0.70	16	128
223-2d50e0.70A10Z100	50	0.70	10	100	223-2d80e0.80A16Z128	80	0.80	16	128
223-2d50e0.70A13Z120	50	0.70	13	120	223-2d80e0.90A16Z128	80	0.90	16	128
223-2d50e0.80A10Z100	50	0.80	10	100	223-2d80e1.00A16Z128	80	1.00	16	128
223-2d50e0.80A13Z120	50	0.80	13	120	223-2d80e1.10A16Z128	80	1.10	16	128
223-2d50e0.90A10Z100	50	0.90	10	100	223-2d80e1.20A16Z128	80	1.20	16	128
223-2d50e0.90A13Z120	50	0.90	13	120	223-2d80e1.30A16Z128	80	1.30	16	128
223-2d50e1.00A10Z100	50	1.00	10	100	223-2d80e1.40A16Z128	80	1.40	16	128
223-2d50e1.00A13Z120	50	1.00	13	120	223-2d80e1.50A16Z128	80	1.50	16	128
223-2d50e1.10A10Z100	50	1.10	10	100	223-2d80e2.00A16Z128	80	2.00	16	128
223-2d50e1.10A13Z120	50	1.10	13	120	223-2d80e2.50A16Z128	80	2.50	16	128
223-2d50e1.20A10Z100	50	1.20	10	100	223-2d80e3.00A16Z128	80	3.00	16	128
223-2d50e1.20A13Z120	50	1.20	13	120					
223-2d50e1.30A10Z100	50	1.30	10	100					



Disponibile con o senza rivestimento



Z
48-160



λ
0°

γ
6°

CARB

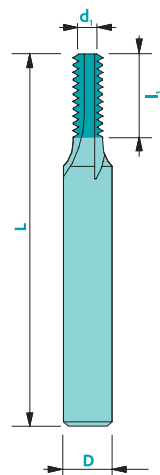
5200

Fresa a filettare - ISO 60°

filettatura interna e esterna



Disponibile con o
senza rivestimento



Gruppo materia (vedi pagina 3)

	a	b
Rivestimento consigliato	Solo	Solo
V_c non rivestito [m/min]	90	80
V_c rivestito [m/min]	110	100

Tolleranze $d_1 \leq 1 \text{ mm}$ ▶ +0/-0.01 D: h5
 $d_1 > 1 \text{ mm}$ ▶ +0/-0.02
 $d_1 = D$ ▶ $d_1: e8$

Z2-5

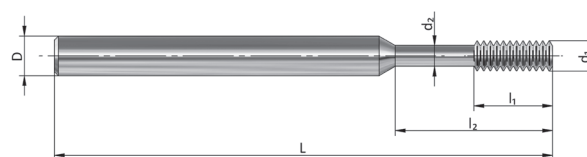

 λ
0°

 γ
8°

CARB

Art. n°	Ø nominal	Passo	d_1	l_1	D	L	Z
5200M1.2	M1.20	0.25	0.85	2.4	3	38	2
5200M1.4	M1.40	0.30	1.00	2.8	3	38	3
5200M1.6/1.8	M1.60/1.80	0.35	1.10	3.6	3	38	3
5200M2	M2.00	0.40	1.40	4.0	3	38	3
5200M2.5	M2.50	0.45	1.80	5.0	3	38	3
5200M3	M3.00	0.50	2.30	6.0	3	38	3
5200M4	M4.00	0.70	3.00	8.0	6	57	3
5200M5	M5.00	0.80	3.80	10.0	6	57	4
5200M6	M6.00	1.00	4.50	12.0	6	57	4
5200M8	M8.00	1.25	5.00	16.0	6	57	4
5200M10	M10.00	1.50	6.00	20.0	6	57	5

A richiesta



Formule

$$F = F_z \cdot Z$$

$$V_f = F_z \cdot Z \cdot n$$

$$n = \frac{V_c \cdot 1000}{\pi \cdot d_1}$$

$$V_c = \frac{\pi \cdot d_1 \cdot n}{1000}$$

$$f_z = \frac{V_f}{Z \cdot n}$$

Leggenda

F [mm]: Avanzamento per giro

FZ [mm]: Avanzamento per dente

Z: Numero di denti

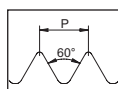
n: Numero di giri al minuto

Vf [mm/min]: Velocità d'avanzamento

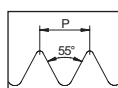
☐ Ordine

☐ Domanda d'offerta

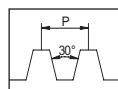
Norma:



ISO 60°



ISO 55°



ISO trapezoidal

☐ Altro:

Dimensioni:

 d_1 : _____

 l_1 : _____

 d_2 : _____

 l_2 : _____

 D^* : _____

 L^* : _____

Materiale da lavorare:

Rivestimento:

☐ Rivestito**

☐ Senza rivestimento

No. Ordine:

Quantità:

Persona di contatto:

Timbro della ditta e data:

*Dimensioni standard delle barre: Ø 3x L 38, Ø 4x L 38, Ø 6x L 38, Ø 6x L 51, Ø 8x L 61, Ø 10x L 72, Ø 12x L 83, Ø 16x L 92, Ø 20x L 104

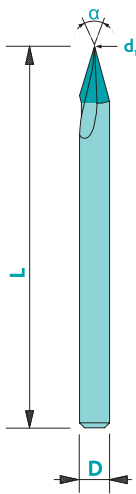
** Senza indicazioni da parte vostra, il rivestimento più adatto sarà applicato.

Fresa a incidere - ¾ - piatto alla punta

119-3

Gruppo materia (vedi pagina 3)	a	b
Rivestimento consigliato	Solo	Solo
n [rpm]	30'000	30'000
Fz↓ [mm]	0.004	0.004
Fz→ [mm]	0.008	0.008

Tolleranze
d_t: +/- 0.01
D: h5



Disponibile con o
senza rivestimento

Codice art. : 119-3a##d#.##
Esempio: fresa ref. 119-3 con angolo di 25° e diametro all'estremità 0.05mm: 119-3a25d0.05

α^{**}	d _t ^{**}	D	L
15-45°	0.02-0.09	3	33
15-45°	0.10-0.30	3	33
50-140°	0.02-0.09	3	33
50-140°	0.10-0.30	3	33

* Angoli possibili: tutti i 5° tra 15° e 45° e tutti gli 10° tra 50° e 140°

** Diametri possibili: tutti gli 0.01 mm tra 0.02 e 0.09 e tutti gli 0.05 mm tra 0.10 e 0.30 mm

Altre dimensioni (angolo, diametro all'estremità, codolo) a richiesta

0.02-0.30



λ
0°

CARB

Formule

$$F = F_z \cdot Z$$

$$V_f = F_z \cdot Z \cdot n$$

$$n = \frac{V_c \cdot 1000}{\pi \cdot d_t}$$

$$V_c = \frac{\pi \cdot d_t \cdot n}{1000}$$

$$f_z = \frac{V_f}{Z \cdot n}$$

Leggenda

F [mm]: Avanzamento per giro

FZ [mm]: Avanzamento per dente

Z: Numero di denti

n: Numero di giri al minuto

Vf [mm/min]: Velocità d'avanzamento

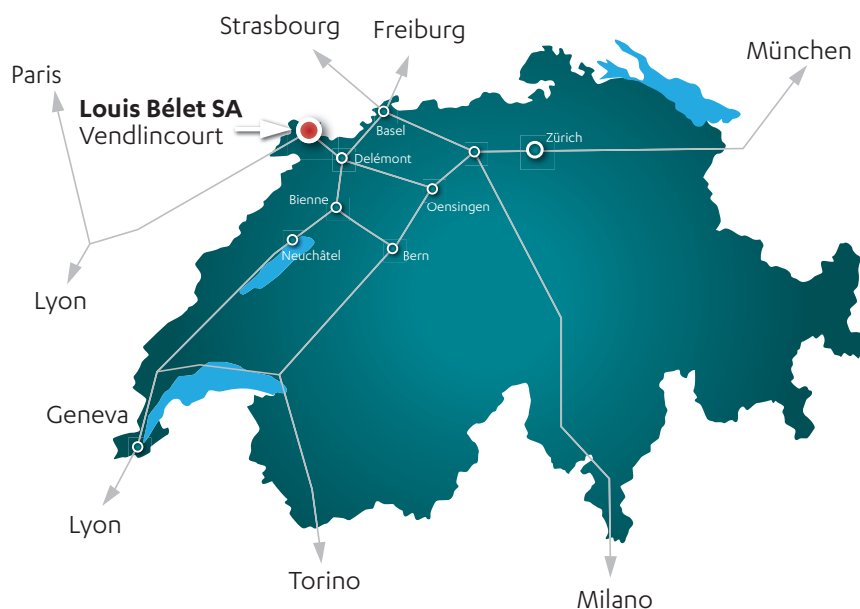


Dal 1948

Dal 1948, Louis Bélet SA, un'impresa a conduzione familiare con oltre 150 collaboratori, produce utensili di alta precisione in metallo duro, PCD e ceramica. Nel 2008, la direzione della ditta è stata ripresa dai due nipoti del fondatore, la signora Roxane Piquerez e il signor Arnaud Maître.

LOUIS BELET SA

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Fax +41 (0) 32 474 45 42
www.louisbelet.ch
info@louisbelet.ch



La ricerca dell'eccellenza

Lo spirito della ditta Belet si basa sulla continua ricerca dell'eccellenza. In tutte le nostre attività, cerchiamo sempre di trovare le soluzioni migliori per i nostri clienti e dipendenti.

La gestione della qualità e la gestione ambientale sono attestate di certificati ISO 9001:2008 e ISO 14001:2004

**Lista dei agenti
disponibili su www.louisbelet.ch**

