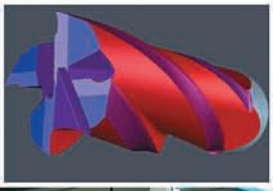
SILMAX



SILMAX

CARBIDE&HSS 2011

Silmax Quality

IQNet

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and its partner
CISQ/ICIM
hereby certify that the organization

SILMAX S.p.A.

Head Office and Operative Unit: **Via Oldofredi, 43 - I-20124 Milano (MI)**
Operative Unit: **Via Fucine, 9 - I-10074 Lanzo Torinese (TO)**

for the following field of activities

Design and production of cutting tools.

Quality Management System
which fulfills the requirements of the following standard

ISO 9001:2000

Issued on: **2008-07-16**
Validity date: **2011-07-15**

Registration Number: **IT-7626**

René Wasmer
President of IQNET

Gianrenzo Prati
President of CISQ

IQNet partners*:
AENOR *Spain* AFAQ AFNOR *France* AIB-Vincotte International *Belgium* ANCE *Mexico* APCER *Portugal* CISQ *Italy* CQC *China* CQM *China* CQS *Czech Republic* Cro Cert *Croatia* DQS *Germany* DS *Denmark* ELOT *Greece* FCAV *Brazil* FONDONORMA *Venezuela* HKQAA *Hong Kong China* ICONTEC *Colombia* IMNC *Mexico* Inspecta Certification *Finland* IRAM *Argentina* IQA *Japan* KFQ *Korea* MSZT *Hungary* Nemko AS *Norway* NSAI *Ireland* PCBC *Poland* QMI *Canada* Quality Austria *Austria* RR *Russia* SAI Global *Australia* SII *Israel* SIQ *Slovenia* SIRIM QAS International *Malaysia* SQS *Switzerland* SRAC *Romania* TEST St Petersburg *Russia* *YUQS Serbia*
IQNet is represented in the USA by: AFAQ AFNOR, AIB-Vincotte International, CISQ, DQS, NSAI Inc., QMI and SAI Global
*The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under www.iqnet-certification.com

ICIM
www.icim.it

CISQ is a member of IQNet

CERTIFICATO n. / *CERTIFICATE No.* **0569/4**

SI CERTIFICA CHE IL SISTEMA DI GESTIONE PER LA QUALITA' DI
WE HEREBY CERTIFY THAT THE QUALITY MANAGEMENT SYSTEM OPERATED BY

SILMAX S.p.A.

UNITA' OPERATIVE
OPERATIVE UNITS

Sede e Unità Operativa
Via Oldofredi, 43 - 20124 Milano (MI)
Unità Operativa
Via Fucine, 9 - 10074 Lanzo Torinese (TO)
Italia

E' CONFORME ALLA NORMA
IS IN COMPLIANCE WITH THE STANDARD

UNI EN ISO 9001:2000

PER LE SEGUENTI ATTIVITA'
FOR THE FOLLOWING ACTIVITIES

EA: 17

Progettazione e fabbricazione di utensili meccanici.
Design and production of cutting tools.

Riferirsi al Manuale della Qualità per l'applicabilità dei requisiti della Norma ISO 9001:2000.
Refer to Quality Manual for details of application to ISO 9001:2000 requirements.

Il presente certificato è soggetto al rispetto del regolamento per la certificazione dei sistemi di gestione per la qualità delle aziende.
The use and the validity of this certificate shall satisfy the requirements of the rules for the certification of company quality management systems.

Data emissione / *First issue*: 16/07/1996
Emissione corrente / *Current issue*: 16/07/2008
Data di scadenza / *Expiring date*: 15/07/2011

ICIM S.p.A. – PIAZZA A. DIAZ, 2 - 20123 MILANO

SINCERT

CISQ
FEDERAZIONE

Carbide

Frese integrali in Metallo Duro
Solid Carbide End mills
Vollhartmetallfräser
Frezy wykończeniowe z monolitu węglika
Punte in Metallo Duro
Carbide Drills
Hochleistungsbohren
Wiertła węglikowe dużej wydajności

Frese ad alte prestazioni per la lavorazione di Acciai

End mills for machining Steels
Hochleistungsfräser für die Stahlbearbeitung
Frezy do obróbki stali

HPC

Frese per la lavorazione di Acciai Temprati

End mills for machining Hardened Steels
Fräser für die Bearbeitung von gehärteten Stählen
Frezy do obróbki stali utwardzanych

HRC

Frese per la lavorazione di Inox, Inconel e Titanio

Machining of Stainless steels, Inconel and Titanium alloys
Fräser für die Bearbeitung von Inox, Inconel und Titanlegierungen
Frezy do obróbki inox, inconel oraz stopów tytanu

COLOUR

Frese per la lavorazione di ALU e Leghe Leggere

Machining of Aluminium and Light Alloys
Fräser für die Bearbeitung von Alu und Leichtlegierungen
Frezy do obróbki aluminium oraz stopów lekkich

ALU

Frese per la Lavorazione di Grafite

End mills for machining Graphite
Fräser für die Bearbeitung von Graphit
Frezy do obróbki grafitu

GRAFITE

Microfrese per Lavorazioni Universali

Micro-end mills for general applications
Mikrofräser für allgemeine Berarbeitungen
Mikro frezy ogólnego stosowania

MICRO

Frese per Lavorazioni Universali

Solid carbide endmills for general applications
Universalfräser
Frezy ogólnego stosowania

STD

Punte ad alto rendimento

High Performance Carbide Drills
Hochleistungsbohren
Wiertła węglikowe dużej wydajności

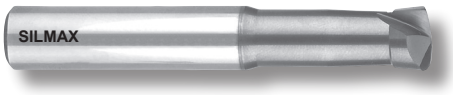
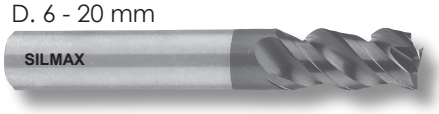
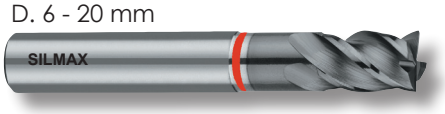
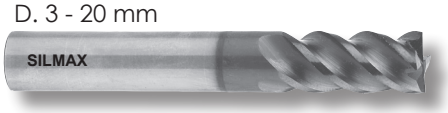
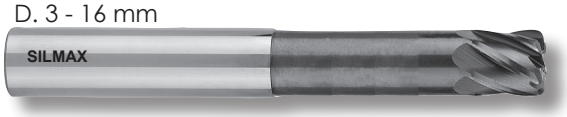
New

DRILLS

HPC

Frese ad alte prestazioni per la lavorazione di Acciai

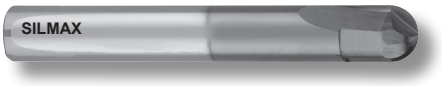
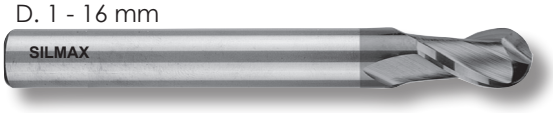
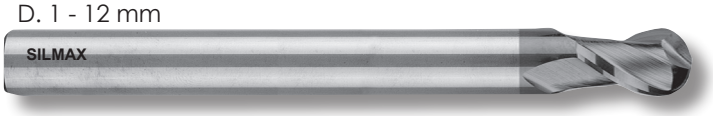
End mills for machining Steels
Hochleistungsfräser für die Stahlbearbeitung
Frezy do obróbki stali

Cod.			Pag.
04w	D. 4 - 16 mm 	Ultra Fine, Silmax Norm, Z=2, λ 0°	19
08w	D. 3 - 16 mm 	Ultra Fine, Silmax Norm, Z=4, λ 0°	19
142	D. 3 - 16 mm 	Ultra Fine, Silmax Norm, Z=4/6, λ 30°	21
151	D. 6 - 20 mm 	Ultra Fine, Silmax Norm, Z=3, λ 43°	23
152 152 Cr	D. 6 - 20 mm 	Ultra Fine, Silmax Norm, Z=4, λ 38° 41°	25
153 153 Cr	D. 3 - 20 mm 	Ultra Fine, Silmax Norm, Z=4, λ 43°	27
155	D. 6 - 20 mm 	Ultra Fine, Silmax Norm, Multi, λ 45°	29
09w	D. 3 - 12 mm 	Ultra Fine, Silmax Norm, Z=4, λ 0°	19
144	D. 3 - 16 mm 	Ultra Fine, Silmax Norm, Z=4/6, λ 30°	21
148	D. 3 - 16 mm 	Ultra Fine, Silmax Norm, Z=4, λ 43°	28

HPC

Frese ad alte prestazioni per la lavorazione di Acciai

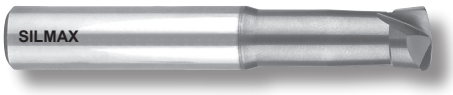
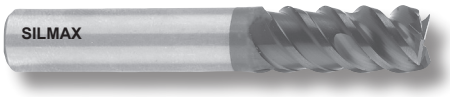
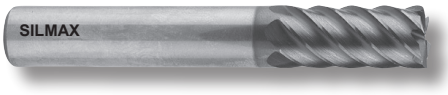
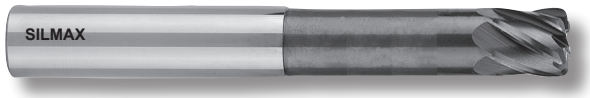
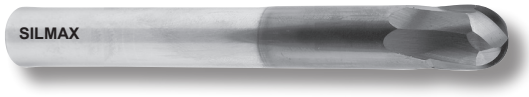
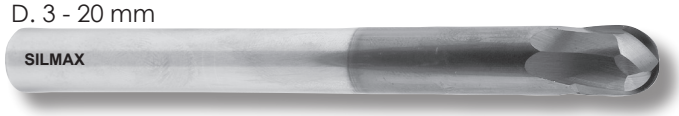
End mills for machining Steels
Hochleistungsfräser für die Stahlbearbeitung
Frezy do obróbki stali

Cod.			Pag.
710	D. 2 - 20 mm 	MG Co10 · Silmax Norm · Z=2 · λ 0°	31
720	D. 4 - 20 mm 	MG Co10 · Silmax Norm · Z=2 · λ 0°	31
734	D. 1 - 16 mm 	Ultra Fine · Silmax Norm · Z=2 · λ 30°	32
733	D. 1 - 12 mm 	Ultra Fine · Silmax Norm · Z=2 · λ 30°	32
190	D. 1 - 12 mm 	MG Co10 · Silmax Norm · Z=2 · λ 0°	35
191	D. 1 - 12 mm 	MG Co10 · Silmax Norm · Z=2 · λ 30°	34
192	D. 1 - 12 mm 	MG Co10 · Silmax Norm · Z=2 · λ 30°	35
90	D. 2 - 6 mm 	MG Co10 · Silmax Norm · Z=2	37

HRC

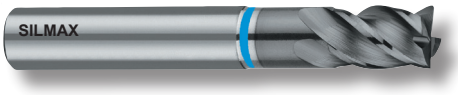
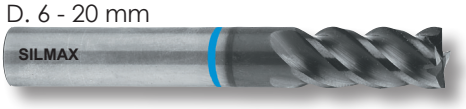
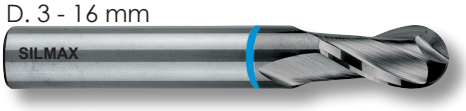
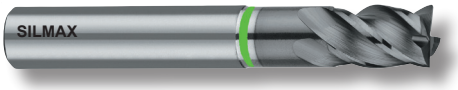
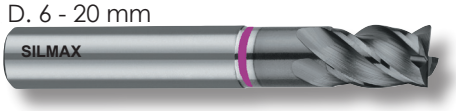
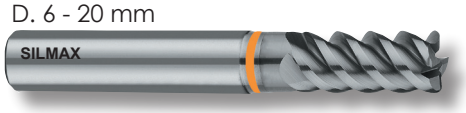
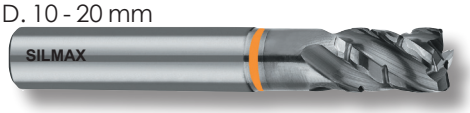
Frese per la lavorazione di Acciai Temprati

End mills for machining Hardened Steel
Fräser für die Bearbeitung von gehärteten Stählen
Frezy do obróbki stali utwardzanych

Cod.				Pag.
04w	D. 4 - 16 mm 	Ultra Fine	Silmax Norm Z=2 λ 0°	41
08w	D. 3 - 16 mm 	Ultra Fine	Silmax Norm Z=4 λ 0°	41
142	D. 3 - 16 mm 	Ultra Fine	Silmax Norm Z=4/6 λ 30°	43
043	D. 6 - 20 mm 	Ultra Fine	Silmax Norm Z=4 λ 52° γ **-15°**	45
143 143 Cr	D. 3 - 16 mm 	Ultra Fine	Silmax Norm Z=4 λ 45° γ **-10°**	46
145	D. 6 - 16 mm 	Ultra Fine	Silmax Norm Z=6 λ 45° γ **-10°**	47
09w	D. 3 - 12 mm 	Ultra Fine	Silmax Norm Z=4 λ 0°	41
144	D. 3 - 16 mm 	Ultra Fine	Silmax Norm Z=4/6 λ 30°	43
727	D. 1 - 20 mm 	Ultra Fine	Silmax Norm Z=2 λ 17° γ **-4°**	49
147	D. 6 - 16 mm 	Ultra Fine	Silmax Norm Z=4 λ 30° γ **-10°**	50
729	D. 3 - 20 mm 	Ultra Fine	Silmax Norm Z=2 λ 17° γ **-4°**	49

COLOUR — Frese per la lavorazione di Inox, Inconel e Titanio

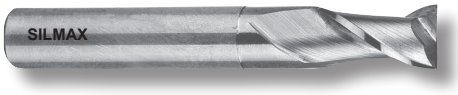
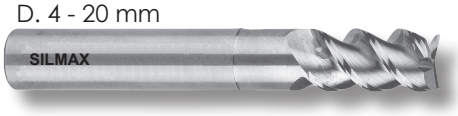
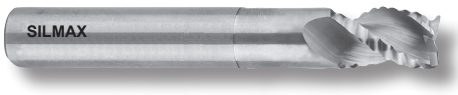
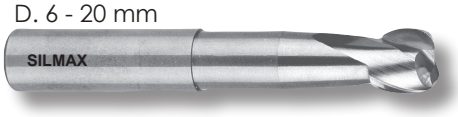
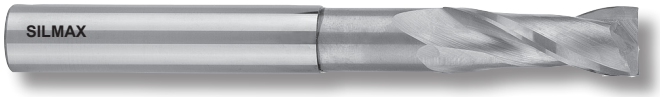
Machining of Stainless steel, Inconel and Titanium
Fräser für Inox, Inconel und Titanlegierungen
Frezy do obróbki Inox, Inconel oraz stopów tytanu

Cod.				Pag.
120 120 Cr	D. 6 - 20 mm 	Ultra Fine Z=4	Silmax Norm λ 38° 41°	53
124 124 Cr	D. 6 - 20 mm 	Ultra Fine Z=4	Silmax Norm λ 38° 40°	53
737	D. 3 - 16 mm 	MG Co10 Z=2	Silmax Norm λ 30°	54
119 119 Cr	D. 6 - 20 mm 	Ultra Fine Z=4	Silmax Norm λ 38° 41°	55
118 118 Cr	D. 6 - 20 mm 	Ultra Fine Z=4	Silmax Norm λ 38° 41°	57
117	D. 6 - 20 mm 	MG Co10 Z=3/4	6527L λ 55°	59
017	D. 10 - 20 mm 	MG Co10 Z=4	Silmax Norm λ 35°	59
	COLOURMILL			

ALU

Frese per la lavorazione di ALU e Leghe Leggere

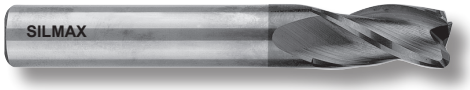
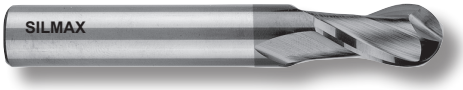
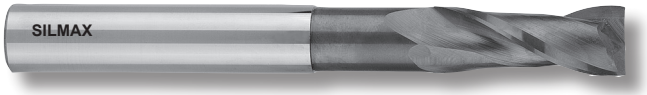
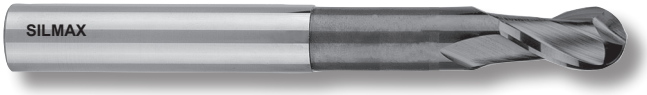
Machining of Alu and Light Alloys
Fräser für die Bearbeitung von Alu und Leichtlegierungen
Frezy do obróbki aluminium oraz stopów lekkich

Cod.			Pag.
700	D. 2 - 20 mm 	MG Co10 · Silmax Norm · Z=1 · λ 30° DX	63
701	D. 2 - 20 mm 	MG Co10 · Silmax Norm · Z=1 · λ 30° SX	63
175s 175s Cr	D. 2 - 20 mm 	MG Co10 · 6527L 6528 · Z=2 · λ 35°	65
115s 115s Cr	D. 4 - 20 mm 	MG Co10 · 6527L 6528 · Z=3 · λ 55°	66
015s	D. 10 - 20 mm 	Ultra Fine · Silmax Norm · Z=3 · λ 40°	69
165s	D. 6 - 20 mm 	MG Co10 · Silmax Norm · Z=2 · λ 35°	67
765s	D. 3 - 20 mm 	MG Co10 · Silmax Norm · Z=2 · λ 50°	67
179c	D. 2 - 12 mm 	MG Co10 · Silmax Norm · Z=2 · λ 35°	68
739c	D. 2 - 12 mm 	MG Co10 · Silmax Norm · Z=2 · λ 35°	68

GRAFITE

Frese per la lavorazione di Grafite

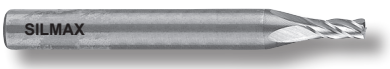
End mills for machining Graphite
Fräser für die Bearbeitung von Graphit
Frezy do obróbki grafitu

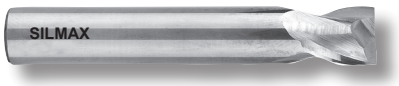
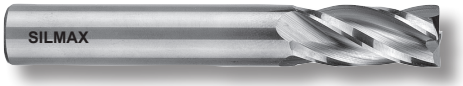
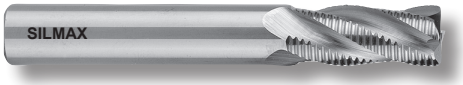
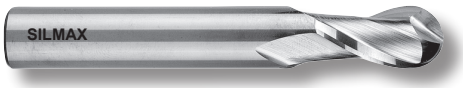
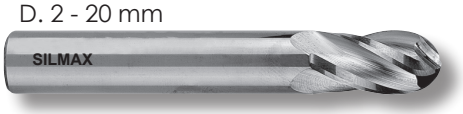
Cod.				Pag.
121	D. 0,5 - 3,0 mm 	MG Co10	Silmax Norm Z=2 λ 30°	76
122	D. 0,5 - 3,0 mm 	MG Co10	Silmax Norm Z=2 λ 30°	76
175Cr	D. 2 - 16 mm 	MG Co10	6527L 6528 Z=2 λ 35°	73
111Cr	D. 2 - 16 mm 	MG Co10	6527L 6528 Z=3 λ 30°	74
765s	D. 3 - 16 mm 	MG Co10	Silmax Norm Z=2 λ 50°	77
737	D. 1 - 16 mm 	MG Co10	Silmax Norm Z=2 λ 30°	77
179c	D. 3 - 12 mm 	MG Co10	Silmax Norm Z=2 λ 35°	75
739c	D. 2 - 12 mm 	MG Co10	Silmax Norm Z=2 λ 35°	78

MICRO

Microfrese per lavorazioni universali

Micro end mills for general applications
Mikrofräser für allgemeine Berarbeitungen
Mikro frezy ogólnego stosowania

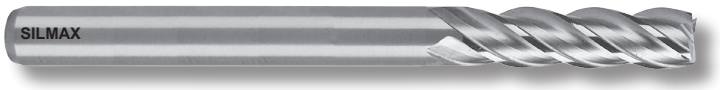
Cod.			Pag.
721	D. 0,2 - 3,0 mm  Nervature, Rib Cutters, Rippfräser, Frezy do elementów cienkościennych	MG Co12 · Silmax Norm · Z=2 · λ 20°	80
722	D. 0,2 - 3,0 mm  Nervature, Rib Cutters, Rippfräser, Frezy do elementów cienkościennych	MG Co12 · Silmax Norm · Z=2 · λ 0°	82
724	D. 1,5 - 3,0 mm 	MG Co10 · Silmax Norm · Z=4 · λ 45°	86
171	D. 0,1 - 3,0 mm 	MG Co10 · 6527L 6528 · Z=2 · λ 30°	88
111	D. 0,6- 3,0 mm 	MG Co10 · 6527L 6528 · Z=3 · λ 30°	88
737	D. 0,1 - 3,0 mm 	MG Co10 · Silmax Norm · Z=2 · λ 30°	89
131	D. 1,0 - 3,0 mm 	MG Co10 · Silmax Norm · Z=4 · λ 30°	89
121	D. 0,5 - 3,0 mm 	MG Co10 · Silmax Norm · Z=2 · λ 30°	90
122	D. 0,5 - 3,0 mm 	MG Co10 · Silmax Norm · Z=2 · λ 30°	90
172	D. 2,0 - 5,0 mm 	MG Co10 · 6527L · Z=2 · λ 30°	91
114	D. 2,0 - 5,0 mm 	MG Co10 · 6527L · Z=3 · λ 30°	91
116	D. 2,0 - 5,0 mm 	MG Co10 · 6527L · Z=4 · λ 30°	92

STD Cod.	Frese per lavorazioni universali	End mills for general applications Universalfräser Frezy pełnowęglikowe, wykończeniowe ogólnego stosowania	Pag.
107	D. 2 - 10 mm 	MG Co10 · Silmax Norm · Z=2 · λ 30°	96
108	D. 2 - 10 mm 	MG Co10 · Silmax Norm · Z=3 · λ 30°	97
109	D. 2 - 10 mm 	MG Co10 · Silmax Norm · Z=4 · λ 30°	97
731	D. 2 - 20 mm 	MG Co10 · 6527K 6528 · Z=2 · λ 30°	98
171 171 Cr	D. 2 - 20 mm 	MG Co10 · 6527L 6528 · Z=2 · λ 30°	99
111 111 Cr	D. 2 - 20 mm 	MG Co10 · 6527L 6528 · Z=3 · λ 30°	100
113 113 Cr	D. 2 - 25 mm 	MG Co10 · 6527L 6528 · Z=4 · λ 30°	102
106 106 Cr	D. 6 - 25 mm 	MG Co10 · 6527L · Z=6/8 · λ 30°	101
013F	D. 4 - 20 mm 	MG Co10 · 6527L · Z=4 · λ 30°	107
737	D. 2 - 20 mm 	MG Co10 · Silmax Norm · Z=2 · λ 30°	105
131	D. 2 - 20 mm 	MG Co10 · Silmax Norm · Z=4 · λ 30°	105
747	D. 4 - 16 mm 	MG Co10 · Silmax Norm · Z=2 · λ 30°	106

STD

Frese per lavorazioni universali

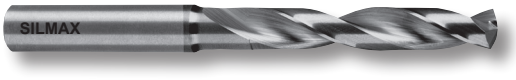
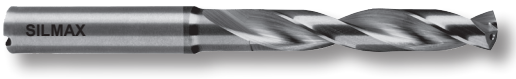
End mills for general applications
Universalfräser
Frezy pełnowęglikowe, wykończeniowe ogólnego stosowania

Cod.			Pag.
173	D. 3 - 16 mm 	MG Co10 · Silmax Norm · Z=2 · λ 30°	103
123	D. 3 - 16 mm 	MG Co10 · Silmax Norm · Z=4 · λ 30°	103
176	D. 4 - 16 mm 	MG Co10 · Silmax Norm · Z=2 · λ 30°	104
126	D. 4 - 16 mm 	MG Co10 · Silmax Norm · Z=4 · λ 30°	104
130	D. 6 - 20 mm 	MG Co10 · Silmax Norm · Z=4 · λ 30°	106

DRILLS

Punte ad alto rendimento

High performance Carbide Drills
Hochleistungsbohren
Wiertła węglikowe dużej wydajności

Cod.			Pag.
3030	D. 3 - 16 mm 	MG Co10 · DIN 6537K · Z=2	111
3031	D. 3 - 16 mm 	MG Co10 · DIN 6537K · Z=2	113
3050	D. 3 - 16 mm 	MG Co10 · DIN 6537L · Z=2	115
3051	D. 3 - 16 mm 	MG Co10 · DIN 6537L · Z=2	117
3081	D. 4 - 16 mm 	MG Co10 · Silmax Norm · Z=2	119

La qualità come scelta.

HPC

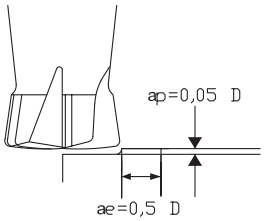
FRESE PER LA LAVORAZIONE DI ACCIAI

END MILLS FOR MACHINING STEELS

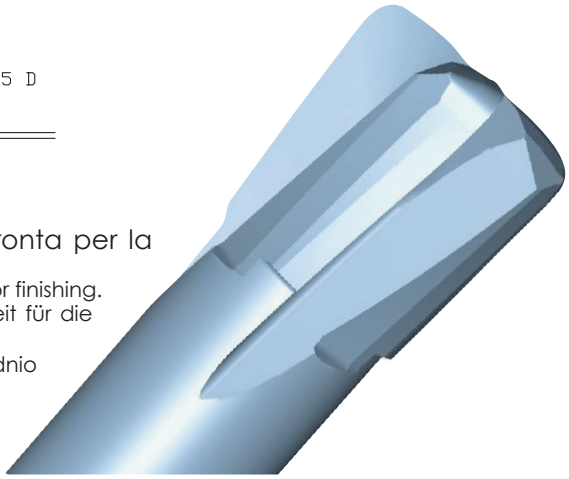
HOCHLEISTUNGSFRÄSER FÜR DIE STAHLBEARBEITUNG

FREZY DO OBRÓBKI STALI

04w - 08w - 09w

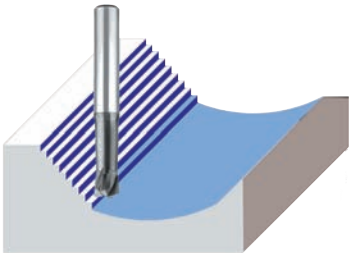


Superficie semi-finita, pronta per la finitura
Semi-finished surface, ready for finishing.
Halbfertige Oberflächen, bereit für die Feinbearbeitung.
Powierzchnia po obróbce średnio dokładnej przygotowana pod obróbkę wykończeniową



Trucioli sottili, minore sforzo di taglio
Thin chips, less cutting forces
Feine Späne, geringere Schnittkräfte
Cienki wiór, mniejsze siły skrawania.

Fresatura a copiare
3D copy milling
Kopierfräsen
Kopiowanie 3D



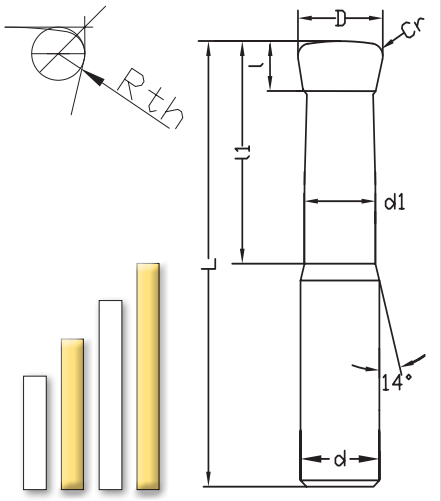
Fresatura di tasca
Pocketing
Taschenfräsen
Wybieranie "kieszeni"

Fresatura frontale
Face Milling
Stirnfräsen
Frezowanie czołowe

	Steel <800 N/mm² AIR MQL MAX									Steel <1000 N/mm² AIR MQL MAX								
	HMG 04w			HMG 08w			HMG 09w			HMG 04w			HMG 08w			HMG 09w		
	0,5 D / 0,05 D																	
m/min	Vc 250			Vc 250			Vc 250			Vc 230			Vc 230			Vc 230		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,500	20000	19900	0,314	25000	19900	0,188	15000	19900	0,490	18000	18300	0,314	23000	18300	0,180	13200	18300
6,0	0,750	20000	13300	0,470	25000	13300	0,282	15000	13300	0,720	17500	12200	0,471	23000	12200	0,280	13200	12200
8,0	0,900	18000	10000	0,625	25000	10000	0,375	15000	10000	0,770	14000	9150	0,628	23000	9150	0,361	13200	9150
10,0	1,000	16000	8000	0,781	25000	8000	0,469	15000	8000	0,850	12500	7320	0,729	21350	7320	0,417	12210	7320
12,0	1,000	13300	6600	0,947	25000	6600	0,568	15000	6600	0,850	10500	6100	0,750	18300	6100	0,419	10218	6100
16,0	1,000	10000	5000	1,000	20000	5000	-	-	-	0,820	7500	4580	0,755	13825	4580	-	-	-

	Steel <1300 N/mm² AIR MQL MAX									Steel 12% Cr MAX								
	HMG 04w			HMG 08w			HMG 09w			HMG 04w			HMG 08w			HMG 09w		
	0,5 D / 0,05 D																	
m/min	Vc 200			Vc 200			Vc 200			Vc 120			Vc 120			Vc 120		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,472	15000	15900	0,314	20000	15900	0,189	12000	15900	0,202	3840	9500	0,300	11600	9500	0,183	6960	9500
6,0	0,703	14900	10600	0,472	20000	10600	0,283	12000	10600	0,200	2560	6400	0,422	10800	6400	0,253	6480	6400
8,0	0,694	11100	8000	0,625	20000	8000	0,375	12000	8000	0,200	1920	4800	0,396	7600	4800	0,238	4560	4800
10,0	0,695	8900	6400	0,695	17800	6400	0,417	10680	6400	0,200	1520	3800	0,400	6160	3800	0,243	3696	3800
12,0	0,698	7400	5300	0,698	14800	5300	0,419	8880	5300	0,200	1280	3200	0,400	5120	3200	0,240	3072	3200
16,0	0,700	5600	4000	0,700	11200	4000	-	-	-	0,200	960	2400	0,400	3840	2400	-	-	-

SILMAX



04w Frese per elevati avanzamenti
High Feed cutters

Ultra Fine

Silmax Norm

λ 0°

Cr

08w 09w Frese per elevati avanzamenti
High Feed cutters

Ultra Fine

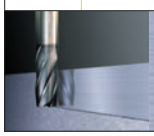
Silmax Norm

λ 0°

Cr

D	d	d1	L	l	l1	04w	HMG	Rth	Cr	Z	08w	HMG	Rth	Cr	Z
h10	h6						€					€			
3	6	2,6	57	3	8						08w030	104,60	0,4	0,3	4
4	6	3,6	57	3	11	04w040	75,60	0,6	0,5	2	08w040	91,10	0,6	0,5	4
5	6	4,6	57	4	15						08w050	101,90	0,6	0,5	4
6	6	5,6	57	5	18	04w060	73,60	0,7	0,6	2	08w060	88,80	0,7	0,6	4
7	8	6,4	63	5	21						08w070	136,80	0,8	0,6	4
8	8	7,3	63	6	24	04w080	99,00	0,8	0,6	2	08w080	119,30	0,8	0,6	4
9	10	8,2	72	6	28						08w090	178,60	0,9	0,7	4
10	10	9,0	72	7	32	04w100	129,50	1,0	0,7	2	08w100	155,90	1,0	0,7	4
12	12	11,0	83	8	36	04w120	166,90	1,2	0,8	2	08w120	201,00	1,2	0,8	4
16	16	14,4	92	10	44	04w160	260,70	1,7	1,0	2	08w160	314,20	1,7	1,0	4

D	d	d1	L	l	l1	09w	HMG	Rth	Cr	Z
h10	h6					Lunga	€			
3	6	2,6	78	3	8	09w030	114,80	0,4	0,3	4
4	6	3,6	78	3	11	09w040	100,10	0,6	0,5	4
5	6	4,6	78	4	15	09w050	111,80	0,6	0,5	4
6	6	5,6	78	5	18	09w060	97,50	0,7	0,6	4
7	8	6,4	92	5	21	09w070	150,60	0,8	0,6	4
8	8	7,3	92	6	24	09w080	131,30	0,8	0,6	4
9	10	8,2	105	6	28	09w090	197,10	0,9	0,7	4
10	10	9,0	105	7	32	09w100	172,10	1,0	0,7	4
12	12	11,0	105	8	36	09w120	221,00	1,2	0,8	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.18

Lavorazioni, Machining Process

Lavorazioni, Machining Process

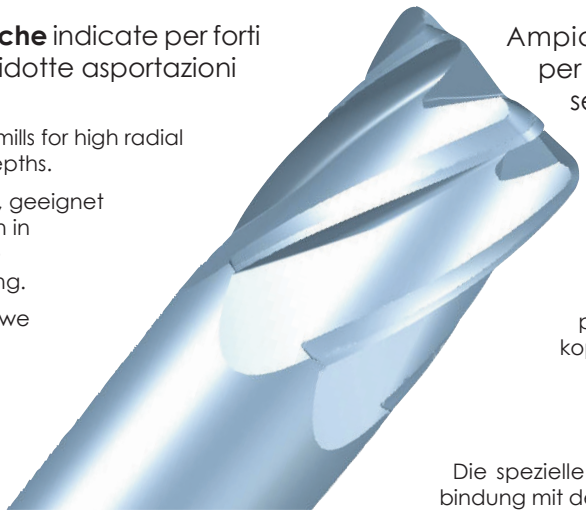
142 - 144

Frese **multitaglienti toriche** indicate per forti asportazioni radiali e ridotte asportazioni assiali.

Multicut corner radius end mills for high radial infeeds and limited axial depths.

Mehrschneidige Torusfräser, geeignet für große Spanabhebungen in Radialrichtung und geringe Abhebungen in Axialrichtung.

Toroidalne frezy wieloostrzowe przeznaczone do pracy przy dużych naddatkach promieniowych i zmniejszonych naddatkach osiowych.



Ampia **gamma di corner radius** per lavorazioni di copiatura nel settore degli stampi.

Wide corner radius range for copy milling in mould production.

Große Auswahl an Eckenradien für das Kopierfräsen im Formenbau.

Szeroka gama dostępnych promieni naroży. Wykorzystywane do kopiowania, oraz przy produkcji form.

La particolare geometria dei corner radius unita alla **micrograna ultrafine** di base, garantisce a questi utensili una eccellente resistenza all'usura.

The special corner radius geometry, along with the ultrafine hard metal grade, gives the tool an excellent wear resistance

Die spezielle Geometrie der Eckenradien in Verbindung mit dem Ultrafeinkorn-Hartmetall garantiert hohe Verschleißfestigkeit der Werkzeuge.

Specjalna geometria naroży w połączeniu z ultra drobnym ziarnem węglika daje narzędzie o doskonałej odporności na zużycie.

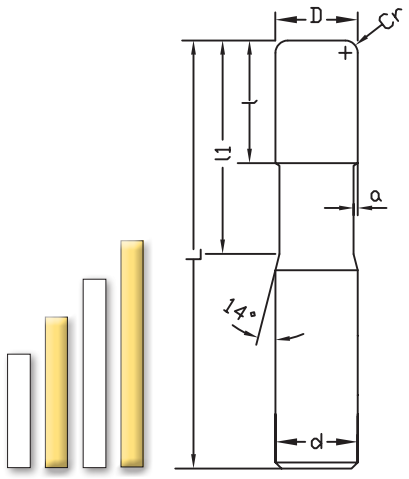
Serie Lunga , Long, Lang, Długa
HMG 144 **F -15%, n -15%**

	Steel <800 N/mm² AIR MQL MAX						Steel <1000 N/mm² AIR MQL MAX					
	HMG 142						HMG 142					
	1,0 D / 0,20 D			0,05 D / 0,10 D			0,030 D / 0,030 D			1,0 D / 0,20 D			0,05 D / 0,10 D			0,030 D / 0,030 D		
m/min	Vc 194			Vc 264			Vc 440			Vc 157			Vc 215			Vc 358		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,016	970	15414	0,064	5358	21019	0,088	12293	35032	0,013	638	12524	0,057	3875	17078	0,079	8963	28463
6,0	0,036	1480	10276	0,084	4708	14013	0,108	10089	23355	0,033	1102	8349	0,077	3507	11385	0,099	7514	18976
8,0	0,050	1553	7707	0,098	4136	10510	0,122	8575	17516	0,047	1187	6262	0,091	3121	8539	0,113	6455	14232
10,0	0,062	1518	6166	0,110	3684	8408	0,134	7485	14013	0,059	1173	5010	0,103	2802	6831	0,125	5672	11385
12,0	0,071	2178	5138	0,119	4988	7006	0,143	9995	11677	0,068	1695	4175	0,112	3814	5693	0,134	7609	9488
16,0	0,157	3631	3854	0,133	4195	5255	0,157	8252	8758	0,148	2781	3131	0,126	3229	4270	0,148	6321	7116

	Steel <1300 N/mm² AIR MQL MAX						Steel 12% Cr MAX					
	HMG 142						HMG 142					
	1,0 D / 0,20 D			0,05 D / 0,10 D			0,030 D / 0,030 D			1,0 D / 0,20 D			0,05 D / 0,10 D			0,030 D / 0,030 D		
m/min	Vc 121			Vc 165			Vc 275			Vc 61			Vc 75			Vc 138		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,013	4830	9634	0,05	2613	13137	0,07	6107	21895	0,013	241	4817	0,05	1188	5971	0,07	3053	10947
6,0	0,030	771	6423	0,070	2452	8758	0,090	5255	14597	0,030	385	3211	0,070	1115	3981	0,090	2627	7298
8,0	0,044	855	4817	0,084	2217	6568	0,104	4571	10947	0,044	428	2408	0,084	1008	2986	0,104	2285	5474
10,0	0,056	856	3854	0,096	2008	5255	0,116	4048	8758	0,056	428	1927	0,096	913	2389	0,116	2024	4379
12,0	0,065	1246	3211	0,105	2750	4379	0,125	5459	7298	0,065	623	1606	0,105	1250	1990	0,125	2729	3649
16,0	0,079	1142	2408	0,119	2346	3284	0,139	4566	5474	0,079	571	1204	0,119	1066	1493	0,139	2283	2737

SILMAX

142 Frese toriche
Corner radius end mills



Ultra Fine

Silmax Norm

λ 30°

Cr

D	d	L	l	Cr	l1	a	142 Cr	HMG		Z
e8	h6							€		
3	3	50	4	0,3	-	-	142030Cr03	37,60		4
4	4	50	5	0,3	-	-	142040Cr03	42,30		4
5	5	50	6	0,5	-	-	142050Cr05	46,90		4
6	6	57	7	0,5	-	-	142060Cr05	53,20		4
6	6	57	7	1,0	-	-	142060Cr10	53,20		4
8	8	63	9	0,5	-	-	142080Cr05	72,30		4
8	8	63	9	1,0	-	-	142080Cr10	72,30		4
10	10	72	11	1,0	-	-	142100Cr10	111,80		4
10	10	72	11	1,5	-	-	142100Cr15	111,80		4
12	12	81	12	1,5	-	-	142120Cr15	148,90		6
16	16	86	16	1,5	-	-	142160Cr15	266,40		6

144 Frese toriche
Corner radius end mills

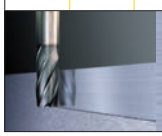
Ultra Fine

Silmax Norm

λ 30°

Cr

D	d	L	l	Cr	l1	a	144 Cr	HMG		Z
e8	h6							€		
3	6	80	4	0,3	-	-	144030Cr03	59,60		4
4	6	80	5	0,3	-	-	144040Cr03	63,90		4
5	6	80	6	0,5	-	-	144050Cr05	68,10		4
6	6	80	7	0,5	17	0,15	144060Cr05	66,90		4
6	6	80	7	1,0	17	0,15	144060Cr10	66,90		4
8	8	80	9	0,5	19	0,15	144080Cr05	83,30		4
8	8	80	9	1,0	19	0,15	144080Cr10	83,30		4
10	10	108	11	1,0	31	0,15	144100Cr10	134,40		4
10	10	108	11	1,5	31	0,15	144100Cr15	134,40		4
12	12	108	12	1,5	32	0,20	144120Cr15	163,20		6
16	16	120	16	1,5	36	0,20	144160Cr15	280,90		6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.20

Lavorazioni, Machining Process

Lavorazioni, Machining Process

SILMAX

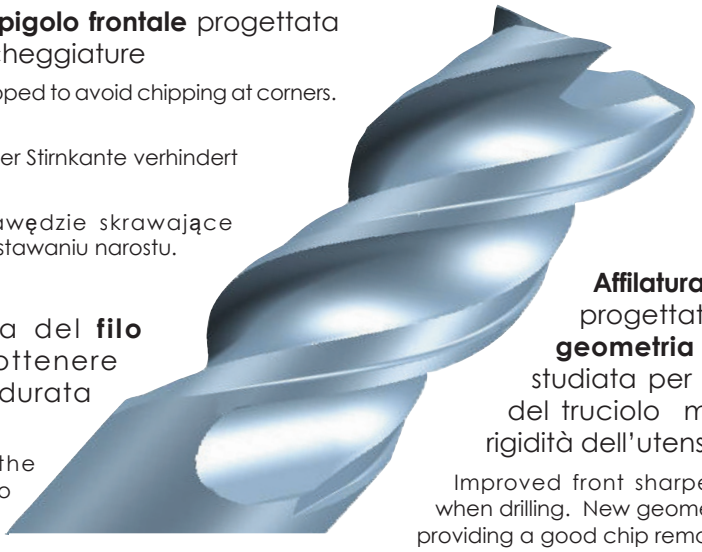
151

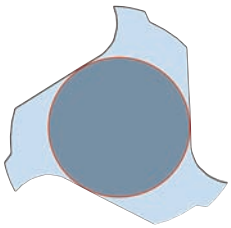
Affilatura dello **spigolo frontale** progettata per prevenire scheggiature

Cutting edges developed to avoid chipping at corners.

Der spezielle Schliff der Stirnkante verhindert Absplitterungen.

Rozbudowane krawędzie skrawające zapobiegające powstawaniu narostu.





Elevata finitura del **filo tagliente** per ottenere una maggiore durata dell'utensile

High finishing of the cutting edge to provide a longer tool life

Die hochwertige Verarbeitung der Schneidkante sorgt für längere Standzeit des Werkzeugs.

Precyzyjnie wykonana krawędź skrawająca, zapewniająca dłuższą żywotność narzędzia.

Affilatura frontale con ampi scarichi progettata per la foratura. **Nuova geometria** del nucleo e delle gole studiata per una rapida evacuazione del truciolo mantenendo la massima rigidità dell'utensile.

Improved front sharpening, providing good results when drilling. New geometry of the core and of the flutes providing a good chip removal.

Stirnschliff mit großzügigen Aussparungen, optimal zum Bohren. Neue Geometrie des Kerns und der Nuten für eine schnelle Spanabfuhr und gleichbleibend hohe Steifigkeit des Werkzeugs.

Zmodyfikowane ostrze centralne umożliwiające wiercenie. Nowa geometria rdzenia oraz zmieniony kształt rowków wiórowych zapewniający doskonałą ewakuację wióra.

Steel <800 N/mm² — AIR MQL MAX

HMG 151

	0,5 D / 1,0 D			1,5 D / 0,10 D			1,5 D		
m/min	Vc 107			Vc 129			Vc 78		
D	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,060	1024	5690	0,060	1229	6828	0,024	300	4161
8,0	0,080	1026	4268	0,080	1231	5121	0,044	413	3121
10,0	0,096	981	3414	0,096	1177	4097	0,060	448	2497
12,0	0,109	926	2845	0,109	1111	3414	0,073	453	2081
16,0	0,129	824	2134	0,129	988	2561	0,093	434	1561
20,0	0,144	739	1707	0,144	887	2048	0,108	406	1248

Steel <1000 N/mm² — AIR MQL MAX

HMG 151

	0,5 D / 1,0 D			1,5 D / 0,10 D			1,5 D		
m/min	Vc 87			Vc 105			Vc 64		
D	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,055	763	4623	0,055	915	5548	0,022	223	3381
8,0	0,075	782	3467	0,075	938	4161	0,042	321	2536
10,0	0,091	755	2774	0,091	906	3329	0,058	352	2029
12,0	0,104	718	2312	0,104	861	2774	0,071	358	1691
16,0	0,124	643	1734	0,124	772	2080	0,091	345	1268
20,0	0,139	580	1387	0,139	695	1664	0,106	323	1014

Steel <1300 N/mm² — AIR MQL MAX

HMG 151

	0,5 D / 1,0 D			1,5 D / 0,10 D			1,5 D		
m/min	Vc 67			Vc 80			Vc 49		
D	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,050	533	3556	0,050	640	4268	0,020	156	2601
8,0	0,070	561	2667	0,070	673	3201	0,040	235	1951
10,0	0,086	549	2134	0,086	659	2561	0,056	261	1561
12,0	0,099	526	1778	0,099	631	2134	0,069	267	1300
16,0	0,119	475	1334	0,119	570	1600	0,089	259	975
20,0	0,134	430	1067	0,134	516	1280	0,104	244	780

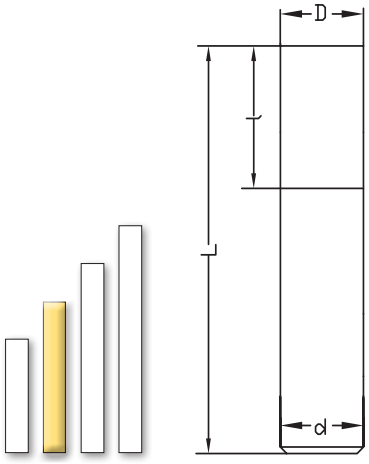
Steel 12% Cr — MAX

HMG 151

	0,5 D / 1,0 D			1,5 D / 0,10 D			1,5 D		
m/min	Vc 34			Vc 40			Vc 25		
D	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,050	267	1778	0,050	320	2134	0,020	78	1300
8,0	0,070	281	1334	0,070	337	1600	0,040	117	975
10,0	0,086	274	1067	0,086	329	1280	0,056	131	780
12,0	0,099	263	889	0,099	315	1067	0,069	134	650
16,0	0,119	237	667	0,119	285	800	0,089	130	488
20,0	0,134	215	533	0,134	258	640	0,104	122	390

151 Frese a tre taglienti per elevate asportazioni

3-flute cutters for high chip removal



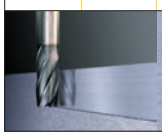
Ultra Fine

Silmax Norm

λ 43°

0,03-0,10
45°

D e8	d h6	L	l			151	HMG €		Z
6	6	57	13			151060	51,90		3
8	8	63	19			151080	70,70		3
10	10	72	22			151100	104,40		3
12	12	81	26			151120	129,60		3
16	16	86	32			151160	238,80		3
20	20	108	38			151200	367,00		3



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.22

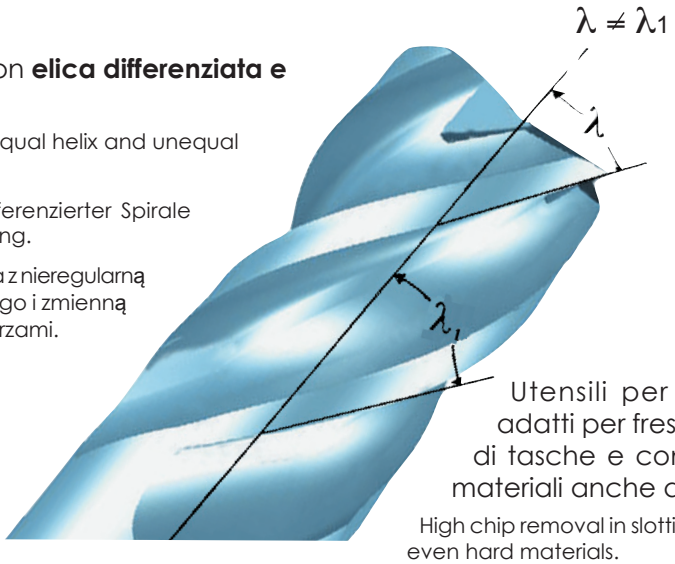
Lavorazioni, Machining Process

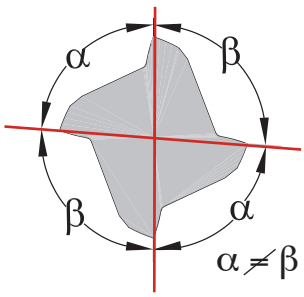
Nuova geometria con **elica differenziata e divisione irregolare.**

New tool design with unequal helix and unequal tooth spacing.

Neue Geometrie mit differenzierter Spirale und unregelmäßiger Teilung.

Nowa geometria narzędzia z nieregularną linią skrętu rowka wiórowego i zmienną odległością pomiędzy ostrzami.





Forte **riduzione delle vibrazioni** in lavorazione con conseguente allungamento della vita utensile.

Strong vibration reduction for an extended tool life.

Starke Reduzierung der Vibrationen bei der Bearbeitung und dadurch deutliche Erhöhung der Werkzeugstandzeit.

Duża redukcja wibracji i w konsekwencji wydłużenie żywotności narzędzia.

Utensili per **elevate asportazioni** adatti per fresature di cave, aperture di tasche e contornature di finitura su materiali anche di elevata durezza.

High chip removal in slotting, pocketing and finishing of even hard materials.

Werkzeuge für hohe Spanabhebungen zum Fräsen von Nuten, Ausarbeiten von Taschen und Umfangsschlichten auch bei sehr harten Werkstoffen.

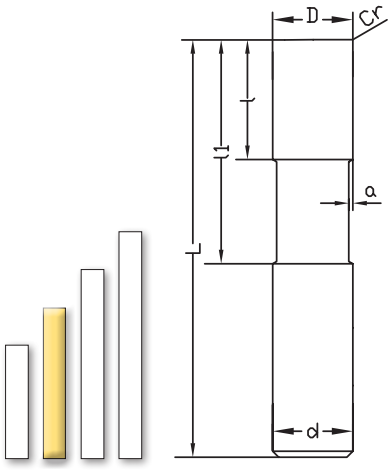
Bardzo dobra ewakuacja wióra przy dużych naddatkach. Doskonałe do wykonywaniu rowków, wybierania kieszeni oraz obróbki wykończeniowej także w materiałach o dużych twardościach.

	Steel <800 N/mm² AIR MQL MAX									Steel <1000 N/mm² AIR MQL MAX								
	HMG 152									HMG 152								
	1,0 D / 1,0 D			1,5 D / 0,25 D			1,5 D / 0,10 D			1,0 D / 1,0 D			1,5 D / 0,25 D			1,5 D / 0,10 D		
m/min	Vc 144			Vc 158			Vc 173			Vc117			Vc 129			Vc 140		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,025	770	7643	0,048	1614	8408	0,078	2862	9172	0,023	574	6210	0,044	1202	6831	0,072	2131	7452
8,0	0,041	941	5732	0,064	1610	6306	0,094	2582	6879	0,039	725	4658	0,060	1226	5123	0,087	1952	5589
10,0	0,053	978	4586	0,076	1535	5045	0,106	2335	5503	0,051	763	3726	0,072	1182	4099	0,100	1781	4471
12,0	0,063	968	3822	0,086	1448	4204	0,116	2130	4586	0,061	760	3105	0,082	1122	3416	0,110	1634	3726
16,0	0,079	907	2866	0,102	1286	3153	0,132	1815	3439	0,077	718	2329	0,098	1004	2562	0,125	1402	2795
20,0	0,091	838	2293	0,114	1152	2522	0,144	1587	2752	0,089	666	1863	0,110	904	2049	0,138	1232	2236

	Steel <1300 N/mm² AIR MQL MAX									Steel 12% Cr MAX								
	HMG 152									HMG 152								
	1,0 D / 1,0 D			1,5 D / 0,25 D			1,5 D / 0,10 D			1,0 D / 1,0 D			1,5 D / 0,25 D			1,5 D / 0,10 D		
m/min	Vc 90			Vc 99			Vc 108			Vc 45			Vc 50			Vc 54		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,021	401	4777	0,040	841	5255	0,065	1490	5732	0,045	430	2389	0,045	473	2627	0,045	516	2866
8,0	0,037	528	3583	0,056	880	3941	0,081	1390	4299	0,061	436	1791	0,061	479	1971	0,061	523	2150
10,0	0,049	563	2866	0,068	859	3153	0,093	1281	3439	0,073	419	1433	0,073	461	1576	0,073	503	1720
12,0	0,059	565	2389	0,078	821	2627	0,103	1182	2866	0,083	397	1194	0,083	437	1314	0,083	477	1433
16,0	0,075	537	1791	0,094	740	1971	0,119	1023	2150	0,099	355	896	0,099	390	985	0,099	425	1075
20,0	0,087	500	1433	0,106	670	1576	0,131	903	1720	0,111	319	717	0,111	351	788	0,111	383	860

SILMAX

152 Frese a quattro taglienti con elica differenziata
4-flute cutters with unequal helix



Ultra fine

Silmax Norm

λ 38° 41°

0,05-0,10 45°

152 Cr Frese a quattro taglienti con elica differenziata
4-flute cutters with unequal helix

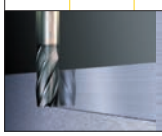
Ultra fine

Silmax Norm

λ 38° 41°

Cr

D	d	L	l	Cr	l1	a	152	HMG		z	152 Cr	HMG		z
e8	h6							€				€		
6	6	57	9	-	18	0,15	152060	55,70		4				
6	6	57	9	0,5	18	0,15					152060Cr05	59,30		4
8	8	63	12	-	24	0,15	152080	75,60		4				
8	8	63	12	0,5	24	0,15					152080Cr05	79,10		4
10	10	72	15	-	30	0,15	152100	102,20		4				
10	10	72	15	1,0	30	0,15					152100Cr10	106,90		4
12	12	83	18	-	36	0,20	152120	139,50		4				
12	12	83	18	1,0	36	0,20					152120Cr10	144,10		4
16	16	92	24	-	42	0,20	152160	229,20		4				
16	16	92	24	1,0	42	0,20					152160Cr10	235,40		4
20	20	104	30	-	52	0,20	152200	344,60		4				
20	20	104	30	1,0	52	0,20					152200Cr10	350,60		4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.24

Lavorazioni, Machining Process

Lavorazioni, Machining Process

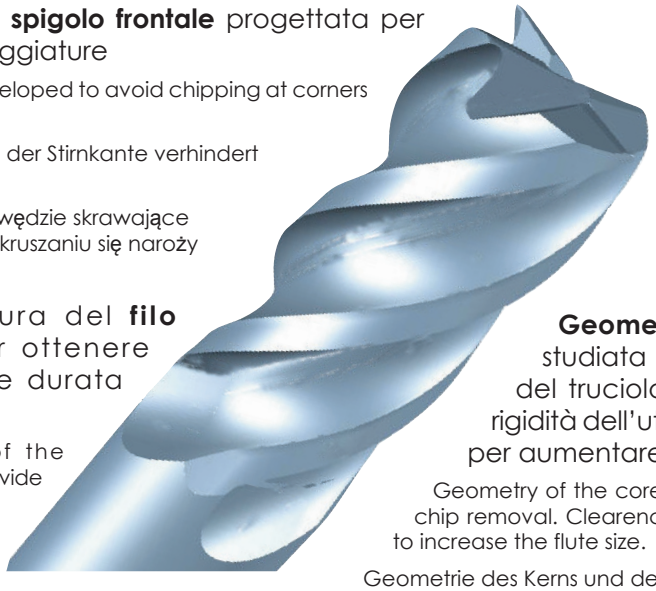
153 - 148

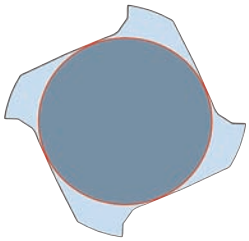
Affilatura dello **spigolo frontale** progettata per prevenire scheggiature

Cutting edges developed to avoid chipping at corners

Der spezielle Schliff der Stirnkante verhindert Absplitterungen.

Rozbudowane krawędzie skrawające zapobiegające wykruszaniu się naroży





Elevata finitura del **filo tagliente** per ottenere una maggiore durata dell'utensile

High finishing of the cutting edge to provide a longer tool life

Die hochwertige Verarbeitung der Schneidkante sorgt für längere Standzeit des Werkzeugs.

Precyzyjnie wykonana krawędź skrawająca, zapewniąca dłuższą żywotność narzędzia.

Geometria del nucleo e delle gole studiata per una rapida evacuazione del truciolo mantenendo la massima rigidità dell'utensile. **Affilatura** della spoglia per aumentare il vano gola.

Geometry of the core and of the flutes providing a good chip removal. Clearence sharpening especially developed to increase the flute size.

Geometrie des Kerns und der Nuten für eine schnelle Spanabfuhr und gleichbleibend hohe Steifigkeit des Werkzeugs. Schliff des Freiwinkels zur Vergrößerung des Nutenraums.

Geometria rdzenia oraz zmieniony kształt rowków wiórowych zapewniający doskonałą ewakuację wióra.

Steel <800 N/mm² — AIR MQL MAX

HMG 153

m/min	Vc 128			Vc 154			
D	fz	F	n	fz	F	n	
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	
4,0	0,032	1289	10191	0,044	2134	12229	Serie Lunga, Long, Lang, Długa HMG 148 F -15%, n -15%
6,0	0,060	1631	6794	0,072	2348	8153	
8,0	0,080	1633	5096	0,092	2254	6115	
10,0	0,096	1561	4076	0,108	2108	4892	
12,0	0,109	1475	3397	0,121	1965	4076	
16,0	0,129	1311	2548	0,141	1720	3057	

Steel <1000 N/mm² — AIR MQL MAX

HMG 153

m/min	Vc 104			Vc 125			
D	fz	F	n	fz	F	n	
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	
4,0	0,027	882	8280	0,038	1495	9936	Serie Lunga, Long, Lang, Długa HMG 148 F -15%, n -15%
6,0	0,055	1214	5520	0,066	1749	6624	
8,0	0,075	1244	4140	0,086	1712	4968	
10,0	0,091	1202	3312	0,102	1618	3975	
12,0	0,104	1143	2760	0,115	1517	3312	
16,0	0,124	1024	2070	0,135	1338	2484	

Steel <1300 N/mm² — AIR MQL MAX

HMG 153

m/min	Vc 80			Vc 96			
D	fz	F	n	fz	F	n	
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	
4,0	0,022	551	6369	0,032	967	7643	Serie Lunga, Long, Lang, Długa HMG 148 F -15%, n -15%
6,0	0,050	849	4246	0,060	1223	5096	
8,0	0,070	893	3185	0,080	1225	3822	
10,0	0,086	874	2548	0,096	1171	3057	
12,0	0,099	837	2123	0,109	1106	2548	
16,0	0,119	756	1592	0,129	983	1911	

Steel 12% Cr — MAX

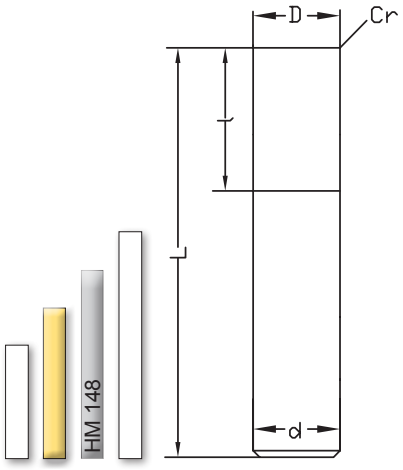
HMG 153

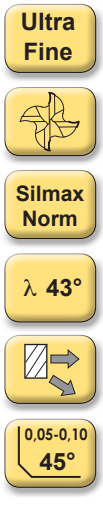
m/min	Vc 40			Vc 48			
D	fz	F	n	fz	F	n	
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	
4,0	0,022	275	3185	0,032	483	3822	Serie Lunga, Long, Lang, Długa HMG 148 F -15%, n -15%
6,0	0,050	425	2123	0,060	611	2548	
8,0	0,070	447	1592	0,080	613	1911	
10,0	0,086	437	1274	0,096	586	1529	
12,0	0,099	418	1062	0,109	553	1274	
16,0	0,119	378	796	0,129	492	955	

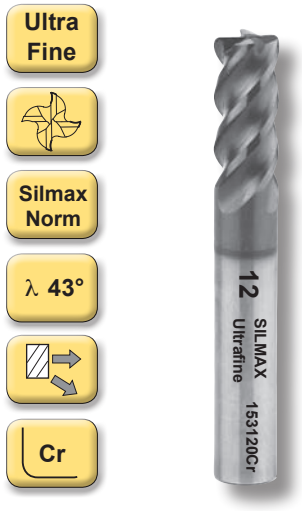
SILMAX

153 Frese a quattro taglienti per elevate asportazioni
4-flute cutters with high chip removal

153 Cr Frese a quattro taglienti per elevate asportazioni
4-flute cutters with high chip removal







D	d	L	l	Cr	153	HMG	Z	153 Cr	HMG	Z
e8	h6					€			€	
3	6	57	7	-	153030	50,10	4			
3	6	57	7	0,3				153030Cr03	55,30	4
3	6	57	7	0,5				153030Cr05	55,30	4
4	6	57	9	-	153040	51,30	4			
4	6	57	9	0,3				153040Cr03	56,30	4
4	6	57	9	0,5				153040Cr05	56,30	4
5	6	57	11	-	153050	53,10	4			
5	6	57	11	0,3				153050Cr03	58,30	4
5	6	57	11	0,5				153050Cr05	58,30	4
6	6	57	13	-	153060	54,60	4			
6	6	57	13	0,5				153060Cr05	59,70	4
6	6	57	13	1,0				153060Cr10	59,70	4
8	8	63	19	-	153080	74,30	4			
8	8	63	19	0,5				153080Cr05	80,70	4
8	8	63	19	1,0				153080Cr10	80,70	4
10	10	72	22	-	153100	109,80	4			
10	10	72	22	0,5				153100Cr05	116,20	4
10	10	72	22	1,0				153100Cr10	116,20	4
12	12	81	26	-	153120	136,30	4			
12	12	81	26	0,5				153120Cr05	144,80	4
12	12	81	26	1,0				153120Cr10	144,80	4
16	16	86	32	-	153160	250,80	4			
16	16	86	32	1,0				153160Cr10	259,20	4
16	16	86	32	1,5				153160Cr15	259,20	4
20	20	108	38	-	153200	385,60	4			
20	20	108	38	1,0				153200Cr10	395,90	4
20	20	108	38	2,0				153200Cr20	395,90	4

PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.26

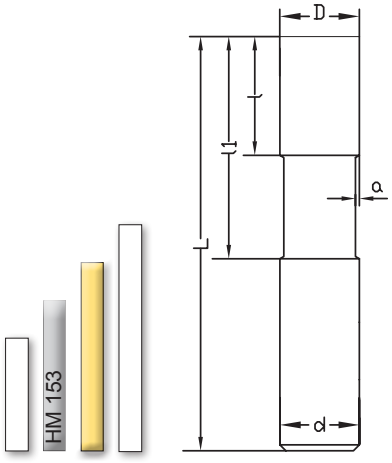
Lavorazioni, Machining Process

Lavorazioni, Machining Process

SILMAX

148 Frese a quattro taglienti per elevate asportazioni

4-flute cutters with high chip removal



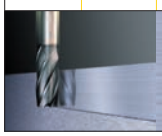
Ultra Fine

Silmax Norm

λ 43°

0,05-0,10
45°

D	d	L	l	l1	a	148	HMG		Z
e8	h6						€		
3	3	64	12	-	-	148030	52,50		4
4	4	64	16	-	-	148040	46,30		4
5	5	64	20	-	-	148050	47,80		4
6	6	80	20	30	0,15	148060	59,30		4
8	8	80	25	35	0,15	148080	74,40		4
10	10	108	28	48	0,15	148100	124,60		4
12	12	108	32	52	0,20	148120	151,90		4
16	16	120	40	60	0,20	148160	274,40		4



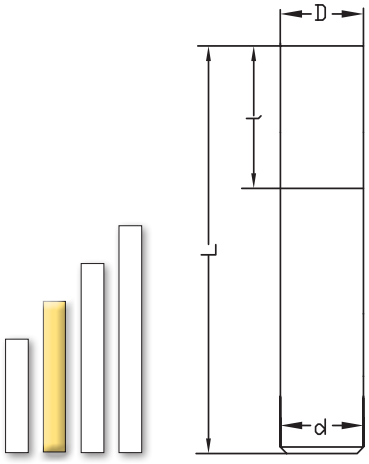
PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.26

Lavorazioni, Machining Process

155 Frese muiltitagliente per superfinitura

Multiflute cutters for superfinishing



Ultra Fine

Silmax Norm

λ 45°

90°

D	d	L	l	155	HMG	Z
e8	h6				€	
6	6	57	13	155060	57,40	6
8	8	63	19	155080	78,40	8
10	10	72	22	155100	115,70	8
12	12	81	26	155120	144,60	10
16	16	86	32	155160	267,10	10
20	20	108	38	155200	395,60	10

Fresa multitagliente per operazioni di **super finitura** su acciai fino a 52HRC.

Multicut end mill for **super finishing** of steels up to 52HRC.

Mehrschneidenfräser zum **Feinstschlichten** von Stählen bis 52HRC.

Frezy wieloostrzowe do obróbek **super wykończeniowych** w materia ach o twardości do 52HRC

155

	Steel <800 N/mm²	Steel <1000 N/mm²	Steel <1300 N/mm²	Steel 12% Cr
	HMG 155	HMG 155	HMG 155	HMG 155
	1,5 D / 0,02 D	1,5 D / 0,02 D	1,5 D / 0,02 D	1,5 D / 0,02 D
m/min	Vc 301	Vc 244	Vc 188	Vc 94

D	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,036	3449	15966	0,033	2569	12972	0,030	1796	9979	0,030	898	4989
8,0	0,046	4413	11975	0,043	3352	9729	0,040	2399	7484	0,040	1200	3742
10,0	0,054	4129	9580	0,051	3168	7783	0,048	2293	5987	0,048	1147	2994
12,0	0,060	4811	7983	0,057	3714	6486	0,054	2707	4989	0,054	1354	2495
16,0	0,070	4211	5987	0,067	3275	4865	0,064	2407	3742	0,064	1204	1871
20,0	0,078	3743	4790	0,075	2924	3892	0,072	2160	2994	0,072	1080	1497

PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Lavorazioni, Machining Process

Lavorazioni, Machining Process

AIR MQL MAX

710 - 720 - 733 - 734

Frese semisferiche per la lavorazione di acciai da stampi, acciai pretemprati, acciai al carbonio, acciai legati, acciai inossidabili, leghe di nickel, leghe di titanio, ghisa.

Ball nose mills for mould steels, pre-hardened steels, carbon steels, alloyed steels, stainless steels, nickel alloys, titan alloys, cast iron.

Halbrundfräser für die Bearbeitung von Gesenkstählen, vorgehärteten Stählen, unlegierten Stählen, legierten Stählen, rostfreien Stählen, Nickellegierungen, Titanlegierungen, Gusseisen.

Frezy promieniowe do pracy w stalach narzędziowych, wstępnie hartowanych, węglowych, stopowych, nierdzewnych, stopach niklu, stopach tytanu, w żeliwach.

Taglienti altamente **resistenti alla scheggiatura** per una lavorazione stabile ed efficiente.

The high chipping resistant cutting edges allow a stable and efficient work.

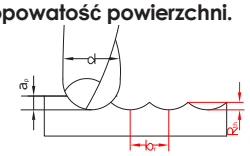
Äußerst splitterfeste Schneiden für gleichmäßige und effektive Bearbeitung.

Krawędzie bardzo odporne na wyłamywanie zalecane do obróbek stabilnych i wydajnych.

Rth **Rugosità, Roughness, Rauhigkeit, Chropowatość powierzchni.**

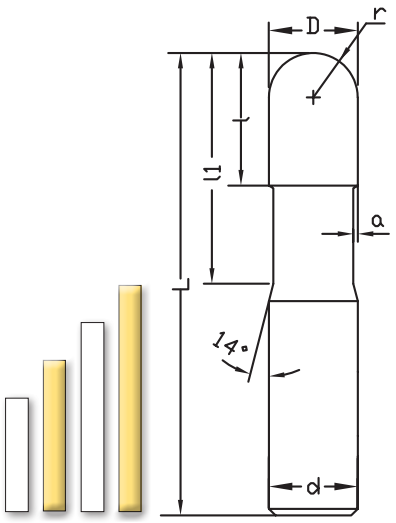
$$Rth = \frac{d}{2} - \sqrt{\frac{d^2 - br^2}{4}}$$

$$br = 2\sqrt{Rth(d1 - Rth)}$$



	Steel <800 N/mm²			Steel <1000 N/mm²			Steel <1300 N/mm²			Steel 12% Cr			
HMG 710													**Lubrificazione, Lubrication**
	0,020 D / 0,060 D			0,020 D / 0,060 D			0,020 D / 0,060 D			0,020 D / 0,060 D			AIR MQL MAX
m/min	Vc 360			Vc 293			Vc 225			Vc 113			
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	
2,0	0,051	5811	57325	0,041	3790	46576	0,031	2199	35828	0,031	1099	17914	Serie Lunga, Long, Lang, D□uga
4,0	0,159	9109	28662	0,139	6470	23288	0,119	4260	17914	0,119	2130	8957	HMG 720 **F -15%, n -15%**
6,0	0,240	9172	19108	0,220	6831	15525	0,200	4777	11943	0,200	2389	5971	
8,0	0,298	8528	14331	0,278	6463	11644	0,258	4614	8957	0,258	2307	4479	
10,0	0,342	7846	11465	0,322	6002	9315	0,302	4330	7166	0,302	2165	3583	
12,0	0,379	7235	9554	0,359	5568	7763	0,339	4044	5971	0,339	2022	2986	
16,0	0,436	6251	7166	0,416	4846	5822	0,396	3548	4479	0,396	1774	2239	

	Steel <800 N/mm²			Steel <1000 N/mm²			Steel <1300 N/mm²			Steel 12% Cr			
HMG 734													**Lubrificazione, Lubrication**
	0,020 D / 0,060 D			0,020 D / 0,060 D			0,020 D / 0,060 D			0,020 D / 0,060 D			AIR MQL MAX
m/min	Vc 360			Vc 293			Vc 225			Vc 113			
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	
2,0	0,051	5811	57325	0,041	3790	46576	0,031	2199	35828	0,031	1099	17914	Serie Lunga, Long, Lang, D□uga
4,0	0,159	9109	28662	0,139	6470	23288	0,119	4260	17914	0,119	2130	8957	HMG 733 **F -15%, n -15%**
6,0	0,240	9172	19108	0,220	6831	15525	0,200	4777	11943	0,200	2389	5971	
8,0	0,298	8528	14331	0,278	6463	11644	0,258	4614	8957	0,258	2307	4479	
10,0	0,342	7846	11465	0,322	6002	9315	0,302	4330	7166	0,302	2165	3583	
12,0	0,379	7235	9554	0,359	5568	7763	0,339	4044	5971	0,339	2022	2986	
16,0	0,436	6251	7166	0,416	4846	5822	0,396	3548	4479	0,396	1774	2239	



710 Frese semisferiche per la lavorazione di stampi
Ball nose end mills for mould steels

MG Co10

Silmax Norm

λ 0°

720 Frese semisferiche per la lavorazione di stampi
Ball nose end mills for mould steels

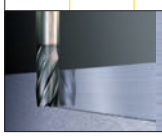
MG Co10

Silmax Norm

λ 0°

D	d h6	L	l	r f8	l1	a	710	HMG €		z
2	6	53	3	1,0	8	0,10	710020	51,50		2
3	6	53	4	1,5	9	0,10	710030	51,00		2
4	6	53	5	2,0	10	0,10	710040	50,00		2
5	6	57	6	2,5	14	0,10	710050	52,20		2
6	6	57	7	3,0	17	0,15	710060	55,60		2
8	8	63	9	4,0	19	0,15	710080	73,60		2
10	10	72	11	5,0	21	0,15	710100	99,30		2
12	12	83	12	6,0	27	0,20	710120	142,40		2
16	16	92	16	8,0	31	0,20	710160	271,00		2
20	20	104	20	10,0	40	0,20	710200	418,30		2

D	d h6	L	l	r f8	l1	a	720	HMG €		z
4	4	62	16	2,0	26	0,10	720040	59,00		2
5	5	62	20	2,5	30	0,10	720050	60,80		2
6	6	78	20	3,0	30	0,15	720060	71,80		2
8	8	78	25	4,0	35	0,15	720080	89,30		2
10	10	105	28	5,0	48	0,15	720100	141,00		2
12	12	105	32	6,0	52	0,20	720120	178,20		2
16	16	130	40	8,0	60	0,20	720160	342,80		2
20	20	150	50	10,0	70	0,20	720200	446,90		2



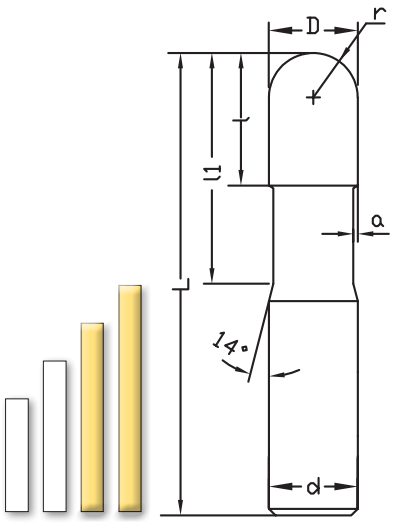
PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.30

Lavorazioni, Machining Process

Lavorazioni, Machining Process

SILMAX



734 Frese semisferiche per la lavorazione di stampi

Ball nose end mills for mould steels

Ultra Fine

Silmax Norm

λ 30°

733 Frese semisferiche per la lavorazione di stampi

Ball nose end mills for mould steels

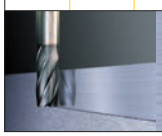
Ultra Fine

Silmax Norm

λ 30°

D	d h6	L	l	r f8	l1	a	734	HMG €		Z
1	3	64	3,0	0,5	-	-	734010	58,80		2
1,5	3	64	4,0	0,75	-	-	734015	58,80		2
2	3	64	4,0	1,0	-	-	734020	55,60		2
2,5	3	64	5,0	1,25	-	-	734025	55,60		2
3	3	64	6,0	1,5	-	-	734030	47,50		2
4	4	64	8,0	2,0	-	-	734040	51,90		2
5	5	64	9,0	2,5	-	-	734050	55,10		2
6	6	80	10,0	3,0	-	-	734060	67,20		2
8	8	80	12,0	4,0	-	-	734080	86,00		2
10	10	108	14,0	5,0	-	-	734100	145,60		2
12	12	108	16,0	6,0	-	-	734120	181,90		2
16	16	120	20,0	8,0	-	-	734160	301,40		2

D	d h6	L	l	r f8	l1	a	733	HMG €		Z
1	6	108	4	0,5	7	0,1	733010	103,30		2
1,5	6	108	4	0,75	7	0,1	733015	103,30		2
2	6	108	5	1,0	8	0,1	733020	98,50		2
2,5	6	108	7	1,25	10	0,1	733025	98,50		2
3	6	108	7	1,5	10	0,1	733030	98,50		2
4	6	108	8	2,0	11	0,1	733040	98,50		2
5	6	108	10	2,5	13	0,1	733050	95,60		2
6	6	108	10	3,0	-	-	733060	95,60		2
8	8	108	12	4,0	-	-	733080	133,90		2
10	10	164	14	5,0	-	-	733100	204,00		2
12	12	164	16	6,0	-	-	733120	252,40		2



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.30

Lavorazioni, Machining Process

Lavorazioni, Machining Process

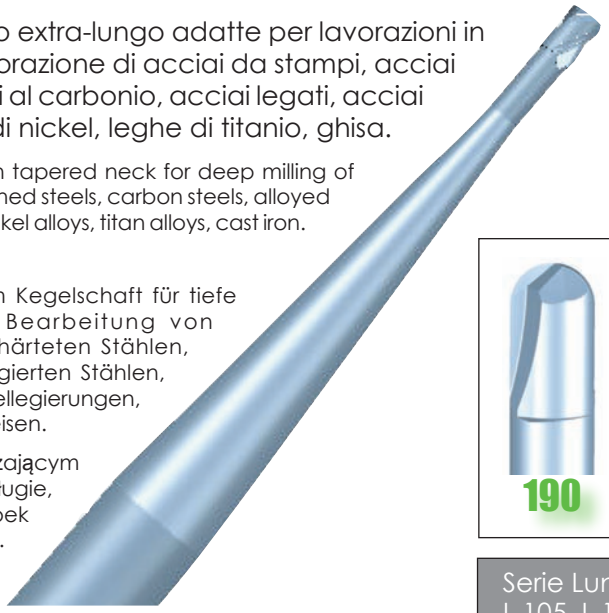
190 - 191 - 192

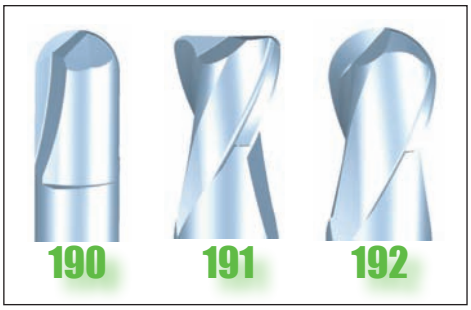
Frese a stelo conico extra-lungo adatte per lavorazioni in profondità, per lavorazione di acciai da stampi, acciai pretemprati, acciai al carbonio, acciai legati, acciai inossidabili, leghe di nickel, leghe di titanio, ghisa.

Extra long end mills with tapered neck for deep milling of mould steels, pre-hardened steels, carbon steels, alloyed steels, stainless steels, nickel alloys, titan alloys, cast iron.

Fräser mit extralangem Kegelschaft für tiefe Bearbeitungen, zur Bearbeitung von Gesenkstählen, vorgehärteten Stählen, unlegierten Stählen, legierten Stählen, rostfreien Stählen, Nickellegierungen, Titanlegierungen, Gusseisen.

Frezy ze stożkowo zwężającym się chwytem, bardzo długie, odpowiednie do obróbek głębokich wybrań. Przeznaczone do obróbek stali narzędziowych, stali wstępnie hartowanych, węglowych, stopowych, nierdzewnych, stopów niklu, stopów tytanu i żeliw.





Serie Lunga Long, Lang, Długa
L 105, L 160
F -15%, n -15%

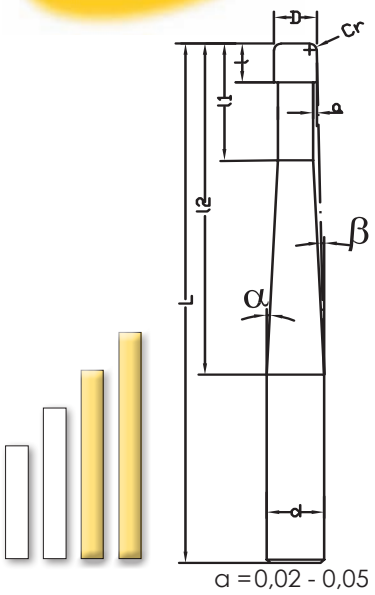
	Steel <800 N/mm² AIR MQL MAX									Steel <1000 N/mm² AIR MQL MAX								
	HMG 191			HMG 191			HMG190 - 192			HMG 191			HMG 191			HMG190 - 192		
	1,0 D / 0,25 D			0,030 D / 0,030 D			0,020 D / 0,060 D			1,0 D / 0,25 D			0,030 D / 0,030 D			0,020 D / 0,060 D		
m/min	Vc 113			Vc 256			Vc 288			Vc 92			208			Vc 234		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
2,0	0,003	124	17936	0,009	761	40764	0,039	3548	45860	0,003	86	14523	0,008	519	33121	0,030	2212	37261
4,0	0,014	249	8968	0,026	1054	20382	0,135	6187	22930	0,012	173	7287	0,023	757	16561	0,117	4356	18631
5,0	0,019	279	7175	0,031	1025	16306	0,180	6587	18344	0,017	203	5829	0,028	754	13248	0,162	4815	14904
6,0	0,024	287	5979	0,036	978	13588	0,216	6604	15287	0,022	214	4858	0,033	729	11040	0,198	4918	12420
8,0	0,031	280	4484	0,043	880	10191	0,274	6272	11465	0,029	213	3643	0,040	666	8280	0,256	4761	9315
10,0	0,037	264	3587	0,049	795	8153	0,318	5836	9172	0,033	191	2915	0,046	606	6624	0,300	4474	7452
12,0	0,041	247	2989	0,053	725	6794	0,355	5421	7643	0,039	191	2429	0,050	556	5520	0,337	4181	6210

	Steel <1300 N/mm² AIR MQL MAX									Steel 12% Cr MAX								
	HMG 191			HMG 191			HMG190 - 192			HMG 191			HMG 191			HMG190 - 192		
	1,0 D / 0,25 D			0,030 D / 0,030 D			0,020 D / 0,060 D			1,0 D / 0,25 D			0,030 D / 0,030 D			0,020 D / 0,060 D		
m/min	Vc 70			Vc 160			Vc180			Vc 35			Vc 80			Vc 90		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
2,0	0,002	55	11210	0,006	323	25478	0,025	1417	28662	0,002	28	5605	0,006	161	12739	0,025	709	14331
4,0	0,010	111	5605	0,020	506	12739	0,099	2835	14331	0,010	55	2803	0,020	253	6369	0,099	1417	7166
5,0	0,015	138	4484	0,025	519	10191	0,144	3291	11465	0,015	69	2242	0,025	259	5096	0,144	1646	5732
6,0	0,020	149	3737	0,030	510	8493	0,180	3439	9554	0,020	75	1868	0,030	255	4246	0,180	1720	4777
8,0	0,027	152	2803	0,037	474	6369	0,238	3404	7166	0,027	76	1401	0,037	237	3185	0,238	1702	3583
10,0	0,033	147	2242	0,043	436	5096	0,282	3235	5732	0,033	73	1121	0,043	218	2548	0,282	1618	2866
12,0	0,037	139	1868	0,047	402	4246	0,319	3044	4777	0,037	70	934	0,047	201	2123	0,319	1522	2389

SILMAX

191 Frese a stelo per lavorazioni in profondità

Extra long cutters with tapered neck for deep milling



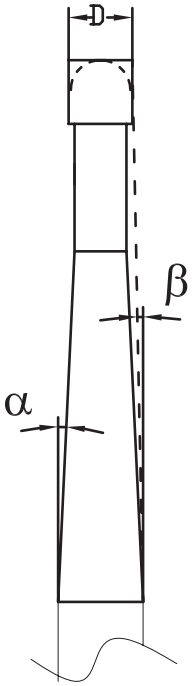
a =0,02 - 0,05

MG Co10

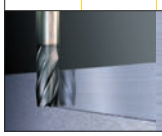
Silmax Norm

λ 30°

Cr

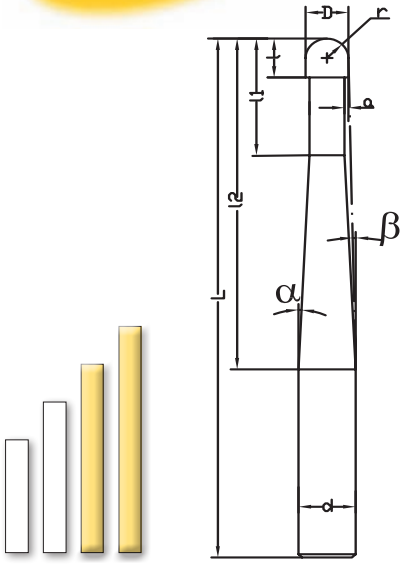


D	d	L	l	l1	l2	191	HMG		Cr	D	L	α	β
e8	h6						€						
1	6	78	3	5	36	19107801	84,60		0,3	1,0	78	4,5	4,0
1,5	6	78	3	6	35	191078015	84,60		0,3	1,5	78	4,3	3,8
2	6	78	3	7	34	19107802	80,60		0,3	2,0	78	4,1	3,4
2	6	105	3	7	61	19110502	103,10		0,3	2,0	105	2,1	1,9
2,5	6	78	4	8	34	191078025	80,60		0,3	2,5	78	3,7	3,1
2,5	6	105	4	8	61	191105025	103,10		0,3	2,5	105	1,8	1,7
3	6	78	4	10	34	19107803	80,60		0,3	3,0	78	3,5	2,6
3	6	105	4	10	61	19110503	103,10		0,3	3,0	105	1,6	1,4
4	6	78	5	13	34	19107804	80,60		0,3	4,0	78	2,7	1,7
4	6	105	5	13	61	19110504	103,10		0,3	4,0	105	1,2	1,0
5	6	78	6	16	34	19107805	77,10		0,5	5,0	78	1,6	0,9
5	6	105	6	16	61	19110505	98,20		0,5	5,0	105	0,6	0,5
6	8	78	6	18	34	19107806	90,80		0,5	6,0	78	3,6	1,8
6	8	105	6	18	61	19110506	115,70		0,5	6,0	105	1,3	1,0
6	8	160	6	18	116	19116006	150,80		0,5	6,0	160	0,6	0,5
8	10	105	8	24	57	19110508	144,10		0,5	8,0	105	1,7	1,1
8	10	160	8	24	112	19116008	197,40		0,5	8,0	160	0,8	0,5
10	12	105	10	30	51	19110510	170,80		1,0	10,0	105	2,7	1,2
10	12	160	10	30	106	19116010	236,40		1,0	10,0	160	0,8	0,6
12	16	160	12	36	102	19116012	354,00		1,0	12,0	160	1,7	1,2



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.33

Lavorazioni, Machining Process



190 Frese a stelo per lavorazioni in profondità

Extra long cutters with tapered neck for deep milling

MG Co10

Silmax Norm

λ 0°

192 Frese a stelo per lavorazioni in profondità

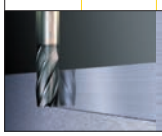
Extra long cutters with tapered neck for deep milling

MG Co10

Silmax Norm

λ 30°

D	d	L	l	l1	l2	190	HMG		r	192	HMG		r
	h6						€		f8		€		f8
1	6	78	3	5	36	19007801	91,40		0,5	19207801	91,40		0,5
1,5	6	78	3	6	35	190078015	91,40		0,8	192078015	91,40		0,8
2	6	78	3	7	34	19007802	87,20		1,0	19207802	87,20		1,0
2	6	105	3	7	61	19010502	109,40		1,0	19210502	109,40		1,0
2,5	6	78	4	8	34	190078025	87,20		1,3	192078025	87,20		1,3
2,5	6	105	4	8	61	190105025	109,40		1,3	192105025	109,40		1,3
3	6	78	4	10	34	19007803	87,20		1,5	19207803	87,20		1,5
3	6	105	4	10	61	19010503	109,40		1,5	19210503	109,40		1,5
4	6	78	5	13	34	19007804	87,20		2,0	19207804	87,20		2,0
4	6	105	5	13	61	19010504	109,40		2,0	19210504	109,40		2,0
5	6	78	6	16	34	19007805	84,70		2,5	19207805	84,70		2,5
5	6	105	6	16	61	19010505	105,70		2,5	19210505	105,70		2,5
6	8	78	6	18	34	19007806	98,30		3,0	19207806	98,30		3,0
6	8	105	6	18	61	19010506	122,80		3,0	19210506	122,80		3,0
6	8	160	6	18	116	19016006	161,50		3,0	19216006	161,50		3,0
8	10	105	8	24	57	19010508	152,00		4,0	19210508	152,00		4,0
8	10	160	8	24	112	19016008	204,40		4,0	19216008	204,40		4,0
10	12	105	10	30	51	19010510	177,90		5,0	19210510	177,90		5,0
10	12	160	10	30	106	19016010	243,30		5,0	19216010	243,30		5,0
12	16	160	12	36	102	19016012	359,00		6,0	19216012	359,00		6,0



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.33

Lavorazioni, Machining Process

Lavorazioni, Machining Process

90

Utensili sviluppati per la lavorazione delle **cave profonde su matrici per estrusione**. Il disegno di nuova concezione del corpo tagliente incrementa la rigidità che, unita alla estrema precisione della geometria, garantisce un grado di finitura eccezionale ed un allungamento della vita utensile.

Tapered tools for **deep milling of extrusion moulds**. The increased tool toughness, along with an extreme geometry precision, allows an excellent surface finishing and an extended tool life.

Werkzeuge für die Bearbeitung **von tiefen Nuten in Strangpressmatrizen**. Das neuartige Design des Schneidkörpers erhöht die Steifigkeit und garantiert – in Verbindung mit der hochpräzisen Geometrie – höchste Verarbeitungsqualität sowie verlängerte Werkzeugstandzeit.

Frezy stożkowe przeznaczone do obróbki głębokich wybrań w np. dyszach formujących. Zwiększona sztywność narzędzia. Bardzo precyzyjna geometria gwarantuje wysoką dokładność w obróbce wykończeniowej, a także wpływa dodatnio na żywotność narzędzia.

Steel <800 N/mm² — AIR MQL MAX

HMC 90

												
m/min	Vc 45			Vc 66				Vc 43			Vc 54		
D	fz	F	n	fz	F	n		fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm		mm/z	mm/min	rpm	mm/z	mm/min	rpm
2,5	0,014	161	5717	0,059	987	8408		0,011	121	5465	0,049	666	6831
3,0	0,019	178	4764	0,071	1002	7006		0,016	143	4554	0,061	700	5693
3,5	0,023	184	4084	0,082	988	6005		0,020	152	3904	0,072	705	4879
4,0	0,026	185	3573	0,092	963	5255		0,023	156	3416	0,082	697	4270
4,5	0,029	183	3176	0,100	933	4671		0,026	157	3036	0,090	682	3795
5,0	0,031	180	2859	0,107	902	4204		0,028	155	2732	0,097	664	3416

Steel <1300 N/mm² — AIR MQL MAX

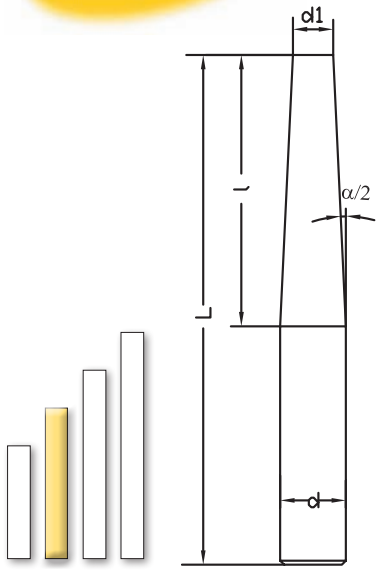
HMC 90

												
m/min	Vc 33			Vc 45								
D	fz	F	n	fz	F	n						
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm						
2,5	0,008	68	4204	0,039	543	7006						
3,0	0,013	89	3503	0,051	601	5839						
3,5	0,017	99	3003	0,062	623	5005						
4,0	0,020	104	2627	0,072	627	4379						
4,5	0,023	107	2335	0,080	622	3892						
5,0	0,025	107	2102	0,087	611	3503						

SILMAX

90 Frese coniche per Matrici

Tapered cutters for deep milling of extrusion moulds



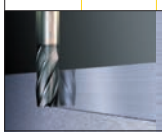
MG Co10

Silmax Norm

λ

45°

d1	l	d	L	a/2	λ	90	HMC		Z
k10		h6					€		
2	40	6	78	1°30'	42°	13040020	53,50		2
3	40	6	78	1°30'	35°	13040030	48,50		2
4	40	8	78	1°30'	35°	13040040	49,40		2
5	40	8	78	1°30'	35°	13040050	52,40		2
2,5	40	8	78	2°	35°	20040025	52,40		2
3	40	8	78	2°	35°	20040030	52,40		2
3,5	40	8	78	2°	35°	20040035	52,40		2
3,5	50	8	92	2°	35°	20050035	61,30		2
2	40	8	78	3°	42°	30040020	52,40		2
2,5	40	8	78	3°	35°	30040025	52,40		2
3	40	8	78	3°	35°	30040030	52,40		2
3	50	10	92	3°	35°	30050030	71,10		2
3,5	40	8	78	3°	35°	30040035	52,40		2
3,5	50	10	92	3°	35°	30050035	71,10		2
4	40	10	83	3°	35°	30040040	53,70		2
4	50	10	92	3°	35°	30050040	71,10		2
4,5	40	10	83	3°	35°	30040045	70,50		2
4,5	50	10	92	3°	35°	30050045	70,50		2
2,0	40	10	83	5°	35°	50040020	53,70		2
2,5	30	8	78	5°	35°	50030025	52,40		2
2,5	40	10	83	5°	35°	50040025	53,70		2
3	30	10	83	5°	35°	50030030	53,70		2
3	40	10	83	5°	35°	50040030	53,70		2
3	50	12	92	5°	35°	50050030	72,50		2
3,5	40	12	92	5°	35°	50040035	72,50		2
4	30	10	83	5°	35°	50030040	53,70		2
4	40	12	92	5°	35°	50040040	72,50		2
4	50	14	104	5°	35°	50050040	91,20		2
5	30	12	92	5°	35°	50030050	55,70		2
5	40	12	92	5°	35°	50040050	72,50		2
5	50	14	104	5°	35°	50050050	91,20		2
5	60	16	130	5°	35°	50060050	96,30		2
6	40	14	104	5°	35°	50040060	91,20		2
6	60	18	130	5°	35°	50060060	144,60		2



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.36

Lavorazioni, Machining Process

Lavorazione di Acciai

Steels, Stählen, Stale

Gruppo		Nr	DIN	Gruppo	Nr	DIN
Steel < 800 N/mm²	Non legati < 800 N/mm²	1.1231	Ck67	Legati < 800 N/mm²	1.5026	55Si7
		1.1248	Ck75		1.7176	55Cr3
		1.1274	Ck101		1.8159	50CrV4
		1.0402	C22		1.3505	100Cr6
		1.0406	C25		1.6546	40NiCrMo2 2
		1.0501	C35		1.7218	25CrMo4
		1.0503	C45		1.7220	34CrMo4
		1.1133	20Mn5		1.7223	41CrMo4
	Legati < 800 N/mm²	1.7015	15Cr3			
		1.5752	14NiCr14			
		1.5919	15CrNi6			
		1.6523	21NiCrMo2			
		1.6587	17CrNiMo6			
		1.7131	16MnCr5			
Steel < 1000 N/mm²	Non legati < 1000 N/mm²	1.0535	C55	Legati < 1000 N/mm²	1.7225	42CrMo4
		1.0601	C60		1.8159	50CrV4
		1.1203	Ck55		1.7045	42Cr4
		1.1206	Ck50		1.8507	34CrAlMo5
		1.1221	Ck60		1.8509	41CrAlMo7
		1.1157	40Mn4		1.8515	31CrMo12
		1.1165	30Mn5			
		1.1167	36Mn5	Acciai legati per utensili	1.2067	100Cr6
		1.1170	28Mn6		1.2330	35CrMo4
	Legati < 1000 N/mm²	1.5710	36NiCr6		1.2332	47CrMo4
		1.5755	31NiCr14		1.2510	100MnCrW4
		1.6511	36CrNiMo4		1.2516	120WV4
		1.7033	34Cr4		1.2542	45WCrV7
		1.7034	37Cr4		1.2833	100V1
		1.7035	41Cr4		1.2842	90MnCrV8
		1.7218	25CrMo4	Ghisa	0.6015	GG-15
		1.7220	34CrMo4		0.6010	GG-10
		1.7223	41CrMo4		0.6020	GG-20
Steel < 1300 N/mm²	Legati < 1300 N/mm²	1.5710	36NiCr6	Acciai legati per utensili	1.2311	40CrMnMo7
		1.6511	36CrNiMo4		1.2344	X40CrMoV5 1
		1.6580	30CrNiMo8		1.2365	X32CrMoV3 3
		1.6582	34CrNiMo6		1.2581	X30WCrV9 3
		1.7220	34CrMo4		1.2343	X38 CrMoV5 1
		1.7223	41CrMo4		1.2344	X40CrMoV5 1
		1.7225	42CrMo4		1.2714	56NiCrMoV7
		1.7361	32CrMo12			
		1.8159	50CrV4			
				Ghisa	0.6030	GG-30
					0.6040	GG-40
12% Cr	Acciai legati per utensili	1.2080	X210Cr12	Acciai resistenti al calore	1.4914	-
		1.2436	X210CrW12		1.4920	X15CrMo12 1
		1.2601	X165CrMoV12		1.4924	-
		1.2706	X3NiCrMo18 8 5		1.4718	X45CrSi9 3
		1.2709	X2NiCoMoTi18 9 5		1.4845	X12CrNi25 21
		1.2201	X165CrV12		1.4878	X12CrNiTi18 9
		1.2376	X96CrMoV12		1.4742	X10CrAl18
		1.2379	X155CrMo12 1		1.4923	X22CrMoV12 1
		1.2609	X165CrVMo12 1			
		1.2631	X50CrMoW9 1 1			
		1.2880	X165CrCoMo12			

HRC

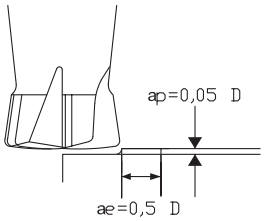
FRESE PER LA LAVORAZIONE DI ACCIAI TEMPRATI

END MILLS FOR MACHINING HARDENED STEELS

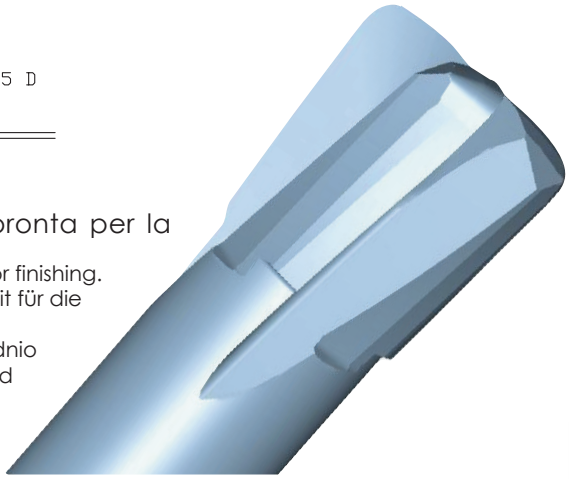
FRÄSER FÜR DIE BEARBEITUNG VON GEHÄRTETEN STÄHLEN

FREZY DO OBRÓBKI STALI UTWARDZANYCH

04w - 08w - 09w

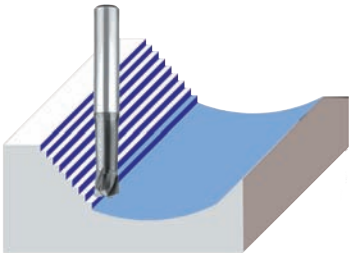


Superficie semi-finita, pronta per la finitura
Semi-finished surface, ready for finishing.
Halbfertige Oberflächen, bereit für die Feinbearbeitung.
Powierzchnia po obróbce średnio dokładnej – przygotowana pod obróbkę wykończeniową



Trucioli sottili, minore sforzo di taglio
Thin chips, less cutting forces
Feine Späne, geringere Schnittkräfte.
Cienki wiór, mniejsze siły skrawania.

Fresatura a copiare
3D copy milling
Kopierfräsen
Kopiowanie 3D



Fresatura di tasca
Pocketing
Taschenfräsen
Wybieranie "kieszeni"

Fresatura frontale
Face Milling
Stirnfräsen
Frezowanie czołowe

HRC < 52 AIR

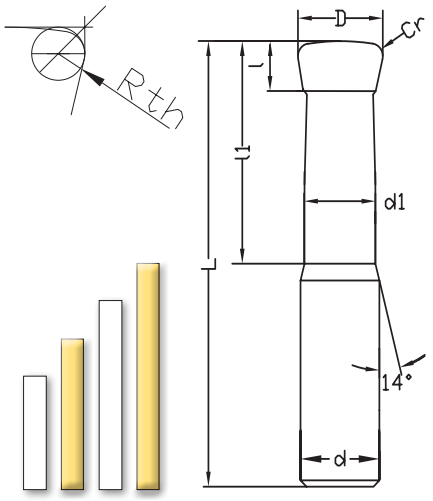
	HMC 04W			HMC 08W			HMC 09W		
									
m/min	Vc 150			Vc 150			Vc 150		
D	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,202	4800	11900	0,305	14500	11900	0,183	8700	11900
6,0	0,200	3200	8000	0,394	12600	8000	0,236	7560	8000
8,0	0,200	2400	6000	0,396	9500	6000	0,238	5700	6000
10,0	0,198	1900	4800	0,401	7700	4800	0,241	4620	4800
12,0	0,200	1600	4000	0,400	6400	4000	0,240	3840	4000
16,0	0,200	1200	3000	0,400	4800	3000			

HRC < 56 AIR

	HMC 04w			HMC 08w			HMC 09w		
									
m/min	Vc 120			Vc 120			Vc 120		
D	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,147	2800	9500	0,200	7600	9500	0,120	4560	9500
6,0	0,148	1900	6400	0,195	5000	6400	0,117	3000	6400
8,0	0,146	1400	4800	0,198	3800	4800	0,119	2280	4800
10,0	0,151	1150	3800	0,204	3100	3800	0,122	1860	3800
12,0	0,148	950	3200	0,195	2500	3200	0,117	1500	3200
16,0	0,146	700	2400	0,198	1900	2400			

HRC < 60 AIR

	HMC 04w			HMC 08w			HMC 09w		
									
m/min	Vc 100			Vc 100			Vc 100		
D	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,103	1650	8000	0,097	3100	8000	0,058	1860	8000
6,0	0,099	1050	5300	0,099	2100	5300	0,059	1260	5300
8,0	0,100	800	4000	0,100	1600	4000	0,060	960	4000
10,0	0,102	650	3200	0,102	1300	3200	0,061	780	3200
12,0	0,100	550	2600	0,100	1100	2600	0,063	660	2600
16,0	0,100	400	2000	0,100	800	2000			



04w Frese per elevati avanzamenti
High Feed cutters

Ultra Fine

Silmax Norm

λ 0°

Cr

08w 09w Frese per elevati avanzamenti
High Feed cutters

Ultra Fine

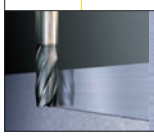
Silmax Norm

λ 0°

Cr

D	d	d1	L	l	l1	04w	HMC	Rth	Cr	Z	08w	HMC	Rth	Cr	Z
h10	h6						€					€			
3	6	2,6	57	3	8						08w030	104,60	0,4	0,3	4
4	6	3,6	57	3	11	04w040	75,60	0,6	0,5	2	08w040	91,10	0,6	0,5	4
5	6	4,6	57	4	15						08w050	101,90	0,6	0,5	4
6	6	5,6	57	5	18	04w060	73,60	0,7	0,6	2	08w060	88,80	0,7	0,6	4
7	8	6,4	63	5	21						08w070	136,80	0,8	0,6	4
8	8	7,3	63	6	24	04w080	99,00	0,8	0,6	2	08w080	119,30	0,8	0,6	4
9	10	8,2	72	6	28						08w090	178,60	0,9	0,7	4
10	10	9,0	72	7	32	04w100	129,50	1,0	0,7	2	08w100	155,90	1,0	0,7	4
12	12	11,0	83	8	36	04w120	166,90	1,2	0,8	2	08w120	201,00	1,2	0,8	4
16	16	14,4	92	10	44	04w160	260,70	1,7	1,0	2	08w160	314,20	1,7	1,0	4

D	d	d1	L	l	l1	09w	HMC	Rth	Cr	Z
h10	h6					Lunga	€			
3	6	2,6	78	3	8	09w030	114,80	0,4	0,3	4
4	6	3,6	78	3	11	09w040	100,10	0,6	0,5	4
5	6	4,6	78	4	15	09w050	111,80	0,6	0,5	4
6	6	5,6	78	5	18	09w060	97,50	0,7	0,6	4
7	8	6,4	92	5	21	09w070	150,60	0,8	0,6	4
8	8	7,3	92	6	24	09w080	131,30	0,8	0,6	4
9	10	8,2	105	6	28	09w090	197,10	0,9	0,7	4
10	10	9,0	105	7	32	09w100	172,10	1,0	0,7	4
12	12	11,0	105	8	36	09w120	221,00	1,2	0,8	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

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Lavorazioni, Machining Process

Lavorazioni, Machining Process

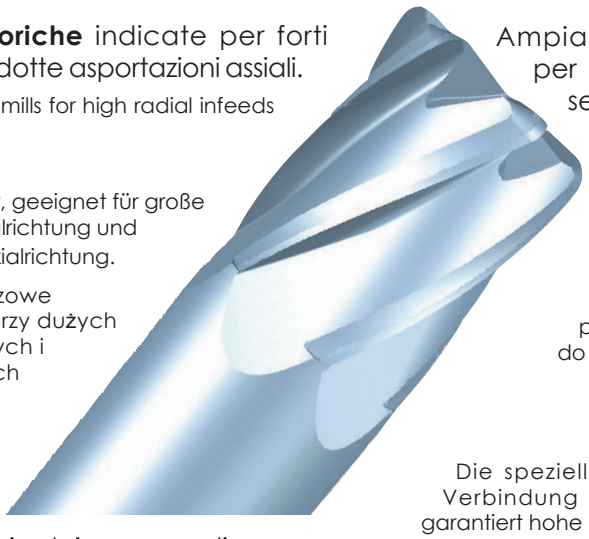
142 - 144

Frese **multitaglienti toriche** indicate per forti asportazioni radiali e ridotte asportazioni assiali.

Multicut corner radius end mills for high radial infeeds and limited axial depths.

Mehrschneidige Torusfräser, geeignet für große Spanabhebungen in Radialrichtung und geringe Abhebungen in Axialrichtung.

Toroidalne frezy wieloostrzowe przeznaczone do pracy przy dużych naddatkach promieniowych i zmniejszonych naddatkach osiowych.



Ampia **gamma di corner radius** per lavorazioni di copiatura nel settore degli stampi.

Wide corner radius range for copy milling in mould production.

Große Auswahl an Eckenradien für das Kopierfräsen im Formenbau.

Szeroka gama dostępnych promieni naroży. Wykorzystywane do kopiowania oraz produkcji form.

La particolare geometria dei corner radius unita alla **micrograna ultrafine** di base, garantisce a questi utensili una eccellente resistenza all'usura.

The special corner radius geometry, along with the ultrafine hard metal grade, gives the tool an excellent wear resistance

Die spezielle Geometrie der Eckenradien in Verbindung mit dem Ultrafeinkorn-Hartmetall garantiert hohe Verschleißfestigkeit der Werkzeuge.

Specjalna geometria naroży w połączeniu z ultra drobnym ziarnem węglika daje narzędzie o doskonałej odporności na zużycie.

Serie Lunga , Long, Lang, Długa
HMG 144 **F -15%, n -15%**

HRC < 52 AIR

HMC 142

	0,20 D / 1,0 D	0,10 D / 0,05 D	0,030 D / 0,030 D
m/min	Vc 91	Vc 113	Vc 206
D	fz F n	fz F n	fz F n
mm	mm/z mm/min rpm	mm/z mm/min rpm	mm/z mm/min rpm
4,0	0,007 189 7225	0,022 778 8957	0,034 2215 16421
6,0	0,020 385 4817	0,042 1003 5971	0,054 2365 10947
8,0	0,034 497 3613	0,056 1010 4479	0,068 2246 8211
10,0	0,046 526 2890	0,068 968 3583	0,080 2090 6568
12,0	0,055 790 2408	0,077 1373 2986	0,089 2912 5474
16,0	0,069 748 1806	0,091 1223 2239	0,103 2538 4105

HRC < 56 AIR

HMC 142

	0,10 D / 0,05 D	0,030 D / 0,030 D
m/min	Vc 99	Vc 165
D	fz F n	fz F n
mm	mm/z mm/min rpm	mm/z mm/min rpm
4,0	0,011 357 7882	0,016 826 13137
6,0	0,028 589 5255	0,036 1261 8758
8,0	0,042 668 3941	0,050 1324 6568
10,0	0,054 675 3153	0,062 1294 5255
12,0	0,063 988 2627	0,071 1856 4379
16,0	0,077 911 1971	0,085 1676 3284

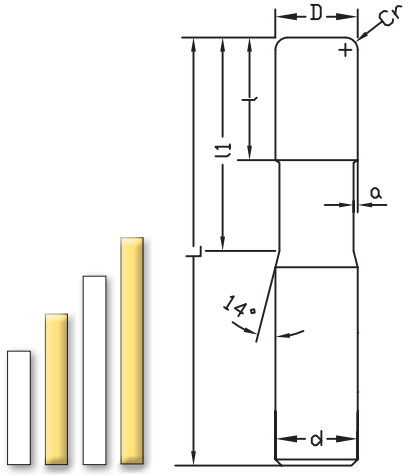
HRC < 60 AIR

HMC 142

	0,10 D / 0,05 D	0,030 D / 0,030 D
m/min	Vc 50	Vc 83
D	fz F n	fz F n
mm	mm/z mm/min rpm	mm/z mm/min rpm
4,0	0,007 112 3941	0,011 282 6568
6,0	0,021 221 2627	0,027 473 4379
8,0	0,035 279 1971	0,041 544 3284
10,0	0,047 293 1576	0,053 552 2627
12,0	0,056 439 1314	0,062 810 2189
16,0	0,070 414 985	0,076 749 1642

SILMAX

142 Frese toriche
Corner radius end mills



Ultra Fine

Silmax Norm

λ 30°

Cr

D	d	L	l	Cr	l1	a	142 Cr	HMC	HMH	Z
e8	h6							€	€	
3	3	50	4	0,3	-	-	142030Cr03	37,60	41,80	4
4	4	50	5	0,3	-	-	142040Cr03	42,30	46,50	4
5	5	50	6	0,5	-	-	142050Cr05	46,90	51,30	4
6	6	57	7	0,5	-	-	142060Cr05	53,20	57,40	4
6	6	57	7	1,0	-	-	142060Cr10	53,20	57,40	4
8	8	63	9	0,5	-	-	142080Cr05	72,30	79,80	4
8	8	63	9	1,0	-	-	142080Cr10	72,30	79,80	4
10	10	72	11	1,0	-	-	142100Cr10	111,80	119,30	4
10	10	72	11	1,5	-	-	142100Cr15	111,80	119,30	4
12	12	81	12	1,5	-	-	142120Cr15	148,90	156,30	6
16	16	86	16	1,5	-	-	142160Cr15	266,40	279,20	6

PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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Lavorazioni, Machining Process

144 Frese toriche
Corner radius end mills

Ultra Fine

Silmax Norm

λ 30°

Cr

D	d	L	l	Cr	l1	a	144 Cr	HMC	HMH	Z
e8	h6							€	€	
3	6	80	4	0,3	-	-	144030Cr03	59,60	63,80	4
4	6	80	5	0,3	-	-	144040C0r3	63,90	68,10	4
5	6	80	6	0,5	-	-	144050Cr05	68,10	72,50	4
6	6	80	7	0,5	17	0,15	144060Cr05	66,90	71,10	4
6	6	80	7	1,0	17	0,15	144060Cr10	66,90	71,10	4
8	8	80	9	0,5	19	0,15	144080Cr05	83,30	90,70	4
8	8	80	9	1,0	19	0,15	144080Cr10	83,30	90,70	4
10	10	108	11	1,0	31	0,15	144100Cr10	134,40	141,80	4
10	10	108	11	1,5	31	0,15	144100Cr15	134,40	141,80	4
12	12	108	12	1,5	32	0,20	144120Cr15	163,20	170,60	6
16	16	120	16	1,5	36	0,20	144160Cr15	280,90	293,70	6

Lavorazioni, Machining Process

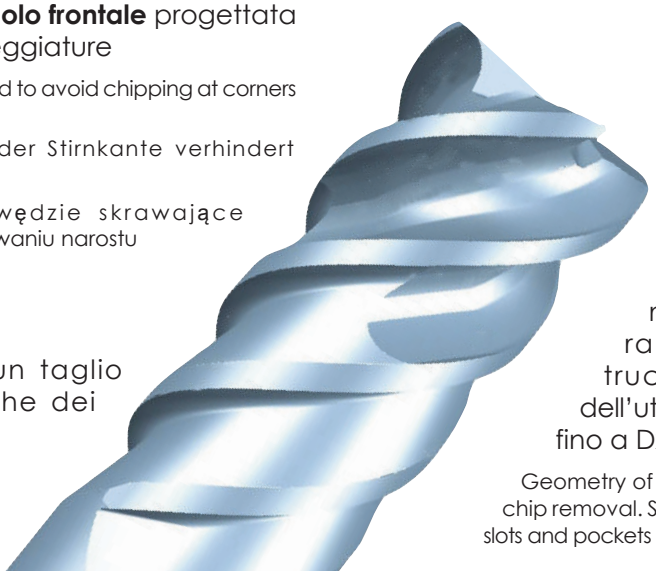
043 - 143 - 145

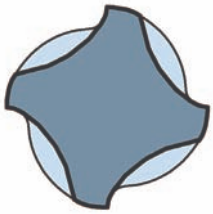
Affilatura dello **spigolo frontale** progettata per prevenire scheggiature

Cutting edges developed to avoid chipping at corners

Der spezielle Schliff der Stirnkante verhindert Absplitterungen.

Rozbudowane krawędzie skrawające zapobiegające powstawaniu narostu





Doppia geometria del nucleo con assottigliamento frontale, per una rapida evacuazione del truciolo massima rigidità dell'utensile per lavorare in cava fino a DxD.

Geometry of the core providing a very good chip removal. Special core geometry to machine slots and pockets up to DxD

Elica a 52° per un taglio più morbido anche dei materiali temprati.

52° elix, rake angle -15° featuring good performance when machining hardened steels

52° Spirale für weicheren Schnitt auch bei gehärteten Werkstoffen.

Kąt pochylenia linii śrubowej 52° umożliwia "miękkie" skrawanie także materiałów utwardzonych.

Doppelgeometrie des Kerns mit gradualer Verringerung der Stirnseite für schnelle Spanabfuhr. Höchste Werkzeugfestigkeit bei der Nutenbearbeitung bis DxD

Podwójna geometria rdzenia wraz ze specjalnym ostrzeniem pozwala na szybką ewakuację wióra. Umożliwia to wykonywanie rowków DxD przy zachowaniu odpowiedniej sztywności narzędzia.

HRC < 52 AIR — HMC 043

m/min	Vc 50			Vc 96		
D	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,024	255	2654	0,024	489	5096
8,0	0,036	283	1990	0,036	543	3822
10,0	0,044	283	1592	0,044	543	3057
12,0	0,052	275	1327	0,052	527	2548
16,0	0,063	252	995	0,063	483	1911
20,0	0,072	230	796	0,072	441	1529

HRC < 56 AIR — HMC 043

m/min	Vc 20			Vc 78		
D	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,016	68	1062	0,016	265	4140
8,0	0,028	88	796	0,028	342	3105
10,0	0,036	93	637	0,036	362	2484
12,0	0,044	93	531	0,044	362	2070
16,0	0,055	88	398	0,055	343	1553
20,0	0,064	82	318	0,064	319	1242

HRC < 60 AIR — HMC 043

m/min	Vc 20		
D	fz	F	n
mm	mm/z	mm/min	rpm
6,0	0,012	52	1083
8,0	0,024	76	812
10,0	0,032	84	650
12,0	0,040	86	541
16,0	0,051	83	406
20,0	0,060	78	325

HRC < 52 AIR — HMC 143 / HMC 145

m/min	Vc 243			Vc 49		
D	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,014	1600	19347			
6,0	0,030	2322	12898	0,030	466	2588
8,0	0,042	2409	9674	0,042	483	1941
10,0	0,050	2342	7739	0,050	470	1553
12,0	0,058	2234	6449	0,058	448	1294
16,0	0,069	2009	4837	0,069	403	970

HRC < 56 AIR — HMC 143 / HMC 145

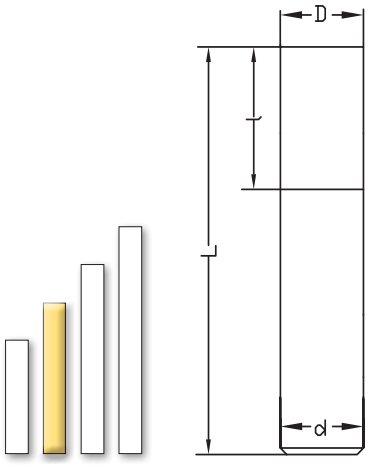
m/min	Vc 180			Vc 39		
D	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,006	546	14331			
6,0	0,020	1146	9554	0,020	248	2070
8,0	0,032	1355	7166	0,032	293	1553
10,0	0,040	1391	5732	0,040	301	1242
12,0	0,048	1368	4777	0,048	296	1035
16,0	0,059	1273	3583	0,059	276	776

HRC < 60 AIR — HMC 143 / HMC 145

m/min	Vc 65			Vc 20		
D	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,004	119	5159			
6,0	0,015	310	3439	0,015	93	1035
8,0	0,027	410	2580	0,027	123	776
10,0	0,035	439	2064	0,035	132	621
12,0	0,043	441	1720	0,043	133	518
16,0	0,054	420	1290	0,054	126	388

043 Frese per la sgrossatura di materiali temprati

Roughing cutters for hardened steels



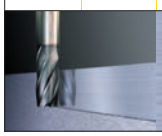
Ultra Fine

Silmax Norm

λ 52°
γ-15°

90°

D	d	L	l	043	HMC	HMH	Z
e8	h6				€	€	
6	6	57	13	043060	60,20	64,40	4
8	8	63	19	043080	81,90	89,30	4
10	10	72	22	043100	120,80	128,20	4
12	12	81	26	043120	150,20	157,60	4
16	16	86	32	043160	276,20	288,80	4
20	20	108	38	043200	425,00	437,60	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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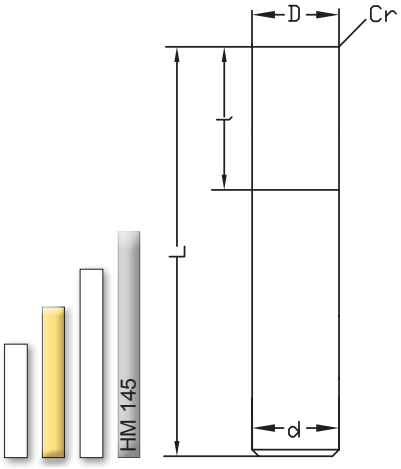
Lavorazioni, Machining Process

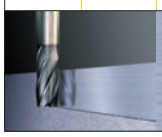
SILMAX

143 Frese per la finitura di acciai temprati
Cutters for finishing of hardened steels

143 Cr Frese per la finitura di acciai temprati con Corner Radius
Cutters for finishing of hardened steels with Corner Radius



D	d	L	l	Cr	143	HMC	HMH	Z	143 Cr	HMC	HMH	Z
e8	h6					€	€			€	€	
3	6	57	7		143030	55,80	60,00	6				
3	6	57	7	0,3					143030Cr03	61,70	65,90	6
4	6	57	9		143040	55,80	60,00	6				
4	6	57	9	0,3					143040Cr03	61,70	65,90	6
5	6	57	11		143050	55,80	60,00	6				
5	6	57	11	0,3					143050Cr03	61,70	65,90	6
6	6	57	13		143060	57,30	61,70	6				
6	6	57	13	0,5					143060Cr05	62,30	66,50	6
8	8	63	19		143080	78,10	85,50	6				
8	8	63	19	0,5					143080Cr05	84,40	91,80	6
10	10	72	22		143100	115,30	122,70	6				
10	10	72	22	1,0					143100Cr10	122,00	129,40	6
12	12	81	26		143120	143,20	150,60	6				
12	12	81	26	1,5					143120Cr15	151,10	158,50	6
16	16	86	32		143160	263,40	276,20	6				
16	16	86	32	1,5					143160Cr15	274,10	286,90	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

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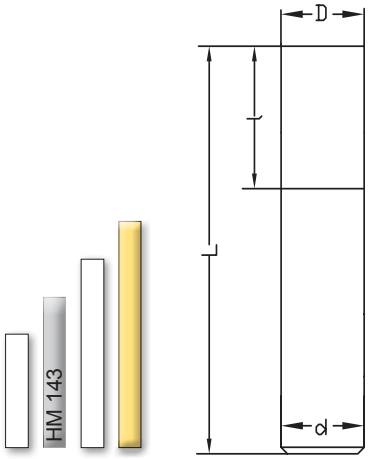
Lavorazioni, Machining Process

Lavorazioni, Machining Process

145 Frese per la finitura di acciai temprati

Cutters for finishing of hardened steels



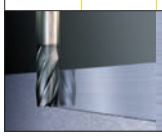
Ultra Fine

Silmax Norm

λ 45°
γ-10°

90°

D e8	d h6	L	l	145	HMC €	HMH €	Z
6	6	80	24	145060	86,90	91,10	6
8	8	80	32	145080	111,00	118,40	6
10	10	108	40	145100	165,40	172,80	6
12	12	108	48	145120	198,40	205,80	6
16	16	130	64	145160	327,30	340,00	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

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Lavorazioni, Machining Process

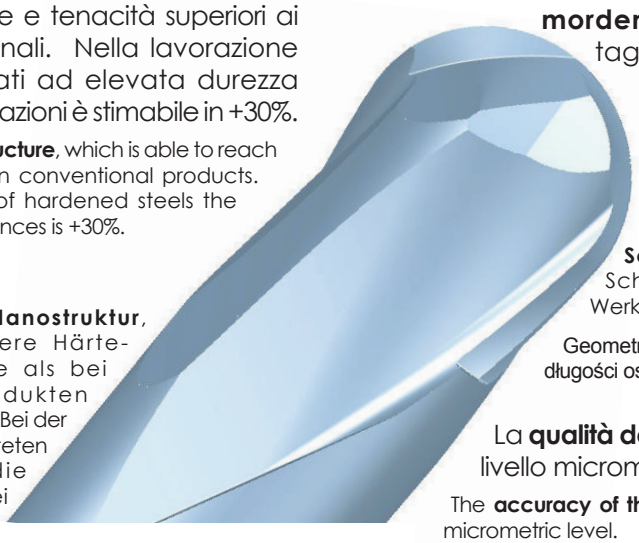
727 - 729 - 147

Metallo duro a nano-struttura in grado di raggiungere durezze e tenacità superiori ai prodotti convenzionali. Nella lavorazione di materiali temprati ad elevata durezza l'incremento di prestazioni è stimabile in +30%.

Hard metal with nano-structure, which is able to reach an hardness higher than conventional products. During the machining of hardened steels the increase of the performances is +30%.

Vollhartmetall mit Nanostruktur, womit weitaus höhere Härte- und Festigkeitswerte als bei herkömmlichen Produkten erreicht werden können. Bei der Bearbeitung von gehärteten Werkstoffen liegt die Leistungssteigerung bei +30%.

Ultra drobnoziarnisty węglik (nanostruktura) pozwala uzyskać znacznie wyższą twardość i wytrzymałość niż w przypadku narzędzi konwencjonalnych. Dzięki temu, przy obróbce materiałów utwardzonych uzyskujemy wzrost wydajności o 30%.



Geometria sferica con un **grado di mordente costante** su tutto il filo tagliente, partendo dal centro dell'utensile.

Geometry with a **constant rake angle** along the entire cutting edge, starting from the centre of the tool.

Kugelgeometrie mit **konstantem Schneidegrad** auf der gesamten Schneidkante, ausgehend von der Werkzeugmitte.

Geometria ze **stałym kątem natarcia** na całej długości ostrza, zaczynającym się w osi narzędzia.

La **qualità del filo tagliente** è controllata a livello micrometrico.

The **accuracy of the cutting edge** is controlled on a micrometric level.

Die **Qualität der Schneidekante** wird im Mikrometerbereich geprüft.

Jakość krawędzi skrawającej jest kontrolowana mikrometrycznie.

HRC < 52 AIR — HMC 727

0,060 D / 0,020 D

m/min	Vc 225		
D	fz	F	n
mm	mm/z	mm/min	rpm
2,0	0,026	1867	35828
4,0	0,054	1927	17914
6,0	0,070	1672	11943
8,0	0,082	1460	8957
10,0	0,090	1296	7166
12,0	0,098	1167	5971
16,0	0,109	978	4479

HRC < 56 AIR — HMC 727

0,060 D / 0,020 D

m/min	Vc 180		
D	fz	F	n
mm	mm/z	mm/min	rpm
2,0	0,009	524	28662
4,0	0,030	854	14331
6,0	0,046	879	9554
8,0	0,058	824	7166
10,0	0,066	762	5732
12,0	0,074	704	4777
16,0	0,085	611	3583

HRC < 60 AIR — HMC 727

0,060 D / 0,020 D

m/min	Vc 90		
D	fz	F	n
mm	mm/z	mm/min	rpm
2,0	0,005	135	14331
4,0	0,019	269	7166
6,0	0,035	334	4777
8,0	0,047	333	3583
10,0	0,055	318	2866
12,0	0,063	300	2389
16,0	0,074	266	1791

HRC < 52 AIR — HMC 729 / HMC 147

0,060 D / 0,020 D

m/min	Vc 194			Vc 194		
D	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
3,0	0,032	1326	20541			
4,0	0,044	1349	15406			
6,0	0,060	1232	10271	0,065	2670	10271
8,0	0,072	1102	7703	0,074	2269	7703
10,0	0,080	991	6162	0,080	1980	6162
12,0	0,088	901	5135	0,086	1762	5135
16,0	0,099	764	3852	0,094	1455	3852

HRC < 56 AIR — HMC 729 / HMC 147

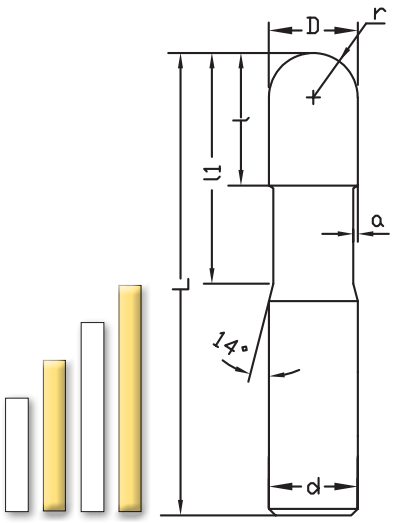
0,060 D / 0,020 D

m/min	Vc 155			Vc 155		
D	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
3,0	0,012	403	16433			
4,0	0,024	586	12325			
6,0	0,040	657	8217	0,043	1413	8217
8,0	0,052	635	6162	0,052	1273	6162
10,0	0,060	596	4930	0,058	1150	4930
12,0	0,068	556	4108	0,064	1048	4108
16,0	0,079	488	3081	0,072	893	3081

HRC < 60 AIR — HMC 729 / HMC 147

0,060 D / 0,020 D

m/min	Vc 77			Vc 77		
D	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
3,0	0,007	113	8217			
4,0	0,014	170	6162			
6,0	0,030	246	4108	0,035	575	4108
8,0	0,042	256	3081	0,044	538	3081
10,0	0,050	249	2465	0,050	496	2465
12,0	0,058	237	2054	0,056	458	2054
16,0	0,069	213	1541	0,064	397	1541



727 Frese semisferiche per la lavorazione di acciai temprati

Ball nose end mills for finishing of hardened steels

Ultra Fine

Silmax Norm

λ 17° γ -4°

729 Frese semisferiche per la lavorazione di acciai temprati

Ball nose end mills for finishing of hardened steels

Ultra Fine

Silmax Norm

λ 17° γ -4°

D	d	L	l	r	l1	a	727	HMC €	HMH €	Z
		h6		f8						
1	6	57	1,5	0,5	3	0,1	727010	72,70	76,40	2
1,5	6	57	2,0	0,75	4	0,1	727015	71,00	74,50	2
2	6	57	2,0	1,0	4	0,1	727020	71,00	74,50	2
2,5	6	57	2,5	1,25	5	0,1	727025	69,10	72,50	2
3	6	57	3,0	1,5	6	0,1	727030	65,20	68,40	2
4	6	57	4,0	2,0	8	0,1	727040	65,20	68,40	2
5	6	57	5,0	2,5	10	0,1	727050	66,10	69,40	2
6	8	63	6,0	3,0	12	0,15	727060	87,10	91,40	2
8	8	63	8,0	4,0	-	-	727080	80,30	84,30	2
10	10	72	10,0	5,0	-	-	727100	103,60	108,60	2
12	12	83	12,0	6,0	-	-	727120	150,90	158,10	2
16	16	92	16,0	8,0	-	-	727160	238,00	249,20	2
20	20	104	20,0	10,0	-	-	727200	361,40	378,40	2

D	d	L	l	r	l1	a	729	HMC €	HMH €	Z
h6				f8						
3	6	78	3	1,5	6	0,1	729030	77,90	81,70	2
4	6	78	4	2,0	8	0,1	729040	76,10	79,80	2
5	6	105	5	2,5	10	0,1	729050	85,70	89,90	2
6	8	105	6	3,0	12	0,15	729060	105,20	110,30	2
8	8	105	8	4,0	-	-	729080	100,80	105,70	2
10	10	120	10	5,0	-	-	729100	146,20	153,20	2
12	12	125	12	6,0	-	-	729120	181,40	190,00	2
16	16	130	16	8,0	-	-	729160	289,00	302,60	2
20	20	160	20	10,0	-	-	729200	550,60	576,30	2

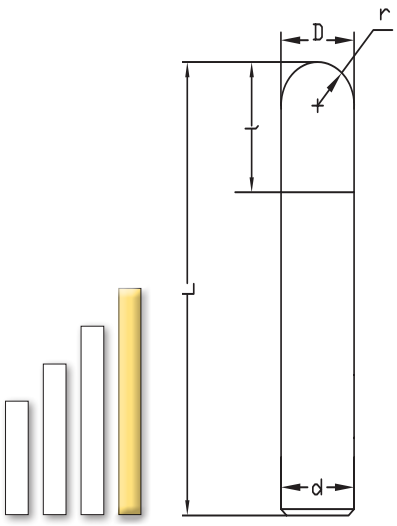
PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.48

Lavorazioni, Machining Process

Lavorazioni, Machining Process

147 Frese semisferiche per la lavorazione di acciai temprati

Ball nose end mills for finishing of hardened steels

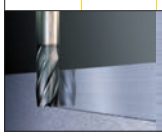


Ultra Fine

Silmax Norm

λ 30°
γ-10°

D	d h6	L	l	r f8	147	HMC €	HMH €	Z
6	6	80	10	3,0	147060	71,70	76,10	4
8	8	80	16	4,0	147080	92,60	100,00	4
10	10	108	19	5,0	147100	141,90	149,30	4
12	12	108	22	6,0	147120	178,50	185,80	4
16	16	130	26	8,0	147160	325,50	338,40	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.48

Lavorazioni, Machining Process

COLOURMILL

COLOUR

FRESE PER LA LAVORAZIONE DI INOX, INCONEL E LEGHE DI TITANIO

END MILLS FOR MACHINING STAINLESS STEEL INCONEL AND TITANIUM ALLOYS

FRÄSER FÜR DIE BEARBEITUNG VON INOX, INCONEL UND TITANLEGIERUNGEN

FREZY DO OBRÓBKI INOX, INCONEL ORAZ STOPÓW TYTANU

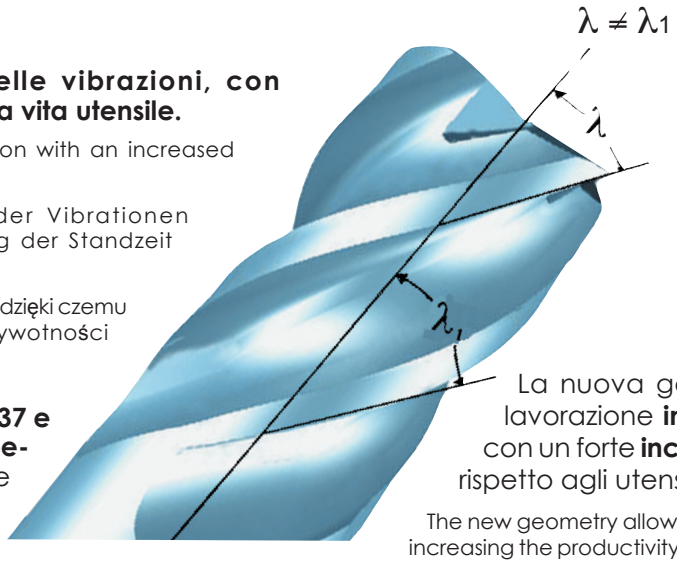
COLOUR

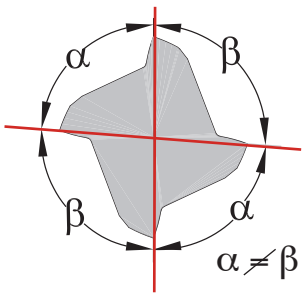
Forte riduzione delle vibrazioni, con prolungamento della vita utensile.

Strong vibration reduction with an increased tool life.

Starke Reduzierung der Vibrationen bei deutlicher Erhölung der Standzeit Werkzeuges.

Redukcja drgań i wibracji dzięki czemu uzyskano wydłużenie żywotności narzędzia.





HM120, HM124, HM737 e HM119 sono **frese specifiche** per lavorare acciai inossidabili e duplex.

HM120, HM124, HM737 and HM119 are specific cutters for the machining of stainless steels, and duplex.

HM120, HM124, HM737 und HM119 sind spezifische Fräser, für die Verarbeitung von rostfreien Stählen und Duplex.

HM120, HM124, HM737 i HM119 są frezami specjalizowanymi do obróbki stali typu INOX i materiałów typu Duplex.

La nuova geometria permette la lavorazione **in cava con 4 taglienti,** con un forte **incremento di produttività** rispetto agli utensili tradizionali.

The new geometry allows to work with 4 cuts, strongly increasing the productivity in comparison with conventional cutters.

Die neue Geometrie erlaubt die Bearbeitung von Nuten, mit 4 Schneiden und eine Erhöhung der Produktivität im Vergleich zu traditionellen Werkzeugen.

Nowa geometria pozwala na obróbkę rowków za pomocą czterech krawędzi skrawających, uzyskując duży wzrost efektywności pracy w stosunku do narzędzi tradycyjnych

INOX FERRITICI / MARTENSITICI — MAX

HMC / HMY 120

	1,0 D			0,25 D			0,10 D		
m/min	Vc 110			Vc 110			Vc 120		
D	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,020	465	5840	0,025	585	5840	0,025	635	6370
8,0	0,025	440	4380	0,030	525	4380	0,030	575	4770
10,0	0,040	560	3500	0,045	630	3500	0,045	690	3820
12,0	0,055	640	2920	0,060	700	2920	0,060	765	3180
16,0	0,065	570	2190	0,070	615	2190	0,070	670	2390
20,0	0,075	525	1750	0,080	560	1750	0,080	610	1910

INOX AUSTENITICI — MAX

HMC / HMY 120

	1,0 D			0,25 D			0,10 D		
m/min	Vc 80			Vc 80			Vc90		
D	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,015	255	4240	0,019	325	4240	0,023	440	4770
8,0	0,027	345	3180	0,026	330	3180	0,034	485	3580
10,0	0,040	410	2550	0,040	410	2550	0,045	515	2860
12,0	0,050	425	2120	0,050	425	2120	0,055	525	2390
16,0	0,060	380	1590	0,060	380	1590	0,070	500	1790
20,0	0,070	355	1270	0,070	355	1270	0,080	460	1430

PH / DUPLEX — MAX

HMC / HMY 119

	1,0 D			0,25 D			0,10 D		
m/min	Vc 60			Vc 60			Vc 60		
D	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,016	205	3180	0,015	190	3180	0,020	255	3180
8,0	0,022	210	2390	0,022	210	2390	0,030	285	2390
10,0	0,030	230	1910	0,029	220	1910	0,040	305	1910
12,0	0,040	255	1590	0,038	240	1590	0,050	320	1590
16,0	0,047	225	1190	0,045	215	1190	0,060	285	1190
20,0	0,052	200	960	0,050	190	950	0,065	250	950

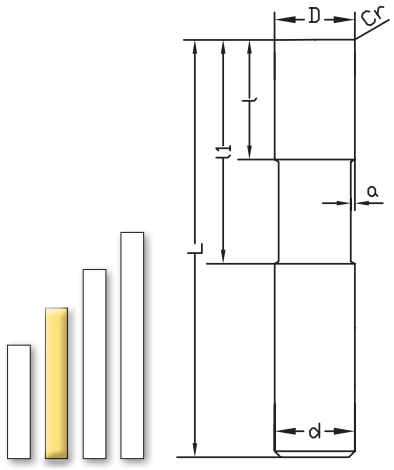
LEGHE DI TITANIO 340-450HB — MAX

HMC / HMY 120

	1,0 D			0,25 D		
m/min	Vc 40			Vc 60		
D	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,015	125	2120	0,015	190	3180
8,0	0,020	125	1590	0,022	210	2390
10,0	0,030	155	1270	0,035	270	1910
12,0	0,040	170	1060	0,045	285	1590
16,0	0,050	160	800	0,060	285	1190
20,0	0,065	165	640	0,075	285	950

HMC / HMY 124

Serie Lunga,
Long, Lang, D□uga
F -30%, n -15%



120 Frese per la lavorazione degli acciai inossidabili

End mills for machining of Stainless steel

INOX

Ultra fine

Silmax Norm

λ 38° 41°

0,1-0,2 45°

124 Frese per la lavorazione degli acciai inossidabili serie Lunga

End mills (long version) for machining of Stainless steel

INOX

Ultra fine

Silmax Norm

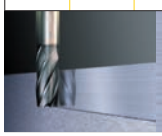
λ 38° 40°

0,1-0,2 45°

COLOUR

D e8	d h6	L	l	Cr	l1	a	120	HMC €	HMY €	Z
6	6	57	9	-	18	0,15	120060	55,70	55,70	4
6	6	57	9	0,5	18	0,15	120060Cr05	59,30	59,30	4
8	8	63	12	-	24	0,15	120080	75,60	75,60	4
8	8	63	12	0,5	24	0,15	120080Cr05	79,10	79,10	4
10	10	72	15	-	30	0,15	120100	102,20	102,20	4
10	10	72	15	1,0	30	0,15	120100Cr10	106,90	106,90	4
12	12	83	18	-	36	0,20	120120	139,50	139,50	4
12	12	83	18	1,0	36	0,20	120120Cr10	144,10	144,10	4
16	16	92	24	-	42	0,20	120160	229,20	229,20	4
16	16	92	24	1,0	42	0,20	120160Cr10	235,40	235,40	4
20	20	104	30	-	52	0,20	120200	344,60	344,60	4
20	20	104	30	1,0	52	0,20	120200Cr10	350,60	350,60	4

D e8	d h6	L	l	Cr	124	HMC €	HMY €	Z
6	6	57	15	-	124060	58,50	58,50	4
6	6	57	15	0,5	124060Cr05	62,20	62,20	4
8	8	63	20	-	124080	79,30	79,30	4
8	8	63	20	0,5	124080Cr05	83,00	83,00	4
10	10	72	25	-	124100	107,10	107,10	4
10	10	72	25	1,0	124100Cr10	112,00	112,00	4
12	12	83	30	-	124120	146,20	146,20	4
12	12	83	30	1,0	124120Cr10	151,00	151,00	4
16	16	92	36	-	124160	240,10	240,10	4
16	16	92	36	1,0	124160Cr10	246,60	246,60	4
20	20	104	45	-	124200	360,80	360,80	4
20	20	104	45	1,0	124200Cr10	367,20	367,20	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.52

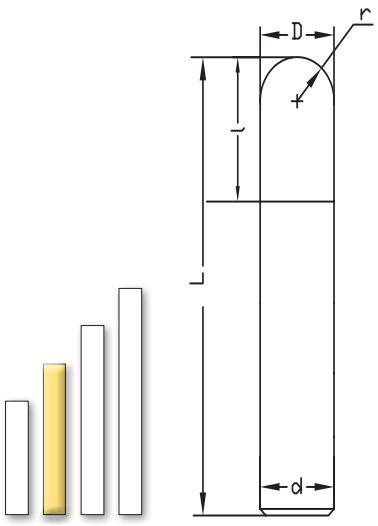
Lavorazioni, Machining Process

Lavorazioni, Machining Process

737 Frese semisferiche per la lavorazione degli acciai inossidabili

Ball nose end mills

INOX



MG Co10

Silmax Norm

λ 30°

D h10	d h6	L	l	r	737	HMC €	HMY €	Z
3	3	38	7	1,5	737030	48,70	48,70	2
4	4	50	8	2,0	737040	46,40	46,40	2
5	5	50	10	2,5	737050	50,00	50,00	2
6	6	57	10	3,0	737060	54,10	54,10	2
8	8	63	16	4,0	737080	70,70	70,70	2
10	10	72	19	5,0	737100	96,50	96,50	2
12	12	83	22	6,0	737120	138,80	138,80	2
16	16	92	26	8,0	737160	250,20	250,20	2

Frese semisferiche per la lavorazione degli acciai inossidabili.

Ball nose end mills for machining of stainless steel.

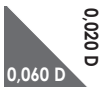
Halbrundfräser für die Bearbeitung von rostfreiem Stahl.

Frezy promieniowe do obróbek stali nierdzewnych.

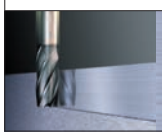
737

INOX MARTENSITICI	MAX	INOX AUSTENITICI

HMC / HMY 737



m/min	Vc 120			Vc 90		
D	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,20	3822	9554	0,175	2508	7166
6,0	0,25	3185	6369	0,225	2150	4777
8,0	0,30	2866	4777	0,275	1971	3583
10,0	0,34	2599	3822	0,315	1806	2866
12,0	0,39	2484	3185	0,365	1744	2389
16,0	0,44	2102	2389	0,415	1487	1791



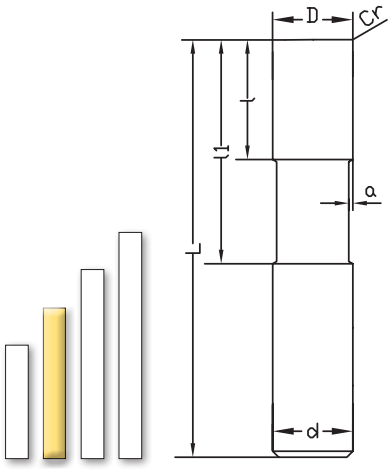
PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Lavorazioni, Machining Process

119 Frese per la lavorazione di duplex

End mills for machining of DUPLEX

DUPLEX



Ultra fine

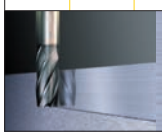
Silmax Norm

λ 38° 41°

0,1-0,2 45°

COLOUR

D	d	L	l	Cr	l1	a	119	HMC	HMY	Z
e8	h6							€	€	
6	6	57	9	-	18	0,15	119060	55,70	55,70	4
6	6	57	9	0,5	18	0,15	119060Cr05	59,30	59,30	4
8	8	63	12	-	24	0,15	119080	75,60	75,60	4
8	8	63	12	0,5	24	0,15	119080Cr05	79,10	79,10	4
10	10	72	15	-	30	0,15	119100	102,20	102,20	4
10	10	72	15	1,0	30	0,15	119100Cr10	106,90	106,90	4
12	12	83	18	-	36	0,20	119120	139,50	139,50	4
12	12	83	18	1,0	36	0,20	119120Cr10	144,10	144,10	4
16	16	92	24	-	42	0,20	119160	229,20	229,20	4
16	16	92	24	1,0	42	0,20	119160Cr10	235,40	235,40	4
20	20	104	30	-	52	0,20	119200	344,60	344,60	4
20	20	104	30	1,0	52	0,20	119200Cr10	350,60	350,60	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.52

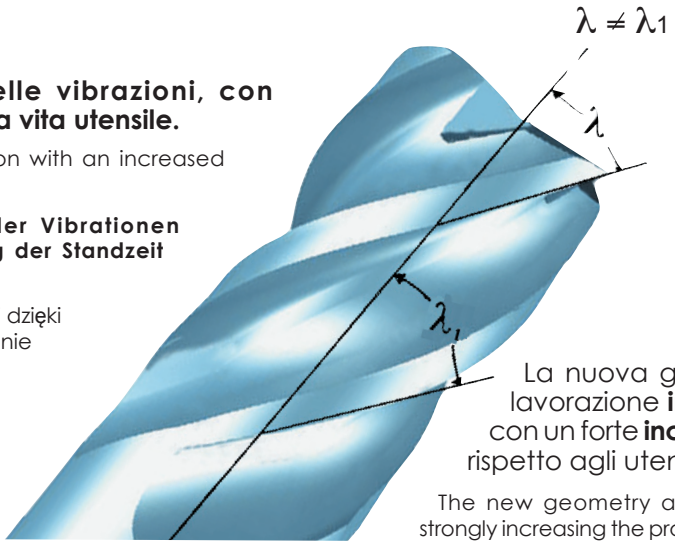
Lavorazioni, Machining Process

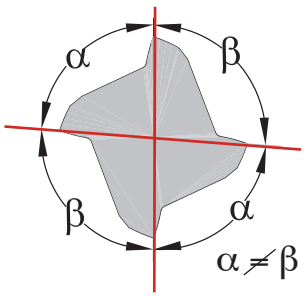
Forte riduzione delle vibrazioni, con prolungamento della vita utensile.

Strong vibration reduction with an increased tool life.

Starke Reduzierung der Vibrationen bei deutlicher Erhölung der Standzeit Werkzeuges.

Redukcja drgań i wibracji dzięki czemu uzyskano wydłużenie żywotności narzędzia.





HM118 è una **fresa specifica** per la lavorazione di superleghe.

La nuova geometria permette la lavorazione **in cava con 4 taglienti,** con un forte **incremento di produttività** rispetto agli utensili tradizionali.

HM118 is a specific cutter for the machining of superalloys.

The new geometry allows to work with 4 cuts, strongly increasing the productivity in comparison with conventional cutters.

HM118 ist ein spezifischer Fräser, für die Verarbeitung von Superlegierungen.

Die neue Geometrie erlaubt die Bearbeitung von Nuten, mit 4 Schneiden und eine Erhöhung der Produktivität im Vergleich zu traditionellen Werkzeugen.

HM118 jest frezem specjalizowanym do obróbki tzw. super stopów

Nowa geometria pozwala na obróbkę rowków za pomocą czterech krawędzi skrawających, uzyskując duży wzrost wydajności w stosunku do narzędzi konwencjonalnych.

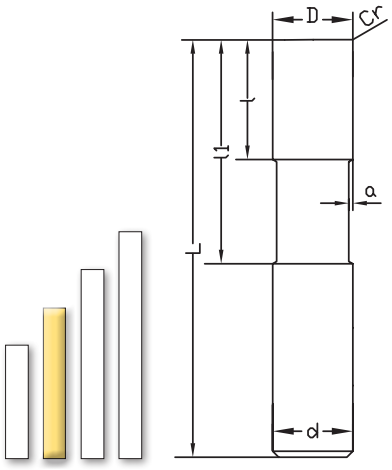
Superleghe MAX							Superleghe difficili da lavorare MAX						Superleghe molto difficili MAX					
HMC / HMY 118							HMC / HMY 118						HMC / HMY 118					
	1,0 D / 1,0 D			1,5 D / 0,25 D			1,0 D / 1,0 D			1,5 D / 0,25 D			1,0 D / 1,0 D			1,5 D / 0,25 D		
m/min	Vc 27			Vc 28			Vc 24			Vc 28			Vc 20			Vc 22		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,018	103	1433	0,020	116	1486	0,012	61	1274	0,013	77	1486	0,012	51	1062	0,013	61	1168
8,0	0,026	110	1075	0,027	120	1115	0,017	65	955	0,018	80	1115	0,017	54	796	0,018	63	876
10,0	0,035	119	860	0,038	134	892	0,023	70	764	0,025	89	892	0,023	59	637	0,025	70	701
12,0	0,045	129	717	0,050	147	743	0,030	76	637	0,033	98	743	0,030	64	531	0,033	77	584
16,0	0,054	116	537	0,060	134	557	0,036	69	478	0,040	89	557	0,036	57	398	0,040	70	438
20,0	0,060	103	430	0,066	118	446	0,040	61	382	0,044	78	446	0,040	51	318	0,044	62	350

Superleghe MAX					Superleghe difficili da lavorare MAX				Superleghe molto difficili MAX			
HMC / HMY 118					HMC / HMY 118				HMC / HMY 118			
	1,5 D / 0,10 D				1,5 D / 0,10 D				1,5 D / 0,10 D			
m/min	Vc 30				Vc 30				Vc 22			
D	fz	F	n		fz	F	n		fz	F	n	
mm	mm/z	mm/min	rpm		mm/z	mm/min	rpm		mm/z	mm/min	rpm	
6,0	0,023	143	1592		0,015	96	1592		0,015	70	1168	
8,0	0,032	150	1194		0,021	100	1194		0,021	74	876	
10,0	0,044	166	955		0,029	111	955		0,029	81	701	
12,0	0,057	182	796		0,038	121	796		0,038	89	584	
16,0	0,068	161	597		0,045	107	597		0,045	79	438	
20,0	0,075	143	478		0,050	96	478		0,050	70	350	

118 Frese per la lavorazione di superleghe

End mills for machining of Superalloys

INCONEL



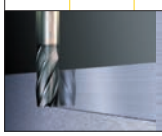
Ultra fine

Silmax Norm

λ 38° 41°

0,1-0,2 45°

D	d	L	l	Cr	l1	a	118	HMC	HMY	Z
e8	h6							€	€	
6	6	57	9	-	18	0,15	118060	55,70	55,70	4
6	6	57	9	0,5	18	0,15	118060Cr05	59,30	59,30	4
8	8	63	12	-	24	0,15	118080	75,60	75,60	4
8	8	63	12	0,5	24	0,15	118080Cr05	79,10	79,10	4
10	10	72	15	-	30	0,15	118100	102,20	102,20	4
10	10	72	15	1,0	30	0,15	118100Cr10	106,90	106,90	4
12	12	83	18	-	36	0,20	118120	139,50	139,50	4
12	12	83	18	1,0	36	0,20	118120Cr10	144,10	144,10	4
16	16	92	24	-	42	0,20	118160	229,20	229,20	4
16	16	92	24	1,0	42	0,20	118160Cr10	235,40	235,40	4
20	20	104	30	-	52	0,20	118200	344,60	344,60	4
20	20	104	30	1,0	52	0,20	118200Cr10	350,60	350,60	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.56

Lavorazioni, Machining Process

COLOUR

COLOUR

Forte aumento della produttività, grazie alle maggiori profondità radiali e assiali.

High increase in productivity, thanks to the bigger radial and axial cutting depths.

Starke Erhöhung der Produktivität, dank der grösseren radialen und axialen Schnittiefen.

Znaczne podniesienie produktywności dzięki pracy z większymi naddatkami promieniowymi i poosiowym.

Minore pressione sul filo tagliente, con **riduzione dell'usura** e aumento della vita utensile.

Smaller pressure on the cutting edge, reducing its wear and increasing the tool life.

Reduzierter Druck auf die Schneidkanten, mit deutlicher Reduzierung des Verschleisses und Erhöhung der Standzeit des Werkzeuges.

Niższe siły działające na ostrze powodują redukuję zużycia narzędzia i zwiększenie jego żywotności.

Annullamento delle vibrazioni grazie alla continua variazione dell'angolo di attacco e dell'angolo dell'elica.

Elimination of vibrations thanks to the continuous change in rake and helix angles.

Eliminieren der Vibrationen durch eine kontinuierliche Variation des Kontakt und des Helix winkels.

Likwidacja wibracji następuje dzięki zmiennym kątom przyłożenia i pochylenia linii śrubowej rowka wiórowego.

Interruzione del truciolo per una **migliore evacuazione** dalla zona di taglio.

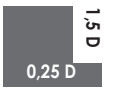
Chip breaker for a better removal from the cutting zone.

Spanbrecher zur besseren Spanabfuhr im Schnittbereich.

Następuje łamanie wióra ułatwiające ewakuację ze strefy skrawania.

LEGHE DI TITANIO 340-450HB MAX

HMC 017

															
m/min	Vc 40			Vc 40			Vc 50			Vc 50			Vc 50		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
10,0	0,025	125	1270	0,030	155	1270	0,042	270	1590	0,030	190	1590	0,035	225	1590
12,0	0,032	135	1060	0,040	170	1060	0,053	280	1330	0,040	210	1330	0,045	240	1330
16,0	0,040	125	800	0,050	160	800	0,066	265	990	0,050	200	990	0,060	240	990
20,0	0,050	125	640	0,065	165	640	0,086	275	800	0,065	210	800	0,075	240	800

LEGHE DI TITANIO 340-450HB MAX

HMC 117

															
m/min	Vc 70			Vc 100											
D	fz	F	n	fz	F	n									
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm									
6,0	0,012	135	3710	0,020	320	5310									
8,0	0,020	165	2790	0,024	285	3980									
10,0	0,030	270	2230	0,035	445	3180									
12,0	0,040	295	1860	0,045	480	2650									
16,0	0,050	280	1390	0,060	480	1990									

117 Frese a finire per la lavorazione delle leghe di Titanio

Cutters for finishing of Alloys of Titanium

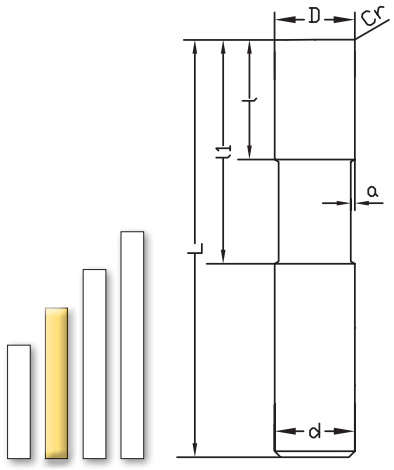
TITANIO

MG Co10

6527L

λ 55°

Cr



D h10	d h6	L	l	Cr	l1	a	117	Uncoated HM0 €	Uncoated HMC €	Z
6	6	57	10	0,5	21	0,15	117060	37,70	47,90	3
8	8	63	16	0,5	27	0,15	117080	51,00	63,80	3
10	10	72	22	1,0	30	0,15	117100	78,50	95,10	4
12	12	83	26	1,0	38	0,20	117120	103,50	126,50	4
16	16	92	32	1,5	42	0,20	117160	179,60	209,50	4
20	20	104	38	2,0	54	0,20	117200	285,40	323,70	4

017 Frese a sgrossare per la lavorazione delle leghe di Titanio

Cutters for roughing of Alloys of Titanium

TITANIO

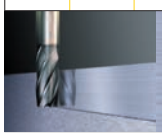
MG Co10

Silmax Norm

λ 35°

Cr

D h10	d h6	L	l	Cr	l1	a	017	Uncoated HM0 €	Uncoated HMC €	Z
10	10	72	15	1,0	30	0,15	017100Cr10	105,60	121,90	4
10	10	72	15	3,0	30	0,15	017100Cr30	105,60	121,90	4
12	12	83	18	1,0	36	0,20	017120Cr10	130,70	153,70	4
12	12	83	18	3,0	36	0,20	017120Cr30	130,70	153,70	4
16	16	92	24	1,0	42	0,20	017160Cr10	193,80	223,60	4
16	16	92	24	3,0	42	0,20	017160Cr30	193,80	223,60	4
20	20	104	30	1,0	52	0,20	017200Cr10	301,00	339,30	4
20	20	104	30	3,0	52	0,20	017200Cr30	301,00	339,30	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.58

Lavorazioni, Machining Process

Lavorazioni, Machining Process

Lavorazione di Inox, Inconel e Titanio

Stainless steel, Inconel ,Titanium alloys

Gruppo		Nr	Std	DIN	Gruppo	Nr	Std	DIN
INOX	Ferritico / martensitico	1.4000	AISI 403	X6Cr13	Austenitico	1.4303	AISI 308	X5CrNi18 12
		1.4002	AISI 405	X6CrAl13		1.4305	AISI 303	X10CrNiS18 9
		1.4005	AISI 416	X12CrS13		1.4306	AISI 304L	X2CrNi19 11
		1.4006	AISI 410	X10Cr13		1.4310	AISI 301	X12CrNi17 7
		1.4016	AISI 430	X6Cr17		1.4401	AISI 316	ZX5CrNiMo18 10
		1.4021	AISI 420	X20Cr13		1.4404	AISI 316L	X2CrNiMo17 13 2
		1.4024		X15Cr13		1.4406	AISI 316LN	X2CrNiMoN17 12 2
		1.4057	AISI 431	X20CrNi17 2		1.4429	AISI 316LN	X2CrNiMoN17 13 3
		1.4104	AISI 430 F	X12CrMoS17		1.4435	AISI 316L	X2CrNiMo18 14 3
		1.4112	AISI 440 B	X90CrMoV18		1.4436	AISI 316	X5CrNiMo17 13 3
		1.4113	AISI 434	X6CrMo17		1.4438	AISI 317L	X2CrNiMo18 16 4
		1.4125	AISI 440 C	X105CrMo17		1.4460	AISI 329	X8CrNiMo27 5
		1.4510	AISI 439	X6CrTi17		1.4541	AISI 321	X6CrNiTi18 10
		1.4512	AISI 409	X5CrTi12		1.4550	AISI 347-348	X6CrNiNb18 10
						1.4571	AISI 316Ti	X6CrNiMoTi17 12 2
		1.4301	AISI 304	X5CrNi18 9		1.4573	AISI 316Ti	X10CrNiMoTi18 12
						1.4580	AISI 316Cb	X6CrNiMoNb17 12 2
						1.4583	AISI 318	X10CrNiMoNb18 12
PH DUPLEX	PH	1.4504	17-7 PH		Duplex		A240 (S31200)	
		1.4542	AISI630	X5CrNiCuNb17 14		1.4410		
			17-4 PH			1.4462		
		1.4545	15-5 PH					
		1.4564	17-7 PH					
SUPERLEGHE	Superleghe	1.4876	Incoloy 800	X10NiCrAlTi32 20	Superleghe molto difficili da lavorare		Alacrite 601	
		1.4945		X6 CrNiWNb16 16			Alacrite 602	
		1.4962		X12CrNiWTi 16 3			AMS 5759	
		2.4360	Monel 400	NiCu30Fe			IN-738	
		2.4375	Monel K500	NiCu30Al			MAR-M200	
		2.4603	Hastelloy X	NiCr30FeMo			MAR-M246	
		2.4617	Hastelloy B-2				MAR-M302	
		2.4630	Nimonic 75	NiCr20Ti			MAR-M322	
		2.4631	Nimonic 80A	NiCr20TiAl			MAR-M432	
		2.4634	Nimonic 105	NiCo20Cr15MoAlTi			MAR-M509	
		2.4640	Inconel 600	NiCr15Fe		2.4654	Rene 41	
		2.4668	Inconel 718	NiCr19Fe18Nb5Mg			Rene 77	
		2.4670	Nimocast 713				Rene 95	
		2.4674	Nimocast PK24				Rene 100	
		2.4816	Inconel 600	NiCr15Fe			Rene 220	
		2.4856	Inconel 625	NiCr22Mo9Nb			Stellite	
		2.4858	Inconel 600	NiCr21Mo		2.6554	Waspaloy	
	Superleghe difficili da lavorare	1.4943	Z6NCTDV 25.15B	X4NiCrTi 25 15				
		1.4980	A-286	X5NiCrTi 26 15				
		2.4603	Hastelloy X;	NiCr30FeMo				
		2.4617	Hastelloy B-2					
		2.4632	Nimonic 90	NiCr20Co18Ti				
		2.4668	Inconel 718;	NiCr19Fe18Nb5Mg				
		2.4670	Nimocast 713					
		2.4674	Nimocast PK24					
		2.4812	Hastelloy C					
		2.4856	Inconel 625	NiCr22Mo9Nb				
		2.4983	Udimet 500					
TITANIO	Leghe di Titanio 340-450 HB	3.7124		TiCu2	Leghe di Titanio 340-450 HB			Ti5Al6Sn2Zr1Mo0.25Si
		3.7144		TiAl6Sn2Zr4Mo2				Ti6Al2Sn4Zr2MoSi
		3.7154		TiAl6Zr5				Ti6Al2Sn4Zr6Mo
		3.7165		TiAl6V4				Ti6Al4VELI
		3.7174		TiAl6V6Sn2				Ti6Al6V2Sn
		3.7184		TiAl4Mo4Sn2				Ti7Al4Mo
				Ti3Al22.5V				Ti8Al1Mo1V

FRESE PER LA LAVORAZIONE DI ALLUMINIO E LEGHE LEGGERE

END MILLS FOR MACHINING ALU AND LIGHT ALLOYS

FRÄSER FÜR DIE BEARBEITUNG VON ALU UND LEICHTLEGIERUNGEN

FREZY DO OBRÓBKI ALUMINIUM ORAZ STOPÓW LEKKICH

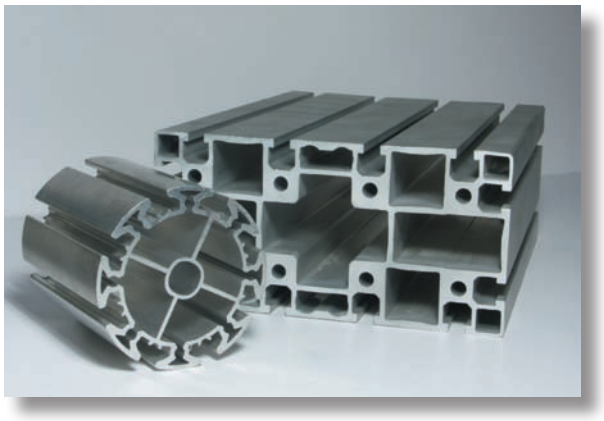
ALU

700 - 701

Frese monotagliente ad elica sinistra e destra per la lavorazione di alluminio e sue leghe, materie plastiche e materiali non ferrosi. L'impiego di questi utensili è consigliato **nella lavorazione di profilati e scatolati.** La geometria del vano gola e la sua eccezionale rugosità superficiale, ottenuta con **specifici processi di lappatura,** consentono una ottima evacuazione del truciolo ed evitano i fenomeni di incollaggio del materiale asportato.

Single cut end mills with right or left helix for aluminum alloys, plastics and non-ferrous alloys. Recommended for the machining **of thin wall elements with open or closed shapes.** The flute geometry and its extremely low roughness, obtained with **specific polishing treatments,** allow an easy chip removal and avoid the material sticking on the cutting edge.

Einschneidenfräser, links- oder rechtsspiralig, für die Bearbeitung von Aluminium und dessen Legierungen, Kunststoffen und Nichteisenwerkstoffen. Der Einsatz dieser Werkzeuge ist für die Bearbeitung von offenen und Kastenprofilen zu empfehlen. Die Nutgeometrie und deren besondere Oberflächenrauhigkeit, die durch spezielle Läppprozesse erzielt wird, erlauben eine ausgezeichnete Spanabfuhr und vermeiden das Verkleben des abgetragenen Werkstoffs.



Frezy jednoostrzowe o lewym i prawym kącie pochylenia linii śrubowej do obróbki aluminium i jego stopów, materiałów plastycznych i nieżelaznych. Zastosowanie tych narzędzi jest zalecane w obróbkach elementów cienkościennych. Geometria kanału wiórowego i jego gładkość uzyskana za pomocą odpowiednich procesów polerowania, pozwala na doskonałe usuwanie wióra i zapobiega jego przylepianiu.

ALU

Alu & alloys ⩽ 6% Si — AIR MQL MAX

HMW 700 - HMW 701

m/min	Vc 600			Vc 792		
D	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,024	1168	47771	0,024	1542	63057
6,0	0,065	2070	31847	0,065	2732	42038
8,0	0,094	2240	23885	0,094	2956	31529
10,0	0,116	2218	19108	0,116	2928	25223
12,0	0,134	2139	15924	0,134	2823	21019
16,0	0,163	1948	11943	0,163	2571	15764
20,0	0,185	1771	9554	0,185	2338	12611

Alu & alloys ⩾ 6% Si — AIR MQL MAX

HMW 700 - HMW 701

m/min	Vc 225			Vc 297		
D	fz	F	n	fz	F	n
mm	mm/z	mm/min	min	mm/z	mm/min	rpm
4,0	0,024	438	17914	0,024	578	23646
6,0	0,065	776	11943	0,065	1025	15764
8,0	0,094	840	8957	0,094	1109	11823
10,0	0,116	832	7166	0,116	1098	9459
12,0	0,134	802	5971	0,134	1059	7882
16,0	0,163	730	4479	0,163	964	5912
20,0	0,185	664	3583	0,185	877	4729

Copper & alloys — AIR MQL MAX

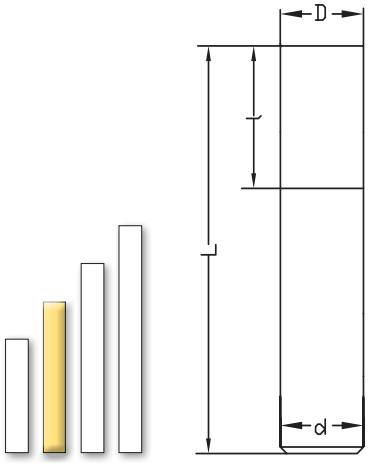
HMW 700 - HMW 701

m/min	Vc 375			Vc 495		
D	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,024	730	29857	0,024	964	39411
6,0	0,065	1294	19904	0,065	1708	26274
8,0	0,094	1400	14928	0,094	1848	19705
10,0	0,116	1386	11943	0,116	1830	15764
12,0	0,134	1337	9952	0,134	1764	13137
16,0	0,163	1217	7464	0,163	1607	9853
20,0	0,185	1107	5971	0,185	1461	7882

Thermo Plastics — AIR MQL MAX

HMW 700 - HMW 701

m/min	Vc 450			Vc 594		
D	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,024	876	35828	0,024	1156	47293
6,0	0,065	1553	23885	0,065	2049	31529
8,0	0,094	1680	17914	0,094	2217	23646
10,0	0,116	1664	14331	0,116	2196	18917
12,0	0,134	1604	11943	0,134	2117	15764
16,0	0,163	1461	8957	0,163	1928	11823
20,0	0,185	1328	7166	0,185	1754	9459



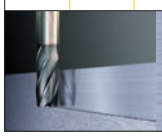
700 Frese monotagliente Elica Dx
Single cut end mills, right hand helix

MG Co10 | Silmax Norm | λ 30° DX | 90°

701 Frese monotagliente Elica Sx
Single cut end mills, left hand helix

MG Co10 | Silmax Norm | λ 30° SX | 90°

D	d	L	l	700	HM0 *Uncoated*	HMW *Uncoated*	Z	701	HM0 *Uncoated*	HMW *Uncoated*	Z
h10	h6				€	€			€	€	
2	2	40	10	700020	16,30	24,60	1	701020	16,30	24,60	1
3	3	40	12	700030	17,40	25,60	1	701030	17,40	25,60	1
4	4	40	15	700040	21,20	29,20	1	701040	21,20	29,20	1
5	5	50	16	700050	27,20	36,60	1	701050	27,20	36,60	1
6	6	60	20	700060	31,10	40,90	1	701060	31,10	40,90	1
8	8	63	22	700080	50,50	62,00	1	701080	50,50	62,00	1
10	10	72	25	700100	76,00	89,90	1	701100	76,00	89,90	1
12	12	83	30	700120	100,60	120,50	1	701120	100,60	120,50	1
14	14	83	30	700140	150,60	170,40	1	701140	150,60	170,30	1
16	16	92	35	700160	213,20	236,20	1	701160	213,20	236,20	1
20	20	104	40	700200	287,70	317,10	1	701200	287,70	322,00	1



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.62

Lavorazioni, Machining Process

Lavorazioni, Machining Process

Alu & alloys < 6% Si

AIR MQL MAX

	HMW 175s						HMW 165s			HMW 115s						HMW 765s		
																		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,024	2246	47771	0,024	2965	63057	-	-	-	0,021	3045	47771	0,021	4020	63057	0,019	2433	63057
6,0	0,060	3822	31847	0,060	5045	42038	0,055	4624	42038	0,050	4777	31847	0,050	6306	42038	0,055	4624	42038
8,0	0,086	4103	23885	0,086	5416	31529	0,081	5101	31529	0,073	5232	23885	0,073	6906	31529	0,081	5101	31529
10,0	0,106	4050	19108	0,106	5346	25223	0,101	5094	25223	0,091	5209	19108	0,091	6876	25223	0,101	5094	25223
12,0	0,122	3898	15924	0,122	5145	21019	0,117	4935	21019	0,105	5038	15924	0,105	6650	21019	0,117	4935	21019
16,0	0,148	3542	11943	0,148	4675	15764	0,143	4517	15764	0,128	4603	11943	0,128	6076	15764	0,143	4517	15764

Alu & alloys > 6% Si

AIR MQL MAX

	HMW 175s						HMW 165s			HMW 115s						HMW 765s		
																		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,024	842	17914	0,024	1112	23646	-	-	-	0,021	761	17914	0,021	1507	23646	0,019	913	23646
6,0	0,060	1433	11943	0,060	1892	15764	0,055	1734	15764	0,050	1194	11943	0,050	2365	15764	0,055	1734	15764
8,0	0,086	1539	8957	0,086	2031	11823	0,081	1913	11823	0,073	1308	8957	0,073	2590	11823	0,081	1913	11823
10,0	0,106	1519	7166	0,106	2005	9459	0,101	1910	9459	0,091	1302	7166	0,091	2578	9459	0,101	1910	9459
12,0	0,122	1462	5971	0,122	1929	7882	0,117	1850	7882	0,105	1259	5971	0,105	2494	7882	0,117	1850	7882
16,0	0,148	1328	4479	0,148	1753	5912	0,143	1694	5912	0,128	1151	4479	0,128	2278	5912	0,143	1694	5912

Copper & alloys

AIR MQL MAX

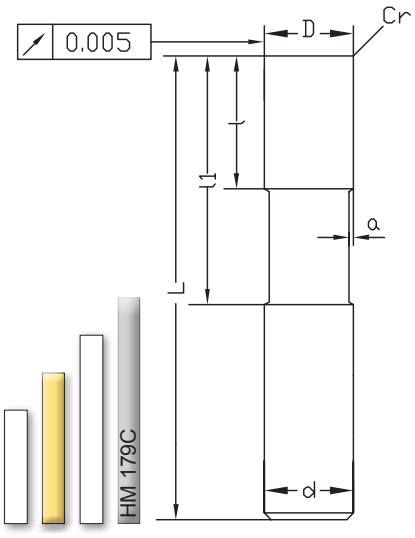
	HMW 175s						HMW 165s			HMW 115s						HMW 765s		
																		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,024	1404	29857	0,024	1853	39411	-	-	-	0,021	1903	29857	0,021	2512	39411	0,019	1521	39411
6,0	0,060	2389	19904	0,060	3153	26274	0,055	2890	26274	0,050	2986	19904	0,050	3941	26274	0,055	2890	26274
8,0	0,086	2564	14928	0,086	3385	19705	0,081	3188	19705	0,073	3270	14928	0,073	4316	19705	0,081	3188	19705
10,0	0,106	2531	11943	0,106	3341	15764	0,101	3184	15764	0,091	3256	11943	0,091	4297	15764	0,101	3184	15764
12,0	0,122	2436	9952	0,122	3215	13137	0,117	3084	13137	0,105	3148	9952	0,105	4156	13137	0,117	3084	13137
16,0	0,148	2213	7464	0,148	2922	9853	0,143	2823	9853	0,128	2877	7464	0,128	3797	9853	0,143	2823	9853

Thermo Plastics

AIR MQL MAX

	HMW 175s						HMW 165s			HMW 115s						HMW 765s		
																		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,024	1685	35828	0,024	2224	47293	-	-	-	0,021	2284	35828	0,021	3015	47293	0,019	1825	47293
6,0	0,060	2866	23885	0,060	3783	31529	0,055	3468	31529	0,050	3583	23885	0,050	4729	31529	0,055	3468	31529
8,0	0,086	3077	17914	0,086	4062	23646	0,081	3826	23646	0,073	3924	17914	0,073	5180	23646	0,081	3826	23646
10,0	0,106	3037	14331	0,106	4009	18917	0,101	3820	18917	0,091	3907	14331	0,091	5157	18917	0,101	3820	18917
12,0	0,122	2923	11943	0,122	3859	15764	0,117	3701	15764	0,105	3778	11943	0,105	4987	15764	0,117	3701	15764
16,0	0,148	2656	8957	0,148	3506	11823	0,143	3388	11823	0,128	3452	8957	0,128	4557	11823	0,143	3388	11823

SERIE LUNGA , Long, Lang, D□uga (F , n)						
-15%	HMW179C	HMW179C				HMW739C



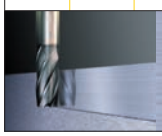
175s Frese a due taglienti
2-flute end mills

MG Co10 | 6527L 6528 | λ 35° | 90°

175s Cr Frese a due taglienti con Corner Radius
2-flute end mills with corner radius

MG Co10 | 6527L 6528 | λ 35° | Cr

D h6	d h6	L	l	Cr	l1	a	175s	HM0 € Uncoated	HMW € Uncoated	Z	175s Cr	HM0 € Uncoated	HMW € Uncoated	Z
2	3	50	6	-	-	-	175020	28,30	37,40	2				
2	3	50	6	0,3	-	-					175020Cr03	32,00	41,00	2
3	3	50	7	-	18	0,1	175030	29,40	38,40	2				
3	3	50	7	0,3	18	0,1					175030Cr03	33,20	42,00	2
4	4	50	8	-	19	0,1	175040	28,90	38,00	2				
4	4	50	8	0,3	19	0,1					175040Cr03	33,60	42,40	2
4	4	50	8	0,5	19	0,1					175040Cr05	33,60	42,40	2
5	5	50	10	-	21	0,1	175050	29,90	39,60	2				
5	5	50	10	0,5	21	0,1					175050Cr05	34,50	44,40	2
6	6	57	10	-	21	0,15	175060	27,30	37,50	2				
6	6	57	10	0,5	21	0,15					175060Cr05	31,80	41,90	2
8	8	63	16	-	27	0,15	175080	42,50	54,90	2				
8	8	63	16	0,5	27	0,15					175080Cr05	46,40	59,00	2
8	8	63	16	0,8	27	0,15					175080Cr08	46,40	59,00	2
10	10	72	19	-	30	0,15	175100	64,80	80,20	2				
10	10	72	19	0,5	30	0,15					175100Cr05	68,60	83,90	2
10	10	72	19	1,0	30	0,15					175100Cr10	68,60	83,90	2
12	12	83	22	-	38	0,20	175120	87,00	108,80	2				
12	12	83	22	1,0	38	0,20					175120Cr10	92,00	113,90	2
12	12	83	22	1,5	38	0,20					175120Cr15	92,00	113,90	2
14	14	83	22	-	38	0,20	175140	118,80	144,10	2				
14	14	83	22	1,5	38	0,20					175140Cr15	124,10	149,50	2
16	16	92	26	-	42	0,20	175160	156,20	184,60	2				
16	16	92	26	1,0	42	0,20					175160Cr10	161,20	189,60	2
16	16	92	26	1,5	42	0,20					175160Cr15	161,20	189,60	2
20	20	104	32	-	54	0,20	175200	268,30	304,70	2				
20	20	104	32	2,0	54	0,20					175200Cr20	274,70	311,20	2



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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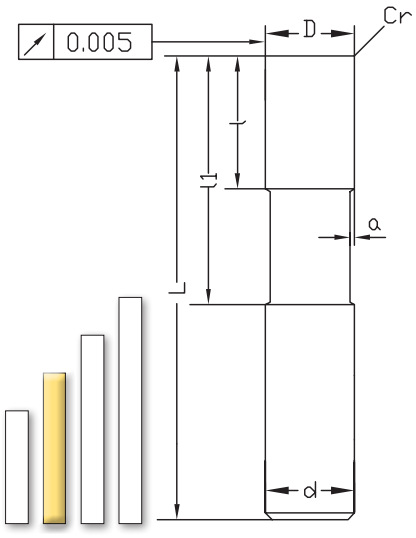
Lavorazioni, Machining Process

Lavorazioni, Machining Process

ALU



115s Frese a tre taglienti
3-flute end mills

MG Co10

6527L 6528

λ 55°

90°

115s Cr Frese a tre taglienti con Corner Radius
3-flute end mills with corner radius

MG Co10

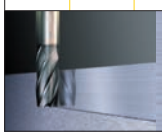
6527L 6528

λ 55°

Cr

Uncoated

D h6	d h6	L	l	Cr	l1	a	115s	HM0 €	HMW €	Z	115s Cr	HM0 €	HMW €	Z
4	4	50	8	-	19	0,1	115040	33,60	42,40	3				
4	4	50	8	0,3	19	0,1					115040Cr03	40,20	49,10	3
5	5	50	10	-	21	0,1	115050	34,50	44,40	3				
5	5	50	10	0,3	21	0,1					115050Cr03	41,30	51,10	3
6	6	57	10	-	21	0,15	115060	31,80	42,70	3				
6	6	57	10	0,3	21	0,15					115060Cr03	37,00	48,00	3
7	7	60	13	-	24	0,15	115070	43,90	56,50	3				
7	7	60	13	0,3	24	0,15					115070Cr03	49,70	62,30	3
8	8	63	16	-	27	0,15	115080	47,00	59,60	3				
8	8	63	16	0,3	27	0,15					115080Cr03	53,00	65,40	3
9	9	67	16	-	27	0,15	115090	64,40	79,50	3				
9	9	67	16	0,5	27	0,15					115090Cr05	69,30	84,50	3
10	10	72	19	-	30	0,15	115100	69,80	85,30	3				
10	10	72	19	0,5	30	0,15					115100Cr05	75,50	91,00	3
12	12	83	22	-	38	0,20	115120	95,30	117,20	3				
12	12	83	22	0,5	38	0,20					115120Cr05	103,10	124,90	3
14	14	83	22	-	38	0,20	115140	130,40	155,80	3				
14	14	83	22	1,0	38	0,20					115140Cr10	138,40	163,80	3
16	16	92	26	-	42	0,20	115160	178,60	207,00	3				
16	16	92	26	1,0	42	0,20					115160Cr10	186,20	214,80	3
20	20	104	32	-	54	0,20	115200	302,60	339,00	4				
20	20	104	32	1,0	54	0,20					115200Cr10	312,20	348,70	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

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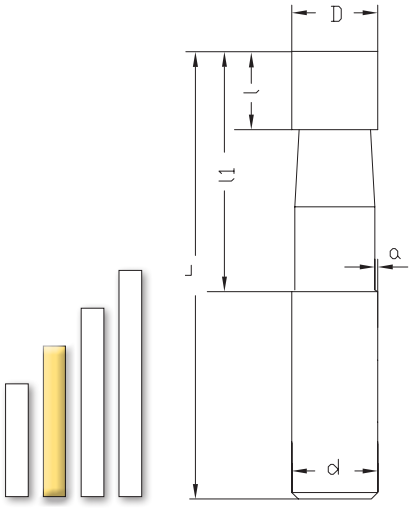
Lavorazioni, Machining Process

Lavorazioni, Machining Process

165s Frese a due tagli con Corner Radius
2-flute end mills with corner radius



MG Co10 | Silmax Norm | λ 35° | Cr

Uncoated

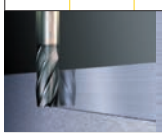
D	d h6	L	l	Cr	l1	a	165s	HM0 €	HMW €	Z
6	6	57	6	1,5	21	0,25	165060	43,40	53,50	2
8	8	63	8	2,0	27	0,35	165080	60,10	72,60	2
10	10	72	10	2,5	32	0,50	165100	79,30	94,70	2
12	12	83	12	3,0	38	0,50	165120	104,00	125,80	2
16	16	92	16	4,0	44	0,80	165160	171,20	199,60	2
20	20	104	20	5,0	54	0,90	165200	284,00	320,60	2

765s Frese semisferiche
Ball nose end mills

MG Co10 | Silmax Norm | λ 50°

Uncoated

D	d h6	L	l	r f8	l1	a	765s	HM0 €	HMW €	Z
3	3	50	3	1,5	22	0,15	765030	35,60	44,70	2
4	4	50	4	2,0	22	0,20	765040	40,10	49,00	2
5	5	50	5	2,5	22	0,20	765050	44,10	53,80	2
6	6	57	6	3,0	21	0,25	765060	46,40	56,50	2
8	8	63	8	4,0	27	0,35	765080	62,50	74,90	2
10	10	72	10	5,0	32	0,50	765100	81,40	96,70	2
12	12	83	12	6,0	38	0,50	765120	106,60	128,40	2
16	16	92	16	8,0	44	0,80	765160	179,10	207,60	2
20	20	104	20	10,0	54	0,90	765200	288,00	324,40	2



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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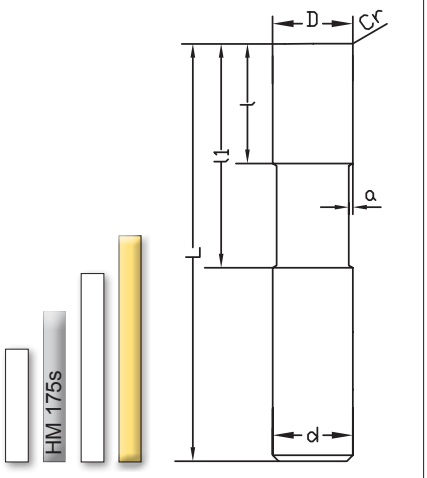
Lavorazioni, Machining Process

Lavorazioni, Machining Process



179C Frese a due taglie serie lunga
2-flute end mills, long version

MG Co10 | Silmax Norm | λ 35° | Cr

739C Frese raggiate a due tagli serie lunga
Radial 2-flute end mills, long version

MG Co10 | Silmax Norm | λ 35°

Uncoated

D h10	d h6	L	l	Cr	l1	a	179C	HM0 €	HMW €	Z
2	3	62	4	0,3	20	0,1	179020C	32,40	44,60	2
3	3	62	6	0,3	20	0,1	179030C	27,00	39,30	2
4	4	80	8	0,3	26	0,1	179040C	39,00	49,40	2
5	5	100	10	0,5	38	0,1	179050C	49,50	63,50	2
6	6	100	12	0,5	50	0,15	179060C	52,20	66,20	2
8	8	100	16	0,5	50	0,15	179080C	69,20	83,60	2
10	10	150	20	0,5	100	0,15	179100C	116,20	148,80	2
12	12	150	24	1,0	100	0,20	179120C	152,40	187,40	2

Uncoated

D h10	d h6	L	l	r	l1	a	739C	HM0 €	HMW €	Z
2	3	62	4	1,0	20	0,1	739020C	35,80	48,00	2
3	3	62	6	1,5	20	0,1	739030C	30,70	43,00	2
4	4	80	8	2,0	26	0,1	739040C	43,40	53,80	2
5	5	100	10	2,5	38	0,1	739050C	55,10	69,10	2
6	6	100	12	3,0	50	0,15	739060C	60,00	74,00	2
8	8	100	16	4,0	50	0,15	739080C	75,40	89,80	2
10	10	150	20	5,0	100	0,15	739100C	128,10	160,80	2
12	12	150	24	6,0	100	0,20	739120C	158,30	193,40	2

PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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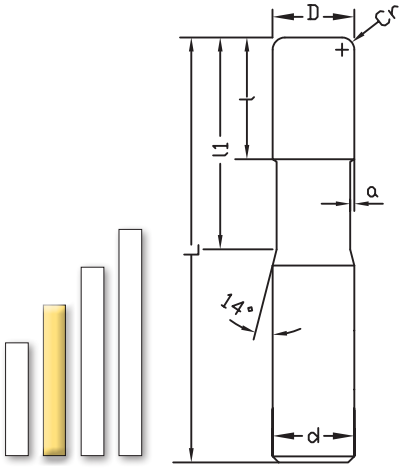
Lavorazioni, Machining Process

Lavorazioni, Machining Process

015s Frese a sgrossare con rompitruciolo

Roughing end mills with chip breaker



Ultra Fine

Silmax Norm

λ 40°

Cr

Uncoated

D h10	d h6	L	l	Cr	l1	a	015s	HM0 €	HMW €	z
10	10	72	15	1,0	30	0,15	015100	91,50	110,10	3
12	12	81	18	1,0	36	0,20	015120	119,20	145,30	3
16	16	92	24	1,0	42	0,20	015160	202,30	236,40	3
20	20	104	30	1,0	52	0,20	015200	325,60	370,50	3

Vano gola sagomato progettato per la massima efficienza di evacuazione e rigidità dell'utensile. Adatto per lavorazioni in cava DxD.

Geometry of the core and the flutes especially developed in order to provide a good chip removal. Recommended for slotting D x D.

Spezielle Nutgeometrie für die optimale Spanabfuhr und Steifigkeit des Werkzeugs. Geeignet für Nutenbearbeitung bis DxD.

Geometria rdzenia i krawędzi skrawającej zaprojektowana została do jak najlepszego usuwania materiału przy zachowaniu jak największej sztywności narzędzia. Doskonale nadaje się do obróbki rowków DxD.

015s

Alu & alloys ≤ 6% Si

AIR MQL MAX

HMW 015s

m/min	Vc 600			Vc 880		
D mm	fz mm/z	F mm/min	n rpm	fz mm/z	F mm/min	n rpm
10,0	0,151	8667	19108	0,141	11871	28025
12,0	0,171	8181	15924	0,161	11298	23355
16,0	0,203	7269	11943	0,193	10136	17516
20,0	0,227	6519	9554	0,217	9141	14013

PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Lavorazioni, Machining Process

ALU

Alluminio e Leghe Leggere

Alu e Light alloys, Alu und Leichtlegierungen, Obróbka aluminium i stopów lekkich

Gruppo		Nr	DIN	Gruppo	Nr	DIN
Alu & alloys <6% Si	Alluminio puro	3.0205	Al99	Leghe malleabili indurite (70-150HB)	3.0615	AlMgSiPb
					3.1255	AlCuSiMn
	Leghe malleabili non indurite (30-80HB)	3.0505	AlMn0.5Mg0.5		3.1305	AlCu2.5Mg0.5
		3.0506	AlMn0.6		3.1325	AlCuMg1
		3.0515	AlMn1		3.1355	AlCuMg2
		3.0517	AlMnCu		3.1645	AlCuMgPb
		3.0525	AlMn1Mg0.5		3.1655	AlCuBiPb
		3.0526	AlMn1Mg1		3.2307	Al99.85MgSi
		3.0915	AlFeSi		3.2315	AlMgSi1
		3.3307	Al99.85Mg0.5		3.3206	AlMgSi0.5
		3.3308	Al99.5Mg0.5		3.3208	Al99.9MgSi
		3.3315	AlMg1		3.3210	AlMgSi0.7
		3.3316	AlMg1.5		3.3211	AlMg1SiCu
		3.3317	Al99.85Mg1		3.4335	AlZn4.5Mg1
		3.3318	Al99.9Mg1		3.4337	Al99.8ZnMg
		3.3326	AlMg1.8		3.4345	AlZnMgCu0.5
		3.3345	AlMg4.5		3.4365	AlZnMgCu1.5
		3.3523	AlMg2.5		3.1371	G-AlCu4TiMg
		3.3525	AlMg2Mn03			
		3.3527	AlMg2Mn0.8			
		3.3535	AlMg3			
		3.3537	AlMg2.7Mn			
		3.3545	AlMg4Mn			
		3.3547	AlMg4.5Mn			
		3.3549	AlMg5Mn			
		3.3555	AlMg5			
Alu & alloys >6% Si	Getti 6-12%Si	3.2151	G-AlSi6Cu4			
		3.2161	G-AlSi8Cu3			
		3.2341	G-AlSi5Mg			
		3.2371	G-AlSi7Mg			
		3.2373	G-AlSi9Mg			
		3.2381	G-AlSi10Mg			
		3.2383	G-AlSi10Mg(Cu)			
Copper & alloys	Non legati	2.0040	0F-Cu	A truciolo lungo	2.0220	CuZn5
	Leghe malleabili non indurite	2.0205	CuZn0.5	A truciolo corto	2.0331	CuZn36Pb1.5
	Leghe malleabili indurite	2.0850	CuNi2Be	Leghe a base CuNi	2.0830	CuNi25
				Leghe CuNiZn a truciolo corto	2.0730	CuNi12Zn24
Thermo Plastics	Thermo Plastica	P E	Baylon	Thermo Plastica	P U R	Baydur
		P P	Daplen		S I	Baysilon
		P V C	Coroplast		U P	Alpolit
		P S	Hostyron		U P	Viapal
		P M M A	Acrylglas		E P	Araldit
		P T F E	Hostaflon		A F K	Kevlar
		P A	Akulon		B F K	
		P C	Makralon		C F K	
		P I			G F K	
		P F	Alberit		M F K	
		M F	Albanit		S F K	
		U F	Bakelite			

FRESE PER LA LAVORAZIONE DI GRAFITE

END MILLS FOR MACHINING GRAPHITE

FRÄSER FÜR DIE BEARBEITUNG VON GRAPHIT

FREZY DO OBRÓBKI GRAFITU

GRAFITE

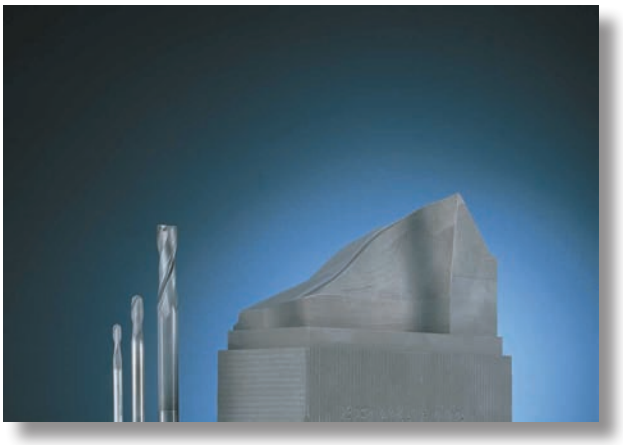
GRAFITE

Maggiore produttività, minore usura

Le frese in metallo duro Silmax rivestite "Diamond" sono ideali per le lavorazioni di materiale non ferroso. Producono un'ottima rugosità superficiale del pezzo, riducendo sensibilmente la tendenza all'incollaggio del materiale di riporto sulla fresa stessa. Consigliato per la lavorazione di materiali fortemente abrasivi, migliorando la durata e le prestazioni dell'utensile.

Greater productivity, less wear.

Silmax Diamond coated Carbide cutters are suggested for machining non-ferrous materials. They provide an excellent surface quality, as well as a lower susceptibility to cold welding . Suggested for machining abrasive materials, Diamond coating provides higher performances and longer tool life.



Höhere Produktivität, weniger Verschleiß

Die Diamond beschichteten Hartmetallfräser von Silmax sind ideal zur Bearbeitung von Nichteisen Werkstoffen. Sie gewährleisten eine optimale Oberflächenrauheit und verhindern weitgehend die Bildung von Aufbauschneiden. Sie sind für die Bearbeitung von stark reibenden Werkstoffen geeignet. Leistung und Standzeit des Werkzeugs werden verbessert.

Większa wydajność, mniejsze zużycie.

Frezy pełnowęglikowe SILMAX z powłoką „DIAMOND" są idealnym wyborem przy obróbce materiałów nieżelaznych. Umożliwiają uzyskanie powierzchni o doskonałej jakości. Powłoka zapobiega powstawaniu narostu. Zalecane do obróbki materiałów mocno ściernych zapewniając większą wydajność i żywotność narzędzia.

Graphite

	175Cr				111 Cr				737			765s		
	0,25 D / 1,0 D			0,25 D / 0,50 D			0,25 D / 1,0 D			0,25 D / 0,50 D			0,020 D / 0,060 D			0,020 D / 0,060 D		
m/min	Vc 750			Vc 900			Vc 750			Vc 900			Vc 1200			Vc 1200		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
4,0	0,025	2984	59683	0,035	6446	71620	0,025	4476	59683	0,035	9669	71620	0,030	5730	95493	0,030	5730	95493
6,0	0,050	3981	39809	0,070	6688	47771	0,050	5971	39809	0,070	10032	47771	0,060	7643	63694	0,060	7643	63694
8,0	0,064	3845	29857	0,084	6047	35828	0,064	5767	29857	0,084	9070	35828	0,074	7107	47771	0,074	7107	47771
10,0	0,076	3609	23885	0,096	5477	28662	0,076	5413	23885	0,096	8215	28662	0,086	6538	38217	0,086	6538	38217
12,0	0,085	3370	19904	0,105	5000	23885	0,085	5055	19904	0,105	7499	23885	0,095	6029	31847	0,095	6029	31847
16,0	0,099	2957	14928	0,119	4265	17914	0,099	4436	14928	0,119	6398	17914	0,109	5209	23885	0,109	5209	23885

Graphite

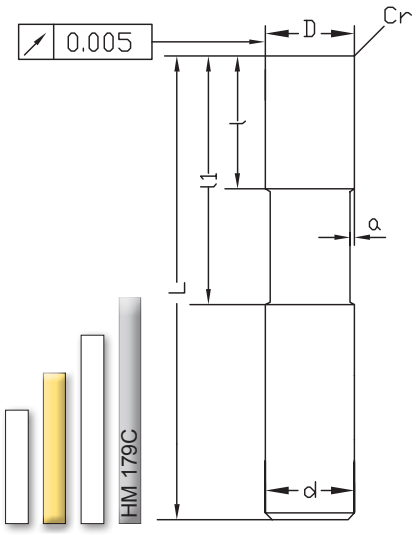
	121				122								
	0,05 D / 0,25 D			0,05 D / 0,25 D			0,020 D / 0,060 D						
m/min	Vc 600			Vc 600			Vc 600						
D	fz	F	n	fz	F	n	fz	F	n				
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm				
0,5	0,001	191	95000	0,001	191	95000	0,001	191	95000				
0,8	0,001	191	95000	0,001	191	95000	0,001	191	95000				
1,0	0,002	318	80000	0,002	318	80000	0,002	318	80000				
1,5	0,003	446	75000	0,003	446	75000	0,003	446	75000				
2,0	0,003	459	75000	0,003	459	75000	0,003	459	75000				
2,5	0,005	764	75000	0,005	764	75000	0,005	764	75000				

Serie Lunga , Long, Lang, D□uga
F -15%, n -15%

175 Cr

Frese a due taglienti rivestite Diamond

2-flute end mills, diamond coated



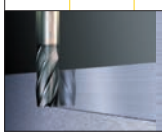
MG Co10

6527L 6528

λ 35°

Cr

D h6	d h6	L	l	Cr	l1	a	175 Cr	HMD €	Z
2	3	50	6	0,3	-	-	175020Cr03	96,90	2
3	3	50	7	0,3	18	0,1	175030Cr03	92,30	2
4	4	50	8	0,3	19	0,1	175040Cr03	89,60	2
5	5	50	10	0,5	21	0,1	175050Cr05	109,60	2
6	6	57	10	0,5	21	0,15	175060Cr05	129,00	2
8	8	63	16	0,5	27	0,15	175080Cr05	188,00	2
10	10	72	19	0,5	30	0,15	175100Cr05	252,50	2
12	12	83	22	1,0	38	0,20	175120Cr10	320,70	2
16	16	92	26	1,0	42	0,20	175160Cr10	586,80	2



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

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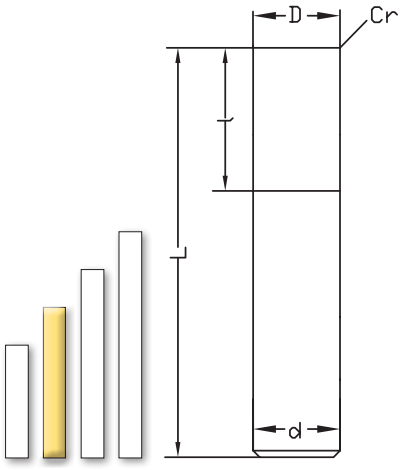
Lavorazioni, Machining Process

GRAFITE

111 Cr

Frese a tre tagli rivestite Diamond

3-flute end mills, diamond coated



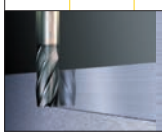
MG Co10

6527L 6528

λ 30°

Cr

D h10	d h6	L	l	Cr	111 Cr	HMD €	Z
2	3	38	5	0,3	111020Cr03	97,20	3
3	3	38	7	0,3	111030Cr03	94,20	3
4	4	50	8	0,3	111040Cr03	91,30	3
5	5	50	10	0,5	111050Cr05	111,80	3
6	6	57	10	0,5	111060Cr05	131,50	3
8	8	63	16	0,5	111080Cr05	191,20	3
10	10	72	19	0,5	111100Cr05	255,00	3
12	12	83	22	1,0	111120Cr10	325,80	3
14	14	83	22	1,5	111140Cr15	342,20	3
16	16	92	26	1,5	111160Cr15	589,30	3



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

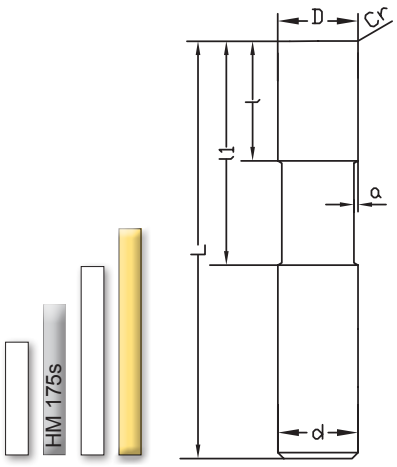
Pag.72

Lavorazioni, Machining Process

GRAFITE

179C Frese a due taglienti rivestite Diamond serie lunga

3-flute end mills, diamond coated, long version



MG Co10

Silmax Norm

λ 35°

Cr

D h10	d h6	L	l	Cr	l1	a	179C		HMD €	Z
3	3	62	6	0,3	20	0,1	179030C		112,50	2
4	4	80	8	0,3	26	0,1	179040C		101,90	2
5	5	100	10	0,5	38	0,1	179050C		122,60	2
6	6	100	12	0,5	50	0,15	179060C		145,40	2
8	8	100	16	0,5	50	0,15	179080C		203,10	2
10	10	150	20	0,5	100	0,15	179100C		336,00	2
12	12	150	24	1,0	100	0,20	179120C		415,30	2

PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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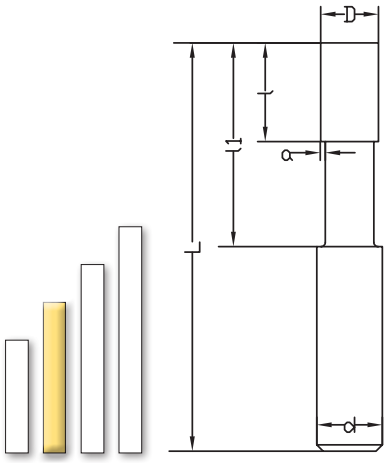
Lavorazioni, Machining Process

GRAFITE

121 Micro

Microfrese a due taglienti rivestite Diamond

2-flute Micro-end mills, diamond coated



MG Co10

Silmax Norm

λ 30°

90°

122 Micro

Microfrese semisferiche rivestite Diamond

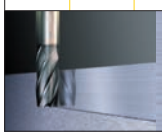
Ball nose Micro-end mills, diamond coated

MG Co10

Silmax Norm

λ 30°

D	d h6	L	l	l1	a	121 D=0-0,02		HMD €	z	122	r ±0,01	HMD €	z
0,5	3	39	0,75	2,0	0,02	1210205		88,20	2	1220205	0,25	88,20	2
0,5	3	39	0,75	4,0	0,02	1210405		88,20	2	1220405	0,25	88,20	2
0,5	3	60	0,75	6,0	0,02	1210605		126,30	2	1220605	0,25	126,30	2
0,8	3	39	1,2	4,0	0,02	1210408		88,20	2	1220408	0,40	88,20	2
0,8	3	39	1,2	6,0	0,02	1210608		88,20	2	1220608	0,40	88,20	2
0,8	3	60	1,2	9,0	0,02	1210908		126,30	2	1220908	0,40	126,30	2
1,0	3	39	1,5	6,0	0,03	1210610		85,30	2	1220610	0,50	85,30	2
1,0	3	39	1,5	9,0	0,03	1210910		85,30	2	1220910	0,50	85,30	2
1,0	3	60	1,5	12,0	0,03	1211210		121,90	2	1221210	0,50	121,90	2
1,5	3	39	2,25	6,0	0,03	1210615		85,30	2	1220615	0,75	85,30	2
1,5	3	39	2,25	9,0	0,03	1210915		85,30	2	1220915	0,75	85,30	2
1,5	3	60	2,25	12,0	0,03	1211215		121,90	2	1221215	0,75	121,90	2
2,0	3	39	3	9,0	0,05	1210920		102,70	2	1220920	1,00	102,70	2
2,0	3	39	3	12,0	0,05	1211220		102,70	2	1221220	1,00	102,70	2
2,0	3	60	3	15,0	0,05	1211520		121,90	2	1221520	1,00	121,90	2
2,5	4	50	3,7	12,0	0,05	1211225		122,20	2	1221225	1,25	122,20	2
2,5	4	80	3,7	25,0	0,05	1212525		122,20	2	1222525	1,25	122,20	2
3,0	4	50	4,5	15,0	0,05	1211530		122,20	2	1221530	1,50	122,20	2
3,0	4	80	4,5	30,0	0,05	1213030		122,20	2	1223030	1,50	122,20	2



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

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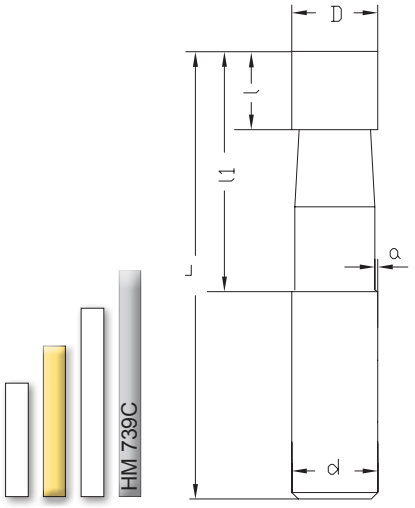
Lavorazioni, Machining Process

Lavorazioni, Machining Process



737 Frese semisferiche rivestite Diamond

Ball nose end mills, diamond coated

MG Co10

Silmax Norm

λ 30°

765 Frese semisferiche rivestite Diamond

Ball nose end mills, diamond coated

MG Co10

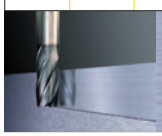
Silmax Norm

λ 50°

D h10	d h6	L	l	r			737		HMD €	Z
1	3	38	3	0,5			737010		95,90	2
2	3	38	5	1,0			737020		91,10	2
3	3	38	7	1,5			737030		101,30	2
4	4	50	8	2,0			737040		97,80	2
5	5	50	10	2,5			737050		117,60	2
6	6	57	10	3,0			737060		138,10	2
8	8	63	16	4,0			737080		194,40	2
10	10	72	19	5,0			737100		258,30	2
12	12	83	22	6,0			737120		334,90	2
16	16	92	26	8,0			737160		632,00	2

Diamond

D h6	d h6	L	l	r	l1	a	765		HMD €	Z
3	3	50	3	1,5	22	0,15	765030		78,00	2
4	4	50	4	2,0	22	0,20	765040		98,70	2
5	5	50	5	2,5	22	0,20	765050		118,90	2
6	6	57	6	3,0	21	0,25	765060		137,40	2
8	8	63	8	4,0	27	0,35	765080		194,90	2
10	10	72	10	5,0	32	0,50	765100		254,20	2
12	12	83	12	6,0	38	0,50	765120		324,20	2
16	16	92	16	8,0	44	0,80	765160		658,80	2



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

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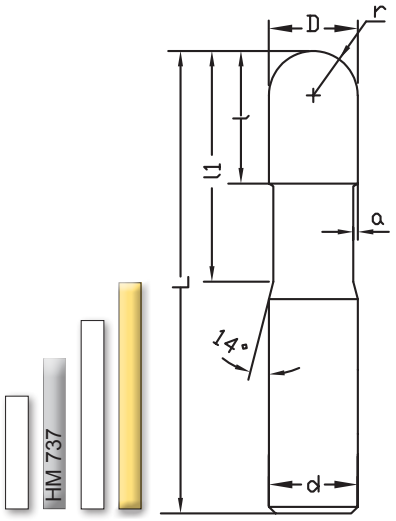
Lavorazioni, Machining Process

Lavorazioni, Machining Process

GRAFITE

739C Frese semisferiche rivestite Diamond

Ball nose end mills, diamond coated

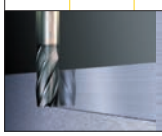


MG Co10

Silmax Norm

λ 35°

D	d	L	l	r	l1	a	739C		HMD	Z
h10	h6								€	
2	3	62	4	1,0	20	0,05	739020C		109,60	2
3	3	62	6	1,5	20	0,1	739030C		104,40	2
4	4	80	8	2,0	38	0,1	739040C		117,20	2
5	5	100	10	2,5	50	0,1	739050C		138,60	2
6	6	100	12	3,0	50	0,15	739060C		161,40	2
8	8	100	16	4,0	50	0,15	739080C		218,90	2
10	10	150	20	5,0	100	0,15	739100C		351,20	2
12	12	150	24	6,0	100	0,2	739120C		430,00	2



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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Lavorazioni, Machining Process

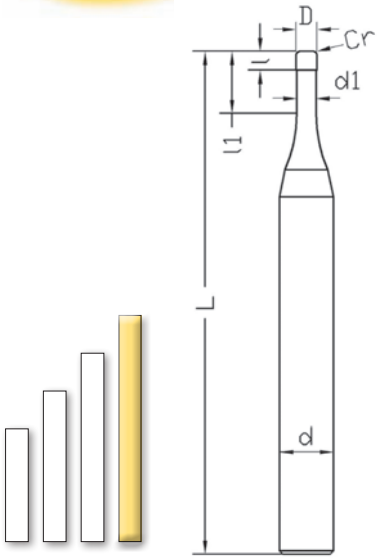
MICROFRESE PER LAVORAZIONI UNIVERSALI

MICRO END MILLS FOR GENERAL APPLICATIONS

MIKROFRÄSER FÜR ALLGEMEINE BERARBEITUNGEN

MIKRO FREZY OGÓLNEGO STOSOWANIA

MICRO



721

Frese toriche per nervature profonde

Corner Radius rib end mills for deep milling

MG Co12

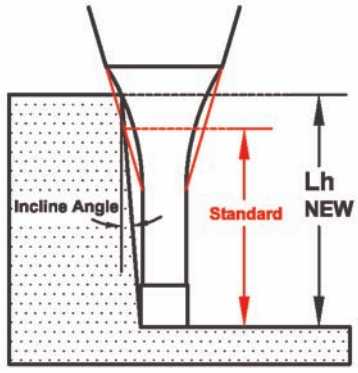
Micro

λ 20°

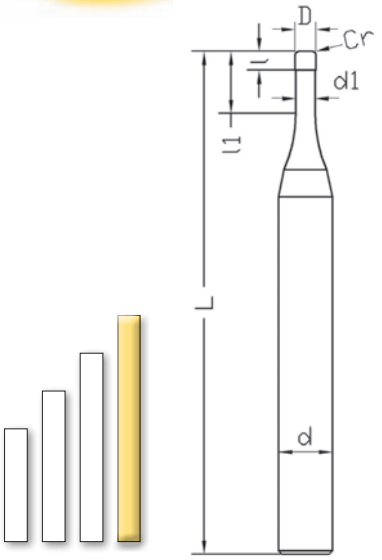
Cr

Grazie alla nuova geometria con raggio, è possibile lavorare profondità maggiori, rispetto all'utensile standard.

Thanks to the new geometry with radius it is possible to work deeper than with a standard tool.



D	d	d1	L	l	l1	721			HMC	Cr	Lh 30'	Lh 1°	Lh 2°	Lh 3°
h10	h6								€					
0,2	4	0,18	45	0,3	0,5	72100502			66,30	0,05	1,21	1,38	1,72	2,07
0,2	4	0,18	45	0,3	1,5	72101502			66,30	0,05	2,34	2,60	3,06	3,48
0,3	4	0,28	45	0,45	1,5	72101503			59,70	0,05	2,34	2,60	3,06	3,48
0,4	4	0,37	45	0,6	2	72102004			59,70	0,05	2,90	3,19	3,69	4,14
0,4	4	0,37	45	0,6	4	72104004			59,70	0,05	5,09	5,48	6,13	6,68
0,5	4	0,47	45	0,7	2	72102005			54,10	0,05	2,90	3,19	3,69	4,14
0,5	4	0,47	45	0,7	4	72104005			54,10	0,05	5,09	5,48	6,13	6,68
0,5	4	0,47	45	0,7	6	72106005			54,10	0,05	7,25	7,72	8,47	9,10
0,6	4	0,57	45	0,9	2	72102006			54,10	0,06	2,90	3,19	3,69	4,14
0,6	4	0,57	45	0,9	4	72104006			54,10	0,06	5,09	5,48	6,13	6,68
0,6	4	0,57	45	0,9	6	72106006			54,10	0,06	7,25	7,72	8,47	9,10
0,7	4	0,67	45	1	2	72102007			54,10	0,07	2,90	3,19	3,69	4,14
0,7	4	0,67	45	1	4	72104007			54,10	0,07	5,09	5,48	6,13	6,68
0,7	4	0,67	45	1	6	72106007			54,10	0,07	7,25	7,72	8,47	9,10
0,8	4	0,77	45	1,2	4	72104008			54,10	0,08	5,09	5,48	6,13	6,68
0,8	4	0,77	45	1,2	6	72106008			54,10	0,08	7,25	7,72	8,47	9,10
0,8	4	0,77	45	1,2	8	72108008			54,10	0,08	9,39	9,93	10,77	11,45
1	4	0,96	50	1,5	6	72106010			57,50	0,10	7,29	7,76	8,50	9,12
1	4	0,96	50	1,5	8	72108010			57,50	0,10	9,43	9,96	10,79	11,47
1	4	0,96	50	1,5	10	72110010			57,50	0,10	11,55	12,14	13,05	13,78
1	4	0,96	50	1,5	12	72112010			57,50	0,10	13,66	14,31	15,28	16,06
1,2	4	1,15	50	1,8	6	72106012			53,50	0,12	7,33	7,79	8,52	9,13
1,2	4	1,15	50	1,8	8	72108012			53,50	0,12	9,46	9,99	10,81	11,48
1,2	4	1,15	50	1,8	12	72112012			53,50	0,12	13,69	14,34	15,30	16,07
1,4	4	1,34	50	2,1	6	72106014			53,50	0,14	7,37	7,82	8,54	9,15
1,4	4	1,34	50	2,1	8	72108014			53,50	0,14	9,50	10,01	10,83	11,50
1,4	4	1,34	50	2,1	12	72112014			53,50	0,14	13,72	14,35	15,31	16,09



721

Frese toriche per nervature profonde

Corner Radius rib end mills for deep milling

MG Co12

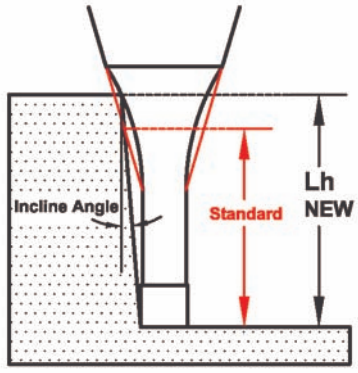
Micro

λ 20°

Cr

Grazie alla nuova geometria con raggio, è possibile lavorare profondità maggiori, rispetto all'utensile standard.

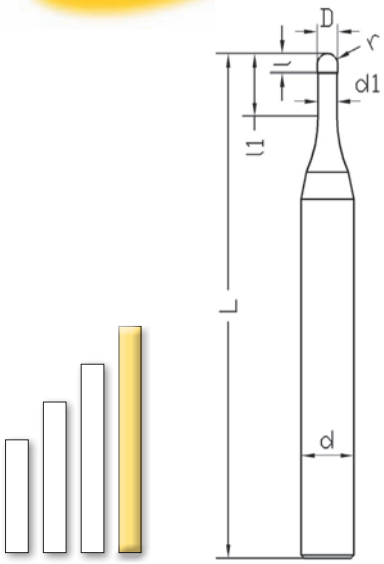
Thanks to the new geometry with radius it is possible to work deeper than with a standard tool.



D	d	d1	L	l	l1	721			HMC	Cr	Lh 30'	Lh 1°	Lh 2°	Lh 3°
h10	h6								€					
1,5	4	1,44	50	2,3	6	72106015			53,50	0,15	7,37	7,82	8,54	9,15
1,5	4	1,44	50	2,3	8	72108015			53,50	0,15	9,50	10,01	10,83	11,50
1,5	4	1,44	50	2,3	10	72110015			53,50	0,15	11,62	12,19	13,08	13,81
1,5	4	1,44	50	2,3	12	72112015			53,50	0,15	13,72	14,35	15,31	16,09
1,5	4	1,44	50	2,3	16	72116015			57,70	0,15	17,92	18,64	19,72	21,42
1,6	4	1,54	50	2,4	6	72106016			55,70	0,16	7,37	7,82	8,54	9,15
1,6	4	1,54	50	2,4	12	72112016			55,70	0,16	13,72	14,35	15,31	16,09
1,6	4	1,54	50	2,4	16	72116016			57,90	0,16	17,92	18,64	19,72	21,42
1,8	4	1,73	50	2,7	6	72106018			55,70	0,18	7,41	7,85	8,56	9,17
1,8	4	1,73	50	2,7	12	72112018			55,70	0,18	13,75	14,37	15,33	16,15
1,8	4	1,73	50	2,7	16	72116018			57,90	0,18	17,95	18,66	19,74	-
2	4	1,92	62	3	6	72106020			55,90	0,20	7,45	7,88	8,58	9,19
2	4	1,92	62	3	12	72112020			55,90	0,20	13,78	14,40	15,34	16,18
2	4	1,92	62	3	16	72116020			58,10	0,20	17,97	18,68	19,75	-
2	4	1,92	62	3	20	72120020			58,10	0,20	22,15	22,93	24,16	-
2,5	4	2,4	62	3,7	10	72110025			55,90	0,25	11,74	12,28	13,15	13,86
2,5	4	2,4	62	3,7	16	72116025			57,90	0,25	18,03	18,72	19,79	-
2,5	4	2,4	62	3,7	20	72120025			58,10	0,25	22,19	22,97	-	-
2,5	4	2,4	62	3,7	25	72125025			58,10	0,25	27,39	28,25	-	-
3	6	2,88	80	4,5	10	72110030			62,70	0,30	11,80	12,33	13,18	13,89
3	6	2,88	80	4,5	16	72116030			62,70	0,30	18,08	18,76	19,80	21,61
3	6	2,88	80	4,5	20	72120030			62,70	0,30	22,24	23,01	24,27	26,92
3	6	2,88	80	4,5	25	72125030			66,40	0,30	27,43	28,28	30,25	-
3	6	2,88	80	4,5	30	72130030			66,40	0,30	32,60	33,53	36,24	-

PARAMETRI DI TAGLIO (Cutting data) **Pag.84**

MICRO



722 Frese semisferiche per nervature profonde

Ball nose rib end mills for deep milling

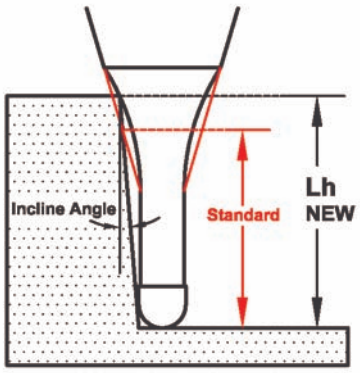
MG Co12

Micro

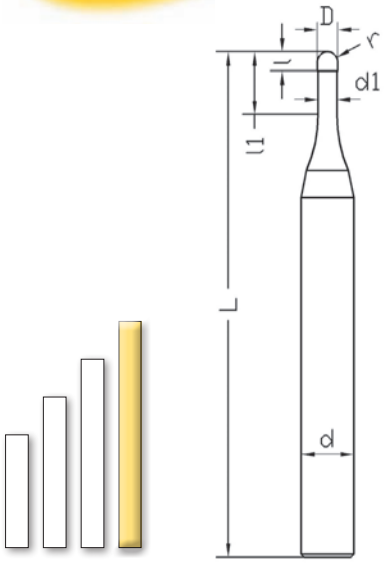
λ 0°

Grazie alla nuova forma con raggio, è possibile lavorare profondità maggiori, rispetto all'utensile standard.

Thanks to the new geometry with radius it is possible to work deeper than with a standard tool.



D	d	d1	L	l	l1	722			HMC	r	Lh 30'	Lh 1°	Lh 2°	Lh 3°
h10	h6								€					
0,2	4	0,18	45	0,16	0,5	72200502			66,30	0,10	1,21	1,38	1,72	2,07
0,2	4	0,18	45	0,16	1,5	72201502			66,30	0,10	2,34	2,60	3,06	3,48
0,3	4	0,28	45	0,26	2	72202003			59,70	0,15	2,90	3,19	3,69	4,14
0,4	4	0,37	45	0,3	1,5	72201504			59,70	0,20	2,34	2,60	3,06	3,48
0,4	4	0,37	45	0,3	3	72203004			59,70	0,20	4,00	4,34	4,92	5,43
0,5	4	0,47	45	0,4	2	72202005			54,10	0,25	2,90	3,19	3,69	4,14
0,5	4	0,47	45	0,4	4	72204005			54,10	0,25	5,09	5,48	6,13	6,68
0,5	4	0,47	45	0,4	6	72206005			54,10	0,25	7,25	7,72	8,47	9,10
0,5	4	0,47	45	0,4	8	72208005			54,10	0,25	9,39	9,93	10,77	11,45
0,6	4	0,57	45	0,5	2	72202006			54,10	0,30	2,90	3,19	3,69	4,14
0,6	4	0,57	45	0,5	4	72204006			54,10	0,30	5,09	5,48	6,13	6,68
0,6	4	0,57	45	0,5	6	72206006			54,10	0,30	7,25	7,72	8,47	9,10
0,6	4	0,57	45	0,5	8	72208006			54,10	0,30	9,39	9,93	10,77	11,45
0,8	4	0,77	45	0,6	4	72204008			54,10	0,40	5,09	5,48	6,13	6,68
0,8	4	0,77	45	0,6	6	72206008			54,10	0,40	7,25	7,72	8,47	9,10
0,8	4	0,77	45	0,6	8	72208008			54,10	0,40	9,39	9,93	10,77	11,45
0,8	4	0,77	45	0,6	10	72210008			54,10	0,40	11,52	12,11	13,02	13,75
1	4	0,96	50	0,8	4	72204010			57,50	0,50	5,11	5,50	6,15	6,70
1	4	0,96	50	0,8	6	72206010			57,50	0,50	7,29	7,76	8,50	9,12
1	4	0,96	50	0,8	8	72208010			57,50	0,50	9,43	9,96	10,79	11,47
1	4	0,96	50	0,8	10	72210010			57,50	0,50	11,55	12,14	13,05	13,78
1	4	0,96	50	0,8	12	72212010			57,50	0,50	13,66	14,31	15,28	16,06
1	4	0,96	50	0,8	16	72216010			61,70	0,50	17,87	18,60	19,70	21,36
1,2	4	1,15	50	1	6	72206012			53,50	0,60	7,33	7,79	8,52	9,13
1,2	4	1,15	50	1	12	72212012			53,50	0,60	13,69	14,34	15,30	16,07
1,4	4	1,34	50	1,1	8	72208014			53,50	0,70	9,50	10,01	10,83	11,50
1,4	4	1,34	50	1,1	16	72216014			57,70	0,70	17,92	18,64	19,72	21,42



722 Frese semisferiche per nervature profonde

Ball nose rib end mills for deep milling

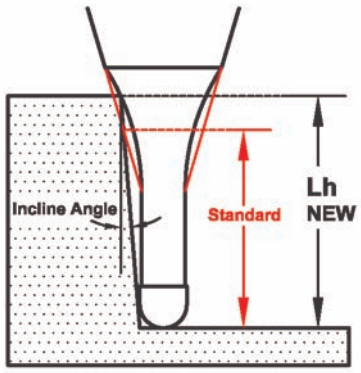
MG Co12

Micro

λ 0°

Grazie alla nuova forma con raggio, è possibile lavorare profondità maggiori, rispetto all'utensile standard.

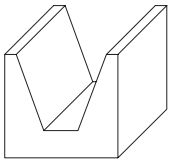
Thanks to the new geometry with radius it is possible to work deeper than with a standard tool.



D	d	d1	L	l	l1	722			HMC	r	Lh 30'	Lh 1°	Lh 2°	Lh 3°
h10	h6								€					
1,5	4	1,44	50	1,2	8	72208015			53,50	0,75	9,50	10,01	10,83	11,50
1,5	4	1,44	50	1,2	12	72212015			53,50	0,75	13,72	14,35	15,31	16,09
1,5	4	1,44	50	1,2	16	72216015			57,70	0,75	17,92	18,64	19,72	21,42
1,6	4	1,54	50	1,3	8	72208016			55,70	0,80	9,50	10,01	10,83	11,50
1,6	4	1,54	50	1,3	12	72212016			55,70	0,80	13,72	14,35	15,31	16,09
1,6	4	1,54	50	1,3	16	72216016			57,90	0,80	17,92	18,64	19,72	21,42
1,8	4	1,73	50	1,4	8	72208018			55,70	0,90	9,53	10,04	10,85	11,60
1,8	4	1,73	50	1,4	12	72212018			55,70	0,90	13,75	14,37	15,33	16,15
1,8	4	1,73	50	1,4	16	72216018			57,90	0,90	17,95	18,66	19,74	-
2	4	1,92	62	1,6	6	72206020			55,90	1,00	7,45	7,88	8,58	9,19
2	4	1,92	62	1,6	10	72210020			55,90	1,00	11,68	12,24	13,12	13,84
2	4	1,92	62	1,6	12	72212020			55,90	1,00	13,78	14,40	15,34	16,18
2	4	1,92	62	1,6	16	72216020			58,10	1,00	17,97	18,68	19,75	-
2	4	1,92	62	1,6	20	72220020			58,10	1,00	22,15	22,93	24,16	-
2	4	1,92	62	1,6	25	72225020			58,10	1,00	27,34	28,22	-	-
3	6	2,88	80	2,4	10	72210030			62,70	1,50	11,80	12,33	13,18	13,89
3	6	2,88	80	2,4	16	72216030			62,70	1,50	18,08	18,76	19,80	21,61
3	6	2,88	80	2,4	20	72220030			62,70	1,50	22,24	23,01	24,27	26,92
3	6	2,88	80	2,4	25	72225030			66,40	1,50	27,43	28,28	30,25	-
3	6	2,88	80	2,4	30	72230030			66,40	1,50	32,60	33,53	36,24	-

PARAMETRI DI TAGLIO (Cutting data) **Pag.85**

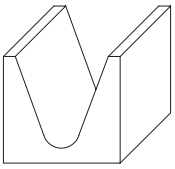
MICRO



721 Frese per Nervature profonde / Rib Cutters

721					<1300 N/mm² MQL				HRC < 52 AIR				HRC < 56 AIR				HRC < 60 AIR			
A	L1/D <4				ae	0,25D	ap	0,05D	ae	0,20D	ap	0,05D	ae	0,18D	ap	0,05D	ae	0,16D	ap	0,01D
B	L1/D <8				ae	0,2D	ap	0,04D	ae	0,18D	ap	0,04D	ae	0,14D	ap	0,04D	ae	0,12D	ap	0,01D
C	L1/D <12				ae	0,16D	ap	0,03D	ae	0,14D	ap	0,03D	ae	0,12D	ap	0,01D	ae	0,1D	ap	0.01D
D	L1/D >12				ae	0,12D	ap	0,02D	ae	0,10D	ap	0,02D	ae	0,1D	ap	0,01D	ae	0,1D	ap	0,01D
RIF	D	Cr	L1	L1/D	Vc	fz	vf	n	Vc	fz	vf	n	Vc	fz	vf	n	Vc	fz	vf	n
A	0,2	0,05	0,5	2,5	33	0,002	210	52548	27	0,002	175	43788	22	0,002	140	35028	11	0,001	35	17514
B	0,2	0,05	1,5	7,5	30	0,002	191	47771	25	0,002	159	39807	20	0,002	127	31844	10	0,001	32	15922
B	0,3	0,05	1,5	5,0	42	0,003	268	44586	35	0,003	223	37154	28	0,003	178	29721	14	0,002	59	14861
B	0,4	0,05	2,0	5,0	53	0,004	338	42197	44	0,004	281	35163	35	0,004	225	28129	18	0,004	113	14064
C	0,4	0,05	4,0	10,0	53	0,004	338	42197	44	0,004	281	35163	35	0,004	225	28129	18	0,004	113	14064
B	0,5	0,05	2,0	4,0	60	0,005	382	38217	50	0,005	318	31846	40	0,005	275	25475	20	0,005	127	12738
C	0,5	0,05	4,0	8,0	60	0,005	382	38217	50	0,005	318	31846	40	0,005	275	25475	20	0,005	127	12738
D	0,5	0,05	6,0	12,0	48	0,005	306	30573	40	0,005	255	25477	30	0,005	206	19106	15	0,005	96	9553
A	0,6	0,06	2,0	3,3	70	0,006	448	37367	59	0,006	374	31138	47	0,006	299	24909	23	0,006	149	12455
B	0,6	0,06	4,0	6,7	64	0,006	408	33970	53	0,006	340	28307	43	0,006	272	22645	21	0,006	136	11322
C	0,6	0,06	6,0	10,0	64	0,006	408	33970	53	0,006	340	28307	43	0,006	272	22645	21	0,006	136	11322
A	0,7	0,07	2,0	2,9	77	0,007	490	35032	64	0,007	409	29192	51	0,007	327	23352	26	0,007	163	11676
B	0,7	0,07	4,0	5,7	70	0,007	446	31847	58	0,007	372	26538	47	0,007	297	21229	23	0,007	149	10615
C	0,7	0,07	6,0	8,6	70	0,007	446	31847	58	0,007	372	26538	47	0,007	297	21229	23	0,007	149	10615
B	0,8	0,08	4,0	5,0	80	0,008	510	31847	67	0,008	425	26538	53	0,008	340	21229	27	0,008	170	10615
B	0,8	0,08	6,0	7,5	80	0,008	510	31847	67	0,008	425	26538	53	0,008	340	21229	27	0,008	170	10615
C	0,8	0,08	8,0	10,0	80	0,008	510	31847	67	0,008	425	26538	53	0,008	340	21229	27	0,008	170	10615
B	1,0	0,10	6,0	6,0	88	0,010	561	28025	73	0,010	467	23354	59	0,010	374	18682	29	0,010	187	9341
C	1,0	0,10	8,0	8,0	88	0,010	561	28025	73	0,010	467	23354	59	0,010	374	18682	29	0,010	187	9341
C	1,0	0,10	10,0	10,0	88	0,010	561	28025	73	0,010	467	23354	59	0,010	374	18682	29	0,010	187	9341
D	1,0	0,10	12,0	12,0	70	0,010	448	22420	59	0,010	374	18683	44	0,010	280	14011	22	0,010	140	7006
B	1,2	0,12	6,0	5,0	90	0,012	573	23885	75	0,012	478	19904	60	0,012	382	15922	30	0,012	191	7961
B	1,2	0,12	8,0	6,7	90	0,012	573	23885	75	0,012	478	19904	60	0,012	382	15922	30	0,012	191	7961
C	1,2	0,12	12,0	10,0	90	0,012	573	23885	75	0,012	478	19904	60	0,012	382	15922	30	0,012	191	7961
B	1,4	0,14	6,0	4,3	90	0,014	573	20473	75	0,014	478	17060	60	0,014	382	13647	30	0,014	191	6824
B	1,4	0,14	8,0	5,7	90	0,014	573	20473	75	0,014	478	17060	60	0,014	382	13647	30	0,014	191	6824
C	1,4	0,14	12,0	8,6	90	0,014	573	20473	75	0,014	478	17060	60	0,014	382	13647	30	0,014	191	6824
B	1,5	0,15	6,0	4,0	90	0,015	573	19108	75	0,015	478	15923	60	0,015	382	12738	30	0,015	191	6369
B	1,5	0,15	8,0	5,3	90	0,015	573	19108	75	0,015	478	15923	60	0,015	382	12738	30	0,015	191	6369
B	1,5	0,15	10,0	6,7	90	0,015	573	19108	75	0,015	478	15923	60	0,015	382	12738	30	0,015	191	6369
C	1,5	0,15	12,0	8,0	90	0,015	573	19108	75	0,015	478	15923	60	0,015	382	12738	30	0,015	191	6369
C	1,5	0,15	16,0	10,7	72	0,015	459	15287	60	0,015	382	12738	45	0,015	287	9553	22	0,015	143	4777
A	1,6	0,16	6,0	3,8	99	0,016	631	19705	82	0,016	525	16421	66	0,016	420	13136	33	0,016	210	6568
B	1,6	0,16	12,0	7,5	90	0,016	573	17914	75	0,016	478	14928	60	0,016	382	11941	30	0,016	191	5971
C	1,6	0,16	16,0	10,0	90	0,016	573	17914	75	0,016	478	14928	60	0,016	382	11941	30	0,016	191	5971
A	1,8	0,18	6,0	3,3	99	0,018	631	17516	82	0,018	525	14596	66	0,018	420	11676	33	0,018	210	5838
B	1,8	0,18	12,0	6,7	90	0,018	573	15924	75	0,018	478	13269	60	0,018	382	10615	30	0,018	191	5307
C	1,8	0,18	16,0	8,9	90	0,018	573	15924	75	0,018	478	13269	60	0,018	382	10615	30	0,018	191	5307
A	2,0	0,20	6,0	3,0	99	0,020	631	15764	82	0,020	525	13136	66	0,020	420	10509	33	0,020	210	5254
B	2,0	0,20	12,0	6,0	90	0,020	573	14331	75	0,020	478	11942	60	0,020	382	9553	30	0,020	191	4777
C	2,0	0,20	16,0	8,0	90	0,020	573	14331	75	0,020	478	11942	60	0,020	382	9553	30	0,020	191	4777
C	2,0	0,20	20,0	10,0	90	0,020	573	14331	75	0,020	478	11942	60	0,020	382	9553	30	0,020	191	4777
B	2,5	0,25	10,0	4,0	90	0,025	573	11465	75	0,025	478	9554	60	0,025	382	7643	30	0,025	191	3821
B	2,5	0,25	16,0	6,4	90	0,025	573	11465	75	0,025	478	9554	60	0,025	382	7643	30	0,025	191	3821
C	2,5	0,25	20,0	8,0	90	0,025	573	11465	75	0,025	478	9554	60	0,025	382	7643	30	0,025	191	3821
C	2,5	0,25	25,0	10,0	90	0,025	573	11465	75	0,025	478	9554	60	0,025	382	7643	30	0,025	191	3821
A	3,0	0,30	10,0	3,3	99	0,030	631	10510	82	0,030	525	8758	66	0,030	420	7006	33	0,030	210	3503
B	3,0	0,30	16,0	5,3	90	0,030	573	9554	75	0,030	478	7961	60	0,030	382	6369	30	0,030	191	3184
B	3,0	0,30	20,0	6,7	90	0,030	573	9554	75	0,030	478	7961	60	0,030	382	6369	30	0,030	191	3184
C	3,0	0,30	25,0	8,3	90	0,030	573	9554	75	0,030	478	7961	60	0,030	382	6369	30	0,030	191	3184
C	3,0	0,30	30,0	10,0	90	0,030	573	9554	75	0,030	478	7961	60	0,030	382	6369	30	0,030	191	3184

MICRO



722 Frese per Nervature profonde
Rib Cutters

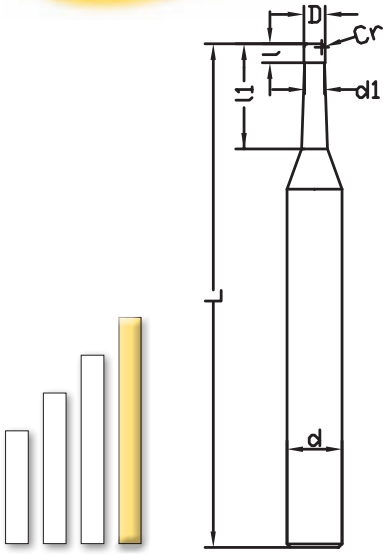
					<1300 N/mm² MQL				HRC < 52 AIR				HRC < 56 AIR				HRC < 60 AIR			
A		**L1/D <4**			ae	0,25D	ap	0,05D	ae	0,20D	ap	0,05D	ae	0,18D	ap	0,05D	ae	0,16D	ap	0,01D
B		**L1/D <8**			ae	0,2D	ap	0,04D	ae	0,18D	ap	0,04D	ae	0,14D	ap	0,04D	ae	0,12D	ap	0,01D
C		**L1/D <12**			ae	0,16D	ap	0,03D	ae	0,14D	ap	0,03D	ae	0,12D	ap	0,01D	ae	0,1D	ap	0.01D
D		**L1/D >12**			ae	0,12D	ap	0,02D	ae	0,10D	ap	0,02D	ae	0,1D	ap	0,01D	ae	0,1D	ap	0,01D
RIF	**D**	**r**	**L1**	**L1/D**	**Vc**	**fz**	**vf**	**n**	**Vc**	**fz**	**vf**	**n**	**Vc**	**fz**	**vf**	**n**	**Vc**	**fz**	**vf**	**n**
A	0,2	0,10	0,5	2,5	40	0,002	256	64092	35	0,002	220	54936	30	0,002	190	47611	15	0,001	48	23806
B	0,2	0,10	1,5	7,5	35	0,002	223	55732	30	0,002	191	47771	26	0,002	166	41401	13	0,001	41	20701
B	0,3	0,15	2,0	6,7	50	0,003	318	53079	42	0,003	268	44586	37	0,003	236	39278	18	0,002	76	19108
A	0,4	0,20	1,5	3,8	69	0,004	439	54936	58	0,004	366	45780	52	0,004	330	41202	25	0,003	121	20143
B	0,4	0,20	3,0	7,5	60	0,004	382	47771	50	0,004	318	39809	45	0,004	287	35828	22	0,003	105	17516
B	0,5	0,25	2,0	4,0	70	0,005	446	44586	59	0,005	376	37580	52	0,005	331	33121	26	0,004	132	16561
C	0,5	0,25	4,0	8,0	70	0,005	446	44586	59	0,005	376	37580	52	0,005	331	33121	26	0,004	132	16561
D	0,5	0,25	6,0	12,0	53	0,005	334	33439	47	0,005	301	30064	39	0,005	248	24841	20	0,004	99	12420
D	0,5	0,25	8,0	16,0	53	0,005	334	33439	47	0,005	301	30064	39	0,005	248	24841	20	0,004	99	12420
A	0,6	0,30	2,0	3,3	92	0,006	586	48832	77	0,006	491	40897	69	0,006	439	36624	35	0,005	183	18312
B	0,6	0,30	4,0	6,7	80	0,006	510	42463	67	0,006	427	35563	60	0,006	382	31847	30	0,005	159	15924
C	0,6	0,30	6,0	10,0	80	0,006	510	42463	67	0,006	427	35563	60	0,006	382	31847	30	0,005	159	15924
D	0,6	0,30	8,0	13,3	60	0,006	382	31847	54	0,006	341	28450	45	0,006	287	23885	23	0,005	119	11943
B	0,8	0,40	4,0	5,0	100	0,008	637	39809	84	0,008	535	33439	62	0,008	395	24682	37	0,007	206	14729
B	0,8	0,40	6,0	7,5	100	0,008	637	39809	84	0,008	535	33439	62	0,008	395	24682	37	0,007	206	14729
C	0,8	0,40	8,0	10,0	100	0,008	637	39809	84	0,008	535	33439	62	0,008	395	24682	37	0,007	206	14729
D	0,8	0,40	10,0	12,5	75	0,008	478	29857	67	0,008	428	26752	47	0,008	296	18511	28	0,007	155	11047
B	1,0	0,50	4,0	4,0	100	0,010	637	31847	84	0,010	535	26752	62	0,010	395	19745	37	0,009	212	11783
B	1,0	0,50	6,0	6,0	100	0,010	637	31847	84	0,010	535	26752	62	0,010	395	19745	37	0,009	212	11783
C	1,0	0,50	8,0	8,0	100	0,010	637	31847	84	0,010	535	26752	62	0,010	395	19745	37	0,009	212	11783
C	1,0	0,50	10,0	10,0	100	0,010	637	31847	84	0,010	535	26752	62	0,010	395	19745	37	0,009	212	11783
D	1,0	0,50	12,0	12,0	75	0,010	478	23885	67	0,010	428	21401	47	0,010	296	14809	28	0,009	159	8838
D	1,0	0,50	16,0	16,0	75	0,010	478	23885	67	0,010	428	21401	47	0,010	296	14809	28	0,009	159	8838
B	1,2	0,60	6,0	5,0	110	0,012	701	29193	92	0,012	586	24416	74	0,012	471	19639	41	0,010	218	10881
C	1,2	0,60	12,0	10,0	110	0,012	701	29193	92	0,012	586	24416	74	0,012	471	19639	41	0,010	218	10881
A																				
B	1,4	0,70	8,0	5,7	120	0,014	764	27298	100	0,014	637	22748	80	0,014	510	18198	45	0,012	246	10237
C	1,4	0,70	16,0	11,4	120	0,014	764	27298	100	0,014	637	22748	80	0,014	510	18198	45	0,012	246	10237
B	1,5	0,75	8,0	5,3	120	0,015	764	25478	100	0,015	637	21231	80	0,015	510	16985	45	0,012	229	9554
C	1,5	0,75	12,0	8,0	120	0,015	764	25478	100	0,015	637	21231	80	0,015	510	16985	45	0,012	229	9554
C	1,5	0,75	16,0	10,7	120	0,015	764	25478	100	0,015	637	21231	80	0,015	510	16985	45	0,012	229	9554
A																				
B	1,6	0,80	8,0	5,0	120	0,016	764	23885	100	0,016	637	19904	80	0,016	510	15924	45	0,014	251	8957
B	1,6	0,80	12,0	7,5	120	0,016	764	23885	100	0,016	637	19904	80	0,016	510	15924	45	0,014	251	8957
C	1,6	0,80	16,0	10,0	120	0,016	764	23885	100	0,016	637	19904	80	0,016	510	15924	45	0,014	251	8957
B	1,8	0,90	8,0	4,4	120	0,018	764	21231	100	0,018	637	17693	80	0,018	510	14154	45	0,016	255	7962
B	1,8	0,90	12,0	6,7	120	0,018	764	21231	100	0,018	637	17693	80	0,018	510	14154	45	0,016	255	7962
C	1,8	0,90	16,0	8,9	120	0,018	764	21231	100	0,018	637	17693	80	0,018	510	14154	45	0,016	255	7962
A	2,0	1,00	6,0	3,0	138	0,020	879	21975	115	0,020	732	18312	92	0,020	586	14650	52	0,018	297	8240
B	2,0	1,00	10,0	5,0	120	0,020	764	19108	100	0,020	637	15924	80	0,020	510	12739	45	0,018	258	7166
B	2,0	1,00	12,0	6,0	120	0,020	764	19108	100	0,020	637	15924	80	0,020	510	12739	45	0,018	258	7166
C	2,0	1,00	16,0	8,0	120	0,020	764	19108	100	0,020	637	15924	80	0,020	510	12739	45	0,018	258	7166
C	2,0	1,00	20,0	10,0	120	0,020	764	19108	100	0,020	637	15924	80	0,020	510	12739	45	0,018	258	7166
D	2,0	1,00	25,0	12,5	90	0,020	573	14331	80	0,020	510	12739	60	0,020	382	9554	34	0,018	193	5374
A	3,0	1,50	10,0	3,3	138	0,030	879	14650	115	0,030	732	12208	92	0,030	586	9766	52	0,025	275	5494
B	3,0	1,50	16,0	5,3	120	0,030	764	12739	100	0,030	637	10616	80	0,030	510	8493	45	0,025	239	4777
B	3,0	1,50	20,0	6,7	120	0,030	764	12739	100	0,030	637	10616	80	0,030	510	8493	45	0,025	239	4777
C	3,0	1,50	25,0	8,3	120	0,030	764	12739	100	0,030	637	10616	80	0,030	510	8493	45	0,025	239	4777
C	3,0	1,50	30,0	10,0	120	0,030	764	12739	100	0,030	637	10616	80	0,030	510	8493	45	0,025	239	4777

MICRO

724

Frese toriche per nervature profonde a 4 tagli

Z4 Corner Radius rib end mills for deep milling



MG Co12

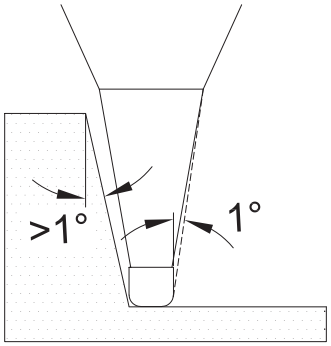
Micro

λ 45°

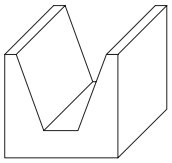
Cr

Parte ribassata con rastremazione per consentire la lavorazione di pareti superiori ad un grado.

Increased stability with 1° neck angle. Allowed inclination of the rib >1°.



D	d	d1	L	l	l1	724			HMC	Cr
h8	h6								€	
1,5	6	1,44	80	2,3	10	72410015			66,70	0,3
1,5	6	1,44	80	2,3	16	72416015			68,80	0,3
1,5	6	1,44	80	2,3	20	72420015			70,90	0,3
2	6	1,94	80	3,0	10	72410020			66,70	0,5
2	6	1,94	80	3,0	16	72416020			68,80	0,5
2	6	1,94	80	3,0	20	72420020			70,90	0,5
2,5	6	2,44	80	3,7	10	72410025			66,70	0,5
2,5	6	2,44	80	3,7	16	72416025			68,80	0,5
2,5	6	2,44	80	3,7	20	72420025			70,90	0,5
3	6	2,94	80	4,5	10	72410030			66,70	0,5
3	6	2,94	80	4,5	16	72416030			68,80	0,5
3	6	2,94	80	4,5	20	72420030			70,90	0,5
4	6	3,94	80	6,0	10	72410040			66,70	0,5
4	6	3,94	80	6,0	16	72416040			68,80	0,5
4	6	3,94	80	6,0	20	72420040			70,90	0,5



724 Frese per Nervature profonde z4
z4 Rib Cutters

					<1300 N/mm² MQL				HRC < 52 AIR				HRC < 56 AIR				HRC < 60 AIR			
A		L1/D <4			ae	0,25D	ap	0,05D	ae	0.20D	ap	0,05D	ae	0,18D	ap	0,05D	ae	0,16D	ap	0,01D
B		L1/D <8			ae	0,20D	ap	0,04D	ae	0.18D	ap	0,04D	ae	0,14D	ap	0,04D	ae	0,12D	ap	0,01D
C		L1/D <12			ae	0,16D	ap	0,03D	ae	0,14D	ap	0,03D	ae	0,12D	ap	0,01D	ae	0,10D	ap	0,01D
D		L1/D >12			ae	0,12D	ap	0,02D	ae	0,10D	ap	0,02D	ae	0,10D	ap	0,01D	ae	0,10D	ap	0,01D
RIF	D	Cr	L1	L1/D	Vc	fz	vf	n	Vc	fz	vf	n	Vc	fz	vf	n	Vc	fz	vf	vfn
B	1,5	0,3	10	6,7	100	0,013	1104	21231	75	0,015	955	15924	60	0,015	764	12739	30	0,010	254	6369
C	1,5	0,3	16	10,7	90	0,013	994	19108	70	0,015	892	14862	55	0,015	700	11677	25	0,010	212	5308
D	1,5	0,3	20	13,3	80	0,013	883	16985	65	0,015	828	13800	50	0,015	636	10616	20	0,010	169	4246
B	2	0,5	10	5,0	100	0,020	1274	15924	80	0,020	1019	12739	60	0,020	764	9554	33	0,015	315	5255
C	2	0,5	16	8,0	90	0,020	1147	14331	75	0,020	955	11943	60	0,020	764	9554	30	0,015	286	4777
C	2	0,5	20	10,0	80	0,020	1019	12739	70	0,020	892	11147	60	0,020	764	9554	30	0,015	286	4777
B	2,5	0,5	10	4,0	100	0,025	1274	12739	80	0,025	1019	10191	60	0,025	764	7643	35	0,020	356	4459
B	2,5	0,5	16	6,4	90	0,025	1147	11465	75	0,025	955	9554	60	0,025	764	7643	33	0,020	336	4204
C	2,5	0,5	20	8,0	90	0,025	1147	11465	75	0,025	955	9554	60	0,025	764	7643	30	0,020	305	3822
A	3	0,5	10	3,3	100	0,030	1274	10616	85	0,030	1083	9023	60	0,030	764	6369	35	0,030	445	3716
B	3	0,5	16	5,3	100	0,030	1274	10616	80	0,030	1019	8493	60	0,030	764	6369	35	0,030	445	3716
B	3	0,5	20	6,7	100	0,030	1274	10616	75	0,030	955	7962	60	0,030	764	6369	33	0,030	420	3503
A	4	0,5	10	2,5	100	0,037	1178	7962	90	0,035	1003	7166	65	0,035	724	5175	45	0,035	501	3583
B	4	0,5	16	4,0	100	0,037	1178	7962	85	0,035	948	6768	65	0,035	724	5175	45	0,035	501	3583
B	4	0,5	20	5,0	100	0,037	1178	7962	80	0,035	892	6369	65	0,035	724	5175	45	0,035	501	3583

Grazie alla nuova forma del raccordo tra il codolo e la parte ribassata, si garantisce la massima rigidità, permettendo di lavorare a maggiori profondità utilizzando frese più corte.
La nuova geometria del tagliente permette un'elevata resistenza alle scheggiature, anche in mancanza di rigidità.
Maggiore durata anche negli utilizzi più difficili. Ottime prestazioni anche su acciai temprati.

Thanks to the new under neck geometry, the highest rigidity is guaranteed and provide deeper machining using shorter cutter. The new cutting's geometry provides an high resistance on chipping at corners, even in lack of rigidity.
A longer tool's life even in the most difficult applications. High performances on hardened steels.

Durch eine neue Form der Verbindung zwischen dem Schaft und dem hinterschliffenen Teil wird die maximale Stabilität garantiert, so dass sie in größeren Tiefen mit kürzeren Fräsern arbeiten können.
Die neue Schneiden-geometrie bietet hohe Beständigkeit gegen Splitterung, auch im Falle von kritischen Bearbeitungs-prozessen.
Längere Standzeiten auch bei schwierigen Einsatzfällen.
Ausgezeichnete Leistung auch bei gehärteten Stählen.

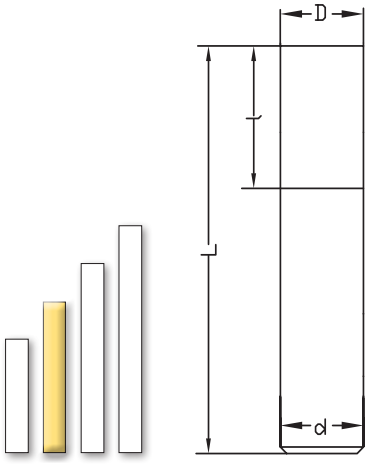
Dzięki nowej geometrii gwarantowana , jest najwyższa sztywność a także istnieje możliwość pracy na większych głębokościach, krótszym narzędziem.
Nowa geometria ostrzy zapewnia większą odporność na wykruszanie naroży, nawet w przypadku braku dostatecznej sztywności układu.
Dłuższa żywotność narzędzia nawet w najtrudniejszych warunkach pracy. Duża wydajność w stalach utwardzonych.

MICRO

SILMAX

171 Micro
Microfrese a due taglienti
2-flute micro end mills

111 Micro
Microfrese a tre taglienti
3-flute micro end mills



MG Co10 | 6527L 6528 | λ 30° | 90°

D	d	L	l		171	HM0	HMF	HMG	Z	111	HM0	HMF	HMG	Z
h10	h6					€	€	€			€	€	€	
						Uncoated					*Uncoated*			
0,1	3	38	0,2		171001	95,80	100,60	110,00	2					
0,2	3	38	0,5		171002	66,50	73,10	82,30	2					
0,3	3	38	1		171003	42,90	48,80	58,20	2					
0,4	3	38	1		171004	42,90	48,80	58,20	2					
0,5	3	38	1,5		171005	34,10	40,90	50,90	2					
0,6	3	38	1,5		171006	38,40	43,80	50,70	2	111006	47,10	51,60	61,80	3
0,7	3	38	2		171007	36,00	43,80	50,70	2					
0,8	3	38	2		171008	36,00	43,80	50,70	2	111008	47,10	51,60	61,70	3
1,0	3	38	3		171010	32,30	37,30	47,00	2	111010	38,10	43,80	53,40	3
1,1	3	38	3		171011	36,00	41,20	50,70	2					
1,2	3	38	4		171012	36,00	41,20	50,70	2	111012	45,30	50,50	61,00	3
1,4	3	38	4		171014	36,00	41,20	50,70	2					
1,5	3	38	4		171015	32,30	37,30	47,00	2	111015	38,10	43,80	53,60	3
1,6	3	38	5		171016	34,60	40,00	49,20	2					
1,8	3	38	5		171018	36,90	41,80	51,60	2	111018	45,30	50,50	61,70	3
2,0	3	38	5		171020	24,20	29,70	38,30	2	111020	25,50	31,10	39,70	3
2,5	3	38	7		171025	25,10	30,80	39,20	2	111025	26,50	32,00	40,70	3
3,0	3	38	7		171030	22,00	27,50	35,80	2	111030	22,50	28,00	36,70	3

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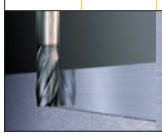
... segue a pag. 100



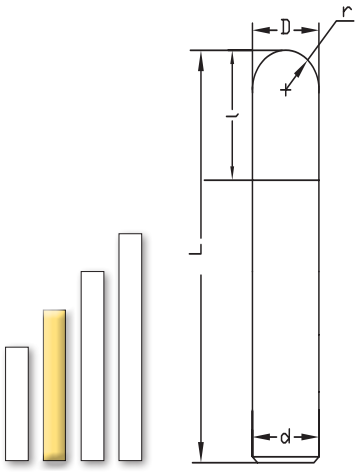
PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.94-95

Lavorazioni, Machining Process

Lavorazioni, Machining Process

737 Micro
Microfrese a due tagli testa semisferica
2-flute ball nose micro cutters

131 Micro
Microfrese a quattro tagli testa semisferica
4-flute ball nose micro cutters



MG Co10

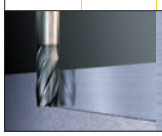
Silmax Norm

λ 30°

D	d	L	l	r	737	Uncoated HM0	HMF	HMG	Z	131	Uncoated HM0	HMF	HMG	Z
h10	h6					€	€	€			€	€	€	
0,1	3	38	0,2	0,05	737001	116,90	122,00	132,00	2					
0,2	3	38	0,5	0,1	737002	89,20	93,90	104,30	2					
0,3	3	38	1	0,15	737003	73,20	77,80	88,50	2					
0,4	3	38	1	0,2	737004	54,60	59,00	69,80	2					
0,5	3	38	1,5	0,25	737005	50,90	57,20	68,00	2					
0,6	3	38	1,5	0,3	737006	48,00	53,10	63,20	2					
0,7	3	38	2	0,35	737007	50,60	55,00	65,20	2					
0,8	3	38	2	0,4	737008	48,00	53,10	63,20	2					
1,0	3	38	3	0,5	737010	46,00	51,50	61,20	2	131010	47,80	53,50	63,00	4
1,1	3	38	3	0,55	737011	48,00	53,10	63,20	2					
1,2	3	38	4	0,6	737012	48,00	53,10	63,20	2					
1,4	3	38	4	0,7	737014	48,00	53,10	63,20	2					
1,5	3	38	4	0,75	737015	46,00	51,50	61,20	2	131015	47,80	53,50	63,00	4
1,6	3	38	4	0,8	737016	48,00	53,10	63,20	2					
1,8	3	38	5	0,9	737018	48,00	53,10	63,20	2					
2,0	3	38	5	1,0	737020	41,30	46,90	56,10	2	131020	41,30	46,90	56,10	4
2,5	3	38	7	1,25	737025	38,10	43,80	52,80	2	131025	39,60	45,30	55,70	4
3,0	3	38	7	1,5	737030	34,30	39,70	48,70	2	131030	41,10	46,60	57,50	4

... segue a pag. 105

... segue a pag. 105



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.94-95

Lavorazioni, Machining Process

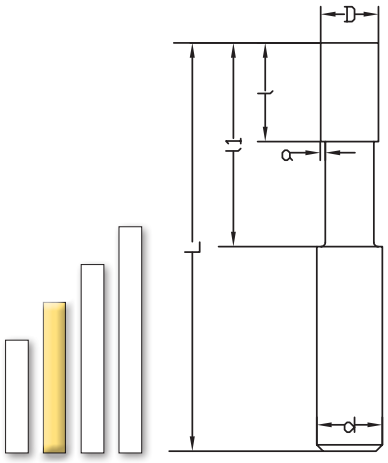
Lavorazioni, Machining Process

MICRO

121 Micro

Microfrese per lavorazioni in profondità

Micro end mills for deep milling



MG Co10

Silmax Norm

λ 30°

90°

122 Micro

Microfrese raggiate per lavorazioni in profondità

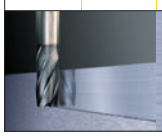
Radial micro end mills for deep milling

MG Co10

Silmax Norm

λ 30°

D	d h6	L	l	l1	a	121 Uncoated D=0-0,02	HM0 €		HMG €	z	122 Uncoated	HM0 €		HMG €	r ±0,01
0,5	3	39	0,75	2,0	0,02	1210205	50,70		54,10	2	1220205	50,70		54,10	0,25
0,5	3	39	0,75	4,0	0,02	1210405	50,70		54,10	2	1220405	50,70		54,10	0,25
0,5	3	60	0,75	6,0	0,02	1210605	77,60		83,80	2	1220605	77,60		83,80	0,25
0,8	3	39	1,2	4,0	0,02	1210408	50,70		54,10	2	1220408	50,70		54,10	0,4
0,8	3	39	1,2	6,0	0,02	1210608	50,70		54,10	2	1220608	50,70		54,10	0,4
0,8	3	60	1,2	9,0	0,02	1210908	77,60		83,80	2	1220908	77,60		83,80	0,4
1,0	3	39	1,5	6,0	0,03	1210610	49,20		53,50	2	1220610	49,20		53,50	0,5
1,0	3	39	1,5	9,0	0,03	1210910	49,20		53,50	2	1220910	49,20		53,50	0,5
1,0	3	60	1,5	12,0	0,03	1211210	75,10		81,00	2	1221210	75,10		81,00	0,5
1,5	3	39	2,25	6,0	0,03	1210615	49,20		53,50	2	1220615	49,20		53,50	0,75
1,5	3	39	2,25	9,0	0,03	1210915	49,20		53,50	2	1220915	49,20		53,50	0,75
1,5	3	60	2,25	12,0	0,03	1211215	75,10		81,00	2	1221215	75,10		81,00	0,75
2,0	3	39	3	9,0	0,05	1210920	53,00		57,90	2	1220920	53,00		57,90	1,0
2,0	3	39	3	12,0	0,05	1211220	53,00		57,90	2	1221220	53,00		57,90	1,0
2,0	3	60	3	15,0	0,05	1211520	75,10		81,00	2	1221520	75,10		81,00	1,0
2,5	4	50	3,7	12,0	0,05	1211225	53,30		58,20	2	1221225	53,30		58,20	1,25
2,5	4	80	3,7	25,0	0,05	1212525	75,40		81,30	2	1222525	75,40		81,30	1,25
3,0	4	50	4,5	15,0	0,05	1211530	55,00		60,20	2	1221530	55,00		60,20	1,5
3,0	4	80	4,5	30,0	0,05	1213030	75,40		85,20	2	1223030	75,40		85,20	1,5



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.94-95

Lavorazioni, Machining Process

Lavorazioni, Machining Process

172 Micro

Microfrese a due tagli con gambo rinforzato

2-flute micro end mills with reinforced shank

MG Co10

6527L

λ 30°

90°

114 Micro

Microfrese a tre tagli con gambo rinforzato

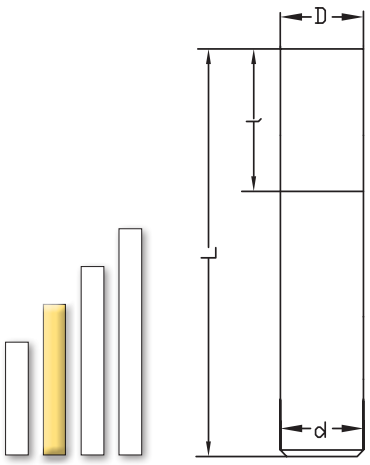
3-flute micro end mills with reinforced shank

MG Co10

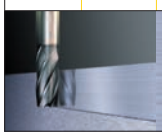
6527L

λ 30°

90°



D	d	L	l	172	Uncoated HM0	HMF	HMG	Z	114	Uncoated HM0	HMF	HMG	Z
h10	h6				€	€	€			€	€	€	
2	6	53	6	172020	28,30	34,60	46,00	2	114020	31,00	37,20	48,70	3
2,5	6	53	7	172025	32,50	38,80	50,40	2	114025	35,40	41,90	52,50	3
3	6	53	7	172030	28,30	34,60	46,00	2	114030	31,00	37,20	48,70	3
3,5	6	53	7	172035	32,30	38,60	50,20	2	114035	34,10	40,20	52,10	3
4	6	53	8	172040	28,30	34,60	46,20	2	114040	29,70	35,80	47,60	3
5	6	57	10	172050	28,30	34,60	46,20	2	114050	29,70	35,80	47,60	3



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.94-95

Lavorazioni, Machining Process

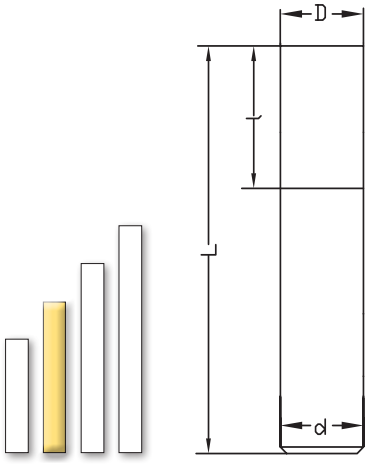
Lavorazioni, Machining Process

MICRO

116 Micro

Microfrese a quattro taglienti con gambo rinforzato

4-flute micro end mills with reinforced shank



MG Co10

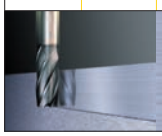
6527L

λ 30°

90°

Uncoated

D h10	d h6	L	l	116	HM0 €	HMF €	HMG €	Z
2	6	53	7	116020	33,50	39,70	51,30	4
2,5	6	53	8	116025	37,20	43,30	55,00	4
3	6	53	8	116030	32,20	38,50	49,90	4
3,5	6	53	10	116035	36,20	42,50	54,00	4
4	6	53	11	116040	31,60	37,90	49,30	4
5	6	57	13	116050	31,60	37,90	49,30	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.94-95

Lavorazioni, Machining Process

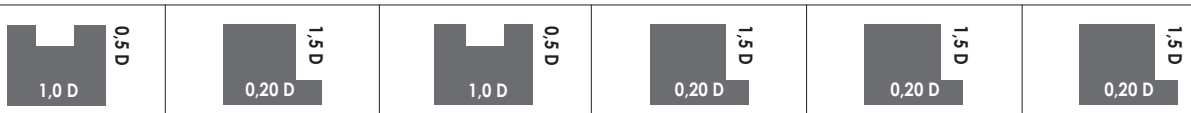
FRESE PER APPLICAZIONI UNIVERSALI

END MILLS FOR GENERAL APPLICATIONS

UNIVERSALFRÄSER

FREZY OGÓLNEGO STOSOWANIA

STD



Steel <800 N/mm²

AIR MQL MAX

	HMG Z = 2						HMG Z = 3						HMG Z = 4			HMG Z = 6		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
2,0	0,002	76	19108	0,004	168	21019	0,003	161	17834	0,004	235	19618	0,004	448	28025			
4,0	0,006	106	9554	0,011	221	10510	0,006	161	8917	0,008	235	9809	0,014	777	14013			
6,0	0,010	122	6369	0,016	219	7006	0,016	278	5945	0,016	306	6539	0,024	897	9342	0,024	1345	9342
8,0	0,015	147	4777	0,023	240	5255	0,023	305	4459	0,023	335	4904	0,031	874	7006	0,031	1311	7006
10,0	0,020	151	3822	0,028	239	4204	0,028	304	3567	0,028	334	3924	0,037	824	5605	0,037	1237	5605
12,0	0,023	149	3185	0,033	231	3503	0,033	294	2972	0,033	323	3270	0,041	772	4671	0,041	1158	4671
16,0	0,029	140	2389	0,040	211	2627	0,040	268	2229	0,040	295	2452	0,049	680	3503	0,049	1020	3503
20,0	0,034	129	1911	0,046	192	2102	0,046	245	1783	0,046	269	1962	0,054	606	2803	0,054	1213	2803

Steel <1000 N/mm²

AIR MQL MAX

	HMG Z = 2						HMG Z = 3						HMG Z = 4			HMG Z = 6		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
2,0	0,002	62	15525	0,004	137	17078	0,002	87	14490	0,004	191	15939	0,004	364	22771			
4,0	0,004	58	7763	0,009	158	8539	0,005	109	7245	0,008	191	7970	0,012	540	11385			
6,0	0,009	91	5175	0,014	163	5693	0,014	207	4830	0,014	228	5313	0,022	668	7590	0,022	1002	7590
8,0	0,016	124	3881	0,021	184	4270	0,021	234	3623	0,021	257	3985	0,029	665	5693	0,029	997	5693
10,0	0,022	134	3105	0,027	185	3416	0,027	235	2898	0,027	259	3188	0,035	633	4554	0,035	950	4554
12,0	0,026	135	2588	0,032	180	2846	0,032	229	2415	0,032	252	2657	0,039	597	3795	0,039	896	3795
16,0	0,033	129	1941	0,039	166	2135	0,039	211	1811	0,039	232	1992	0,047	530	2846	0,047	794	2846
20,0	0,039	121	1553	0,044	152	1708	0,044	193	1449	0,044	212	1594	0,052	475	2277	0,052	949	2277

Steel <1300 N/mm²

AIR MQL MAX

	HMG Z = 2						HMG Z = 3						HMG Z = 4			HMG Z = 6		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
2,0	0,002	48	11943	0,004	105	13137	0,002	67	11146	0,004	147	12261	0,003	210	17516			
4,0	0,004	48	5971	0,008	104	6568	0,005	84	5573	0,008	147	6131	0,010	346	8758			
6,0	0,008	64	3981	0,013	114	4379	0,013	145	3715	0,013	159	4087	0,020	467	5839	0,020	701	5839
8,0	0,015	91	2986	0,020	133	3284	0,020	169	2787	0,020	186	3065	0,027	476	4379	0,027	714	4379
10,0	0,021	99	2389	0,026	135	2627	0,026	172	2229	0,026	190	2452	0,033	459	3503	0,033	689	3503
12,0	0,025	101	1990	0,030	133	2189	0,030	169	1858	0,030	186	2044	0,037	436	2919	0,037	654	2919
16,0	0,033	97	1493	0,038	123	1642	0,038	157	1393	0,038	173	1533	0,045	390	2189	0,045	585	2189
20,0	0,038	91	1194	0,043	113	1314	0,043	144	1115	0,043	159	1226	0,050	351	1752	0,050	702	1752

Steel 12 % Cr

MAX

	HMG Z = 2						HMG Z = 3						HMG Z = 4			HMG Z = 6		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
2,0	0,001	18	5971	0,004	53	6568	0,002	33	5573	0,003	55	6131	0,003	105	8758			
4,0	0,003	18	2986	0,005	42	2787	0,005	42	2787	0,007	64	3065	0,010	173	4379			
6,0	0,008	32	1990	0,013	57	2189	0,013	72	1858	0,013	80	2044	0,020	234	2919	0,020	350	2919
8,0	0,015	45	1493	0,020	66	1642	0,020	84	1393	0,020	93	1533	0,027	238	2189	0,027	357	2189
10,0	0,021	50	1194	0,026	68	1314	0,026	86	1115	0,026	95	1226	0,033	230	1752	0,033	344	1752
12,0	0,025	50	995	0,030	66	1095	0,030	85	929	0,030	93	1022	0,037	218	1460	0,037	327	1460
16,0	0,033	49	746	0,038	62	821	0,038	78	697	0,038	86	766	0,045	195	1095	0,045	292	1095
20,0	0,038	46	597	0,043	57	657	0,043	72	557	0,043	79	613	0,050	176	876	0,050	351	876

+10%	HM107		HM108	HM108	HM109	
=	HM171	HM171	HM111	HM111	HM113	HM106
-15%		HM173 / HM176			HM123 / HM126	

STD

Steel <800 N/mm²

AIR MQL MAX

	HMG 013F				HMG 737			HMG 131		
D	fz	F	n		fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm		mm/z	mm/min	rpm	mm/z	mm/min	rpm
2,0	-	-	-		0,032	3721	57325	0,020	4690	57325
4,0	0,022	987	11220		0,159	9109	28662	0,135	15467	28662
6,0	0,030	897	7473		0,240	9172	19108	0,216	16510	19108
8,0	0,042	931	5605		0,298	8528	14331	0,274	15680	14331
10,0	0,050	905	4484		0,342	7846	11465	0,318	14591	11465
12,0	0,058	863	3737		0,379	7235	9554	0,355	13553	9554
16,0	0,069	776	2803		0,436	6251	7166	0,412	11814	7166
20,0	0,078	701	2242		0,481	5512	5732	0,457	10474	5732

Steel <1000 N/mm²

AIR MQL MAX

	HMG 013F				HMG 737			HMG 131		
D	fz	F	n		fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm		mm/z	mm/min	rpm	mm/z	mm/min	rpm
2,0	-	-	-		0,022	2092	46576	0,015	2765	46576
4,0	0,018	653	9072		0,139	6470	23288	0,117	10890	23288
6,0	0,028	668	6072		0,220	6831	15525	0,198	12296	15525
8,0	0,039	711	4554		0,278	6463	11644	0,256	11902	11644
10,0	0,048	699	3643		0,322	6002	9315	0,300	11184	9315
12,0	0,055	671	3036		0,359	5568	7763	0,337	10453	7763
16,0	0,067	608	2277		0,416	4846	5822	0,394	9179	5822
20,0	0,076	551	1822		0,461	4292	4658	0,439	8175	4658

Steel <1300 N/mm²

AIR MQL MAX

	HMG 013F				HMG 737			HMG 131		
D	fz	F	n		fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm		mm/z	mm/min	rpm	mm/z	mm/min	rpm
2,0	-	-	-		0,015	1099	35828	0,012	1772	35828
4,0	0,015	420	7000		0,119	4260	1794	0,099	7087	17914
6,0	0,025	467	4671		0,200	4777	11943	0,180	8599	11943
8,0	0,037	512	3503		0,258	4614	8957	0,238	8510	8957
10,0	0,045	509	2803		0,302	4330	7166	0,282	8088	7166
12,0	0,053	493	2335		0,339	4044	5971	0,319	7611	5971
16,0	0,064	450	1752		0,396	3548	4479	0,376	6739	4479
20,0	0,073	410	1401		0,441	3159	3583	0,421	6030	3583

Steel 12 % Cr

MAX

	HMG 013F				HMG 737			HMG 131		
D	fz	F	n		fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm		mm/z	mm/min	rpm	mm/z	mm/min	rpm
2,0	-	-	-		0,015	550	17914	0,012	886	17914
4,0	0,015	210	3500		0,119	2130	8957	0,099	3544	8957
6,0	0,025	234	2335		0,200	2389	5971	0,180	4299	5971
8,0	0,037	256	1752		0,258	2307	4479	0,238	4255	4479
10,0	0,045	255	1401		0,302	2165	3583	0,282	4044	3583
12,0	0,053	246	1168		0,339	2022	2986	0,319	3805	2986
16,0	0,064	225	876		0,396	1774	2239	0,376	3369	2239
20,0	0,073	205	701		0,441	1579	1791	0,421	3015	1791

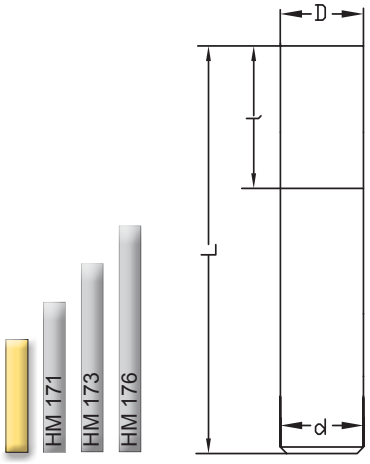
+10%				
=	HM013F		HM737	HM131
-15%			HM747	HM130

STD

107 Frese extra corte a due taglienti

2-flute extra-short end mills

BOX15 BOX12



MG Co10

Silmax Norm

λ 30°

90°

107W

Uncoated

D h10	d h6	L	l	107	HM0 €	HMF €	HMG €	Z
2	6	38	3	107020	13,30	19,10	22,20	2
2,5	6	38	3	107025	13,30	19,10	22,20	2
3	6	38	4	107030	13,30	19,10	22,20	2
3,5	6	38	4	107035	13,30	19,10	22,20	2
4	6	38	5	107040	13,30	19,10	22,20	2
4,5	6	38	5	107045	13,30	19,10	22,20	2
5	6	38	6	107050	13,30	19,10	22,20	2
6	6	38	7	107060	13,30	19,10	22,20	2
7	8	43	9	107070	18,20	25,70	30,40	2
8	8	43	9	107080	18,20	25,70	30,40	2
9	10	50	11	107090	27,30	35,60	41,30	2
10	10	50	11	107100	27,30	35,60	41,30	2

Uncoated

BOX15	Pcs	HM0	HMF	HMG
		€	€	€
BOX15	15	198,50	286,40	333,00

BOX15 **107/108/109**

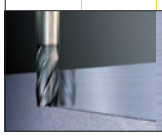
D. 2 mm	3 pcs
D. 3 mm	3 pcs
D. 4 mm	3 pcs
D. 5 mm	3 pcs
D. 6 mm	3 pcs

Uncoated

BOX12	Pcs	HM0	HMF	HMG
		€	€	€
BOX12	12	216,20	298,30	348,70

BOX12 **107/108/109**

D. 5 mm	3 pcs
D. 6 mm	3 pcs
D. 8 mm	3 pcs
D.10 mm	3 pcs



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

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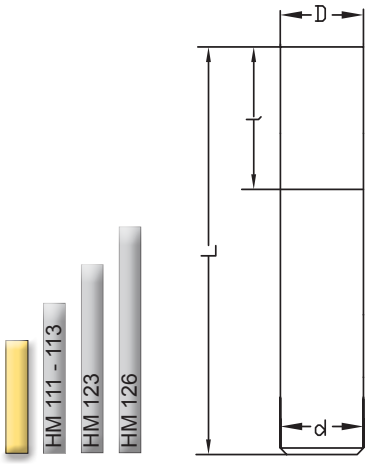
Lavorazioni, Machining Process

STD

SILMAX

108 Frese extra corte a tre taglienti
3-flute extra-short end mills

109 Frese extra corte a quattro taglienti
4-flute extra-short end mills



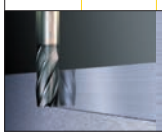
MG Co10 | Silmax Norm | λ 30° | 90°

108W

MG Co10 | Silmax Norm | λ 30° | 90°

109W

D	d	L	l	108	Uncoated HM0	HMF	HMG	Z	109	Uncoated HM0	HMF	HMG	Z
h10	h6				€	€	€			€	€	€	
2	6	38	4	108020	13,30	19,10	22,20	3	109020	13,30	19,10	22,20	4
2,5	6	38	4	108025	13,30	19,10	22,20	3					
3	6	38	5	108030	13,30	19,10	22,20	3	109030	13,30	19,10	22,20	4
3,5	6	38	6	108035	13,30	19,10	22,20	3					
4	6	38	7	108040	13,30	19,10	22,20	3	109040	13,30	19,10	22,20	4
4,5	6	38	8	108045	13,30	19,10	22,20	3					
5	6	38	8	108050	13,30	19,10	22,20	3	109050	13,20	19,10	22,20	4
6	6	38	8	108060	13,30	19,10	22,20	3	109060	13,30	19,10	22,20	4
7	8	43	11	108070	18,20	25,70	30,40	3					
8	8	43	11	108080	18,20	25,70	30,40	3	109080	18,20	25,70	30,40	4
9	10	50	13	108090	27,30	35,60	41,30	3					
10	10	50	13	108100	27,30	35,60	41,30	3	109100	27,30	35,60	41,30	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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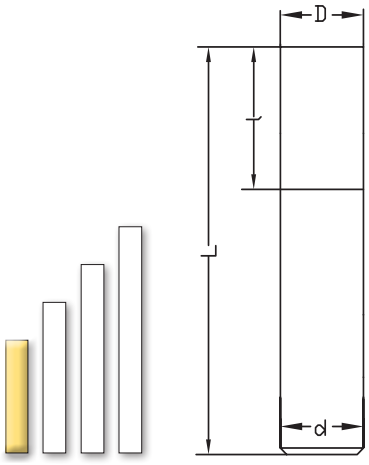
Lavorazioni, Machining Process

Lavorazioni, Machining Process

STD

731 Frese per sedi di chiavetta
Key slot End mills



MG Co10

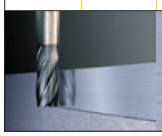
6527K 6528

λ 30°

90°

Uncoated

D	d	L	l	731	HM0	HMF	HMG	Z
e8	h6				€	€	€	
2,0	6	50	3	731020	26,20	32,50	43,20	2
2,5	6	50	3	731025	31,30	37,60	48,10	2
3,0	6	50	4	731030	26,20	32,50	43,20	2
3,5	6	50	4	731035	31,30	37,60	48,10	2
4,0	6	54	5	731040	25,80	32,10	42,70	2
4,5	6	54	5	731045	30,20	36,40	47,20	2
5,0	6	54	6	731050	25,30	31,60	41,90	2
5,5	6	54	6	731055	30,70	36,80	48,40	2
6,0	6	54	7	731060	21,30	27,40	37,90	2
7,0	8	58	9	731070	40,40	48,00	61,50	2
8,0	8	58	9	731080	32,40	39,90	53,60	2
9,0	10	66	11	731090	57,00	65,40	82,40	2
10,0	10	66	11	731100	52,20	60,90	77,20	2
11,0	12	73	12	731110	71,50	81,30	100,50	2
12,0	12	73	12	731120	68,70	78,40	97,70	2
13,0	14	75	14	731130	101,10	112,50	134,70	2
14,0	14	75	14	731140	99,00	110,30	132,70	2
15,0	16	82	16	731150	128,60	146,10	180,30	2
16,0	16	82	16	731160	137,40	155,10	189,10	2
17,0	18	84	18	731170	188,20	207,60	245,90	2
18,0	18	84	18	731180	208,80	228,40	266,50	2
19,0	20	92	20	731190	226,40	247,50	292,90	2
20,0	20	92	20	731200	252,10	273,60	318,70	2



PARAMETRI DI TAGLIO
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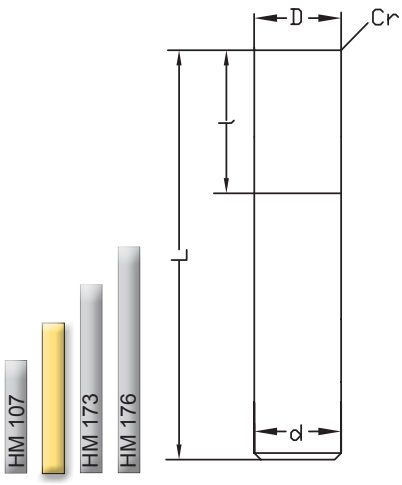
Lavorazioni, Machining Process

STD

171 Frese a due taglienti serie normale
2-flute end mills, standard series

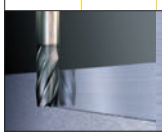
171 Cr Frese a due taglienti serie normale con Corner Radius
2-flute end mills with corner radius, standard series



MG Co10 | 6527L 6528 | λ 30° | 90°

MG Co10 | 6527L 6528 | λ 30° | Cr

D	d	L	l	171	Uncoated HM0	HMF	HMG	Z	171 Cr	Uncoated HM0	HMF	HMG	Z
h10	h6				€	€	€			€	€	€	
		... segue da pag. 88											
2	3	38	5	171020	24,20	29,70	38,30	2					
2,5	3	38	7	171025	25,10	30,80	39,20	2					
3	3	38	7	171030	22,00	27,50	35,80	2	.. Cr 0,3	25,20	30,90	39,30	2
3,5	4	50	7	171035	22,40	28,00	37,90	2					
4	4	50	8	171040	19,60	25,10	34,90	2	.. Cr 0,5	22,80	28,30	38,20	2
4,5	5	50	8	171045	23,80	29,80	40,40	2					
5	5	50	10	171050	20,70	26,80	37,30	2	.. Cr 0,5	25,60	31,80	42,60	2
5,5	6	57	10	171055	27,40	33,70	45,10	2					
6	6	57	10	171060	23,90	30,00	41,40	2	.. Cr 0,5	28,30	34,60	46,00	2
7	7	60	13	171070	32,60	40,10	53,80	2					
8	8	63	16	171080	37,00	44,60	58,40	2	.. Cr 0,8	42,30	49,80	63,90	2
9	9	67	16	171090	48,10	56,10	71,70	2					
10	10	72	19	171100	57,70	67,40	84,90	2	.. Cr 1,0	61,60	71,60	89,00	2
11	11	83	22	171110	69,50	81,60	105,50	2					
12	12	83	22	171120	77,50	91,50	117,20	2	.. Cr 1,5	82,60	96,60	122,50	2
13	13	83	22	171130	90,60	105,80	135,40	2					
14	14	83	22	171140	107,90	123,40	153,60	2	.. Cr 1,5	113,20	128,70	159,20	2
15	15	92	26	171150	136,20	153,90	187,90	2					
16	16	92	26	171160	143,20	161,10	195,40	2	.. Cr 1,5	148,30	166,20	200,40	2
17	17	92	26	171170	211,00	231,50	270,10	2					
18	18	92	26	171180	205,80	226,40	264,10	2	.. Cr 1,5	211,10	231,80	269,50	2
19	19	92	26	171190	252,40	277,20	323,20	2					
20	20	104	32	171200	248,60	273,50	318,70	2	.. Cr 2,0	255,10	279,80	325,10	2



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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Lavorazioni, Machining Process

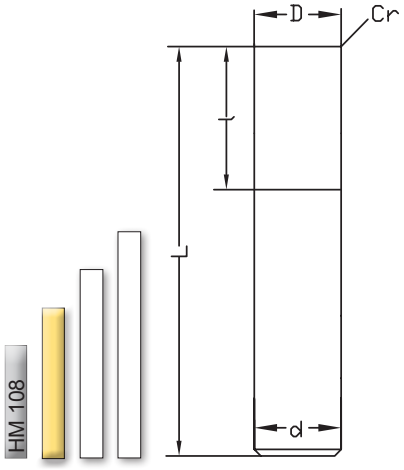
Lavorazioni, Machining Process

STD

SILMAX

111 Frese a tre taglienti serie normale
3-flute end mills, standard series

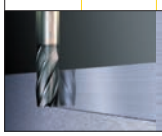
111 Cr Frese a tre taglienti serie normale con Corner Radius
3-flute end mills with corner radius, standard series



MG Co10 | 6527L 6528 | λ 30° | 90°

MG Co10 | 6527L 6528 | λ 30° | Cr

D h10	d h6	L	l	111 Uncoated	HM0 €	HMF €	HMG €	Z	111 Cr Uncoated	HM0 €	HMF €	HMG €	Z
		... segue da pag. 88											
2	3	38	5	111020	25,50	31,10	39,70	3	..Cr 0,3	30,20	35,70	44,40	3
2,5	3	38	7	111025	26,50	32,00	40,70	3					
3	3	38	7	111030	22,50	28,00	36,70	3	..Cr 0,3	27,20	32,70	41,30	3
4	4	50	8	111040	19,60	25,10	34,90	3	..Cr 0,3	24,30	29,70	39,50	3
									..Cr 0,5	24,30	29,70	39,50	3
5	5	50	10	111050	22,60	28,60	39,30	3	..Cr 0,5	27,10	33,30	43,90	3
6	6	57	10	111060	25,10	31,40	42,70	3	..Cr 0,2	29,70	35,80	47,60	3
									..Cr 0,5	29,70	35,80	47,60	3
									..Cr 0,8	29,70	35,80	47,60	3
7	7	60	13	111070	33,90	41,70	55,40	3					
8	8	63	16	111080	39,60	47,20	61,20	3	..Cr 0,5	45,50	53,20	67,30	3
									..Cr 0,8	45,50	53,20	67,30	3
9	9	67	16	111090	49,80	56,90	71,70	3					
10	10	72	19	111100	59,60	69,40	86,90	3	..Cr 0,5	65,50	75,40	92,80	3
									..Cr 1,0	65,50	75,40	92,80	3
11	11	83	22	111110	72,20	85,90	111,50	3					
12	12	83	22	111120	81,40	95,30	121,20	3	..Cr 1,0	89,30	103,20	129,40	3
									..Cr 1,5	89,30	103,20	129,40	3
13	13	83	22	111130	95,10	110,30	140,10	3					
14	14	83	22	111140	112,90	128,60	159,10	3	..Cr 1,5	120,80	136,40	166,90	3
15	15	92	26	111150	143,30	161,00	195,40	3					
16	16	92	26	111160	156,20	174,00	209,00	3	..Cr 1,0	163,90	182,00	217,20	3
									..Cr 1,5	163,90	182,00	217,20	3
18	18	92	26	111180	217,80	238,60	276,60	3	..Cr 1,5	225,80	246,60	284,60	3
20	20	104	32	111200	258,40	281,90	328,20	3	..Cr 2,0	268,20	291,70	337,90	3



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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Lavorazioni, Machining Process

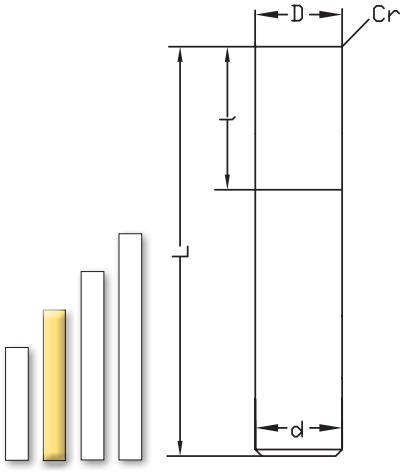
Lavorazioni, Machining Process

STD

SILMAX

106 Frese a sei taglienti serie normale
6-flute end mills, standard series

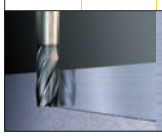
106 Cr Frese a sei taglienti serie normale con Corner Radius
6-flute end mills with corner radius, standard series



MG Co10 | 6527L | λ 30° | 90°

MG Co10 | 6527L | λ 30° | Cr

D h10	d h6	L	l	106	HM0 €	HMF €	HMG €	Z	106 Cr	HM0 €	HMF €	HMG €	Z
					Uncoated					*Uncoated*			
6	6	57	13	106060	34,20	40,30	52,20	6	..Cr 0,5	40,80	46,90	58,60	6
8	8	63	19	106080	47,90	55,60	70,10	6	..Cr 0,8	55,90	63,60	78,20	6
10	10	72	22	106100	74,60	84,50	102,60	6	..Cr 1,0	82,30	92,40	110,70	6
12	12	83	26	106120	96,30	110,40	136,90	6	..Cr 1,5	106,60	120,80	147,20	6
14	14	83	26	106140	134,40	150,10	181,50	6	..Cr 1,5	144,70	160,50	191,90	6
16	16	92	32	106160	179,40	197,60	233,40	6	..Cr 1,5	189,70	208,00	243,70	6
18	18	92	32	106180	245,80	266,80	306,20	8	..Cr 1,5	258,50	279,80	319,20	8
20	20	104	38	106200	277,90	301,50	348,60	8	..Cr 2,0	290,70	314,60	361,40	8
25	25	121	45	106250	519,00	560,10	637,40	8	..Cr 2,0	531,70	656,50	650,10	8



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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Lavorazioni, Machining Process

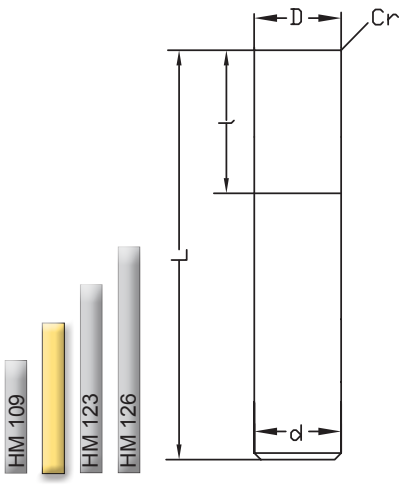
Lavorazioni, Machining Process

STD

SILMAX

113 Frese a quattro taglienti serie normale
4-flute end mills, standard series

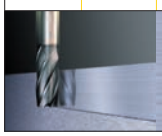
113 Cr Frese a quattro taglienti serie normale con Corner Radius
4-flute end mills with corner radius, standard series



MG Co10 | 6527L 6528 | λ 30° | 90°

MG Co10 | 6527L 6528 | λ 30° | Cr

D	d	L	l	113	HM0	HMF	HMG	Z	113 Cr	HM0	HMF	HMG	Z
h10	h6				€	€	€			€	€	€	
					Uncoated					*Uncoated*			
2	3	38	7	113020	27,40	32,60	41,60	4					
2,5	3	38	8	113025	27,40	32,60	41,60	4					
3	3	38	8	113030	23,90	28,90	37,80	4	..Cr 0,3	28,90	34,20	43,10	4
3,5	4	50	10	113035	25,20	30,80	39,40	4					
4	4	50	11	113040	21,00	26,30	36,30	4	..Cr 0,3	26,00	31,70	41,60	4
									..Cr 0,5	26,00	31,70	41,60	4
4,5	5	50	11	113045	28,10	34,30	45,00	4					
5	5	50	13	113050	24,60	30,60	41,40	4	..Cr 0,5	29,70	35,80	46,60	4
5,5	6	57	13	113055	31,00	37,20	48,70	4					
6	6	57	13	113060	27,10	33,30	44,70	4	..Cr 0,5	32,20	38,50	50,00	4
									..Cr 0,8	32,20	38,50	50,00	4
									..Cr 1,0	32,20	38,50	50,00	4
6,5	7	60	16	113065	41,20	48,70	62,80	4					
7	7	60	16	113070	35,80	43,40	57,10	4					
7,5	8	63	19	113075	46,70	54,50	68,70	4					
8	8	63	19	113080	40,80	48,40	62,70	4	..Cr 0,5	47,30	55,00	69,50	4
									..Cr 0,8	47,30	55,00	69,50	4
8,5	9	67	19	113085	55,10	65,00	80,10	4					
9	9	67	19	113090	50,30	59,80	72,90	4					
9,5	10	72	22	113095	69,70	79,60	97,40	4					
10	10	72	22	113100	61,00	70,60	88,40	4	..Cr 0,5	67,50	77,20	95,10	4
									..Cr 1,0	67,50	77,20	95,10	4
11	11	83	26	113110	72,80	86,60	112,10	4					
12	12	83	26	113120	84,00	97,90	124,00	4	..Cr 1,0	92,40	106,50	132,80	4
									..Cr 1,5	92,40	106,50	132,80	4
13	13	83	26	113130	96,90	112,40	142,30	4					
14	14	83	26	113140	114,30	129,80	160,50	4	..Cr 1,5	122,80	138,30	169,10	4
15	15	92	32	113150	146,50	164,40	199,00	4					
16	16	92	32	113160	158,80	176,80	211,50	4	..Cr 1,5	167,20	185,40	220,40	4
18	18	92	32	113180	230,00	250,90	289,60	4	..Cr 1,5	240,50	261,50	300,20	4
20	20	104	38	113200	261,70	285,30	331,60	4	..Cr 2,0	272,00	295,70	341,90	4
25	25	121	45	113250	491,00	531,80	608,10	4	..Cr 2,0	501,50	542,40	618,50	4



PARAMETRI DI TAGLIO
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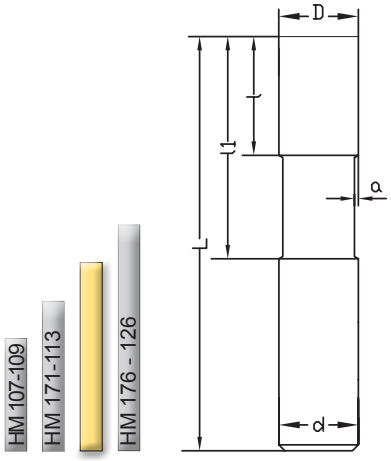


173 Frese a due taglienti serie media

2-flute end mills, medium series

MG Co10

Silmax Norm

λ 30°

90°

123 Frese a quattro taglienti serie media

4-flute end mills, medium series

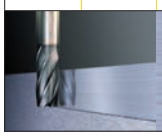
MG Co10

Silmax Norm

λ 30°

90°

D	d	L	l	l1	a	173	HM0	HMF	HMG	Z	123	HM0	HMF	HMG	Z
h10	h6						Uncoated €	Uncoated €	Uncoated €			Uncoated €	Uncoated €	Uncoated €	
3	3	62	14	-	-	173030	26,40	33,40	45,40	2	123030	28,90	36,00	48,10	4
4	4	62	16	-	-	173040	25,90	32,20	43,50	2	123040	28,60	34,90	46,20	4
5	5	62	20	-	-	173050	27,60	33,70	45,20	2	123050	32,70	38,90	50,60	4
6	6	78	20	30	0,15	173060	33,90	41,70	56,60	2	123060	37,90	45,50	60,70	4
7	7	78	24	34	0,15	173070	44,70	53,00	68,50	2					
8	8	78	25	35	0,15	173080	49,10	57,40	73,30	2	123080	51,50	60,10	75,80	4
9	9	78	25	35	0,15	173090	61,30	71,30	88,50	2					
10	10	105	28	48	0,15	173100	77,20	93,10	123,00	2	123100	81,10	97,00	127,10	4
11	11	105	28	48	0,20	173110	85,60	101,20	131,20	2					
12	12	105	32	52	0,20	173120	100,90	117,00	147,60	2	123120	104,00	120,30	151,00	4
13	13	105	32	52	0,20	173130	108,40	126,50	161,00	2					
14	14	105	32	52	0,20	173140	158,20	176,70	213,00	2	123140	162,60	181,20	217,80	4
15	15	130	40	60	0,20	173150	167,30	186,70	224,80	2					
16	16	130	40	60	0,20	173160	199,40	221,70	265,00	2	123160	202,00	224,30	267,80	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.94-95

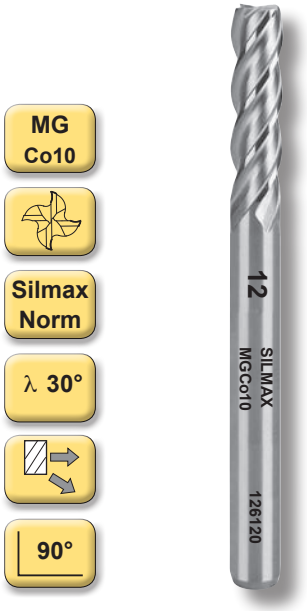
Lavorazioni, Machining Process

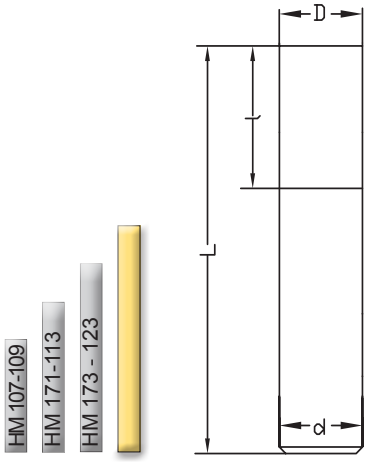
Lavorazioni, Machining Process

STD

176 Frese a due taglienti serie lunga
2-flute end mills, long series

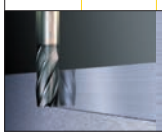
126 Frese a quattro taglienti serie lunga
4-flute end mills, long series





Uncoated

D	d	L	l	176	HM0	HMF	HMG	Z	126	HM0	HMF	HMG	Z
h10	h6				€	€	€			€	€	€	
4	4	80	32	176040	35,70	43,20	54,70	2	126040	35,90	43,40	55,90	4
6	6	105	42	176060	45,60	57,10	77,00	2	126060	49,40	61,10	81,10	4
8	8	105	50	176080	61,60	74,00	95,10	2	126080	64,80	77,20	98,40	4
10	10	120	50	176100	96,00	112,60	141,40	2	126100	101,30	117,80	146,60	4
12	12	160	65	176120	132,70	158,20	201,30	2	126120	136,50	162,10	205,40	4
14	14	160	70	176140	202,00	230,70	282,20	2	126140	205,90	234,70	286,20	4
16	16	160	70	176160	249,20	282,50	340,10	2	126160	252,40	285,70	343,70	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.94-95

Lavorazioni, Machining Process

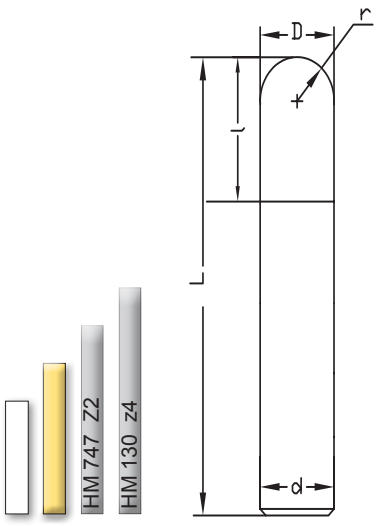
Lavorazioni, Machining Process

STD

SILMAX

737 Frese semisferica serie normale

Ball nose end mills, standard series



MG Co10

Silmax Norm

λ 30°

131 Frese semisferica serie normale

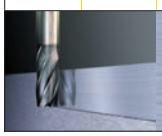
Ball nose end mills, standard series

MG Co10

Silmax Norm

λ 30°

D	d	L	l	r	737 Uncoated HM0	HMF	HMG	Z	131 Uncoated HM0	HMF	HMG	Z
h10	h6				€	€	€		€	€	€	
		... segue da pag. 89										
2	3	38	5	1,0	737020 41,30	46,90	56,10	2	131020 41,30	46,90	56,10	4
2,5	3	38	7	1,25	737025 38,10	43,80	52,80	2	131025 39,60	45,30	55,70	4
3	3	38	7	1,5	737030 34,30	39,70	48,70	2	131030 41,10	46,60	57,50	4
3,5	4	50	7	1,75	737035 35,10	41,00	51,20	2				
4	4	50	8	2,0	737040 30,70	36,20	46,40	2	131040 38,40	44,10	54,70	4
5	5	50	10	2,5	737050 32,90	39,10	50,00	2	131050 40,80	46,90	58,30	4
6	6	57	10	3,0	737060 36,10	42,40	54,10	2	131060 45,20	51,70	63,60	4
7	7	60	13	3,5	737070 46,80	55,10	69,50	2	131070 52,10	60,40	74,90	4
8	8	63	16	4,0	737080 48,70	56,50	70,70	2	131080 57,10	64,90	79,50	4
9	9	67	16	4,5	737090 62,00	71,30	87,40	2	131090 64,90	74,00	88,50	4
10	10	72	19	5,0	737100 68,70	78,60	96,50	2	131100 73,20	83,20	101,20	4
11	11	83	22	5,5	737110 89,60	104,20	129,00	2	131110 89,60	104,20	129,00	4
12	12	83	22	6,0	737120 98,20	112,20	138,80	2	131120 103,40	117,40	144,40	4
13	13	83	22	6,5	737130 124,80	141,70	171,50	2	131130 131,90	148,90	178,90	4
14	14	83	22	7,0	737140 137,60	153,40	185,00	2	131140 146,10	162,00	193,60	4
15	15	92	26	7,5	737150 156,90	176,10	209,80	2	131150 162,70	182,10	216,00	4
16	16	92	26	8,0	737160 195,60	214,10	250,20	2	131160 204,00	222,50	259,30	4
18	18	92	26	9,0	737180 297,10	315,20	365,80	2	131180 335,70	353,40	408,30	4
20	20	104	32	10,0	737200 336,70	357,30	417,90	2	131200 380,10	400,20	466,20	4

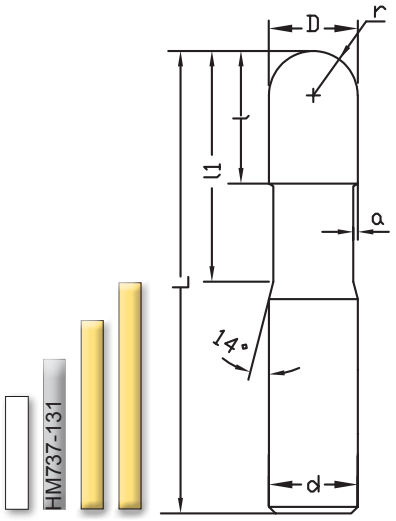


PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.94-95

Lavorazioni, Machining Process

Lavorazioni, Machining Process

STD



747 Frese semisferica serie media

Ball nose end mills, standard series

MG Co10 | Silmax Norm | λ 30°

130 Frese semisferica serie lunga

Ball nose end mills, long series

MG Co10 | Silmax Norm | λ 30°

D h10	d h6	L	l	r	l1	a	747	HM0 €	HMF €	HMG €	Z
4	4	62	16	2,0	-	-	747040	41,50	49,20	62,00	2
5	5	62	20	2,5	-	-	747050	44,40	50,50	62,80	2
6	6	78	20	3,0	30	0,15	747060	51,70	60,20	75,40	2
8	8	78	25	4,0	35	0,15	747080	65,80	75,20	91,50	2
10	10	105	28	5,0	48	0,15	747100	98,70	115,50	144,20	2
12	12	105	32	6,0	52	0,20	747120	133,20	151,00	182,30	2
16	16	130	40	8,0	60	0,20	747160	266,10	287,70	330,30	2

D h10	d h6	L	l	r	l1	a	130	HM0 €	HMF €	HMG €	Z
6	6	105	42	3,0	-	-	130060	63,60	72,10	87,80	4
8	8	105	50	4,0	-	-	130080	80,30	89,70	106,70	4
10	10	120	50	5,0	-	-	130100	113,00	129,70	159,10	4
12	12	160	65	6,0	-	-	130120	160,70	183,70	227,20	4
14	14	160	70	7,0	-	-	130140	207,90	236,70	288,30	4
16	16	160	70	8,0	-	-	130160	288,50	322,20	379,50	4
18	18	160	70	9,0	-	-	130180	380,30	412,10	420,80	4
20	20	160	70	10,0	-	-	130200	461,20	495,80	504,60	4

PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.94-95

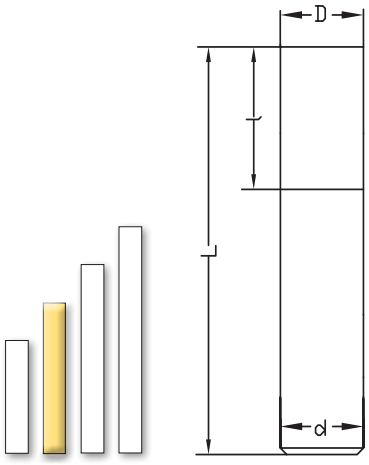
Lavorazioni, Machining Process

Lavorazioni, Machining Process

STD

013F Frese a sgrossare con rompitruciolo

End mills for roughing with chip breaker



MG Co10

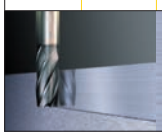
6527L

λ 30°

45°

Uncoated

D h11	d h6	L	l	013F	HM0 €	HMF €	HMG €	Z
4	6	57	13	013F04	47,50	52,30	57,80	4
4,5	6	57	13	013F045	47,50	52,30	57,80	4
5	6	57	13	013F05	45,20	49,30	54,90	4
5,5	6	57	13	013F055	47,50	52,30	57,80	4
6	6	57	13	013F06	52,20	56,70	62,20	4
7	7	60	16	013F07	71,10	77,70	84,70	4
8	8	63	19	013F08	67,60	74,40	81,20	4
9	9	67	19	013F09	90,60	99,10	117,60	4
10	10	72	22	013F10	87,60	97,50	116,00	4
11	11	83	26	013F11	115,30	129,90	155,80	4
12	12	83	26	013F12	109,90	124,10	151,20	4
13	13	83	26	013F13	163,70	183,40	220,20	4
14	14	83	26	013F14	160,30	178,90	215,40	4
15	15	92	32	013F15	202,00	219,30	258,80	4
16	16	92	32	013F16	197,60	215,90	252,40	4
18	18	92	32	013F18	259,40	281,20	313,90	4
20	20	104	38	013F20	300,50	324,40	372,40	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.94-95

Lavorazioni, Machining Process

STD

Gruppo		Nr	DIN	Gruppo	Nr	DIN
Steel < 800 N/mm²	Non legati < 800 N/mm²	1.1231	Ck67	Legati < 800 N/mm²	1.5026	55Si7
		1.1248	Ck75		1.7176	55Cr3
		1.1274	Ck101		1.8159	50CrV4
		1.0402	C22		1.3505	100Cr6
		1.0406	C25		1.6546	40NiCrMo2 2
		1.0501	C35		1.7218	25CrMo4
		1.0503	C45		1.7220	34CrMo4
		1.1133	20Mn5		1.7223	41CrMo4
	Legati < 800 N/mm²	1.7015	15Cr3			
		1.5752	14NiCr14			
		1.5919	15CrNi6			
		1.6523	21NiCrMo2			
		1.6587	17CrNiMo6			
		1.7131	16MnCr5			
Steel < 1000 N/mm²	Non legati < 1000 N/mm²	1.0535	C55	Legati < 1000 N/mm²	1.7225	42CrMo4
		1.0601	C60		1.8159	50CrV4
		1.1203	Ck55		1.7045	42Cr4
		1.1206	Ck50		1.8507	34CrAlMo5
		1.1221	Ck60		1.8509	41CrAlMo7
		1.1157	40Mn4		1.8515	31CrMo12
		1.1165	30Mn5			
		1.1167	36Mn5	Acciai legati per utensili	1.2067	100Cr6
		1.1170	28Mn6		1.2330	35CrMo4
	Legati < 1000 N/mm²	1.5710	36NiCr6		1.2332	47CrMo4
		1.5755	31NiCr14		1.2510	100MnCrW4
		1.6511	36CrNiMo4		1.2516	120WV4
		1.7033	34Cr4		1.2542	45WCrV7
		1.7034	37Cr4		1.2833	100V1
		1.7035	41Cr4		1.2842	90MnCrV8
		1.7218	25CrMo4	Ghisa	0.6015	GG-15
		1.7220	34CrMo4		0.6010	GG-10
		1.7223	41CrMo4		0.6020	GG-20
Steel < 1300 N/mm²	Legati < 1300 N/mm²	1.5710	36NiCr6	Acciai legati per utensili	1.2311	40CrMnMo7
		1.6511	36CrNiMo4		1.2344	X40CrMoV5 1
		1.6580	30CrNiMo8		1.2365	X32CrMoV3 3
		1.6582	34CrNiMo6		1.2581	X30WCrV9 3
		1.7220	34CrMo4		1.2343	X38 CrMoV5 1
		1.7223	41CrMo4		1.2344	X40CrMoV5 1
		1.7225	42CrMo4		1.2714	56NiCrMoV7
		1.7361	32CrMo12			
		1.8159	50CrV4	Ghisa	0.6030	GG-30
					0.6040	GG-40
12% Cr	Acciai legati per utensili	1.2080	X210Cr12	Acciai resistenti al calore	1.4914	-
		1.2436	X210CrW12		1.4920	X15CrMo12 1
		1.2601	X165CrMoV12		1.4924	-
		1.2706	X3NiCrMo18 8 5		1.4718	X45CrSi9 3
		1.2709	X2NiCoMoTi18 9 5		1.4845	X12CrNi25 21
		1.2201	X165CrV12		1.4878	X12CrNiTi18 9
		1.2376	X96CrMoV12		1.4742	X10CrAl18
		1.2379	X155CrMo12 1		1.4923	X22CrMoV12 1
		1.2609	X165CrVMo12 1			
		1.2631	X50CrMoW9 1 1			
		1.2880	X165CrCoMo12			

STD

PUNTE AD ALTO RENDIMENTO

New

HIGH PERFORMANCES CARBIDE DRILLS

HOCHLEISTUNGSBOHREN

WIERTŁA WĘGLIKOWE DUŻEJ WYDAJNOŚCI

DRILLS

CARATTERISTICHE GEOMETRICHE

Affilatura frontale a 140°. Incisione a raggio frontale con distribuzione uniforme delle pressioni di taglio. Gole sagomate per la formazione e la evacuazione ottimale del truciolo. Finitura delle superfici ad elevata scorrevolezza. Onatura innovativa del tagliente .

GEOMETRICAL HIGHLIGHTS

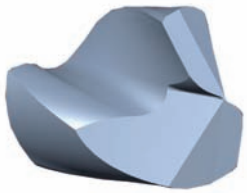
140° face sharpening. Round face gash for an even distribution of the cutting forces. Formed flutes for an effective chip evacuation. Low friction surface finishing. Exclusive edge honing.

GEOMETRISCHE EIGENSCHAFTEN

140° Frontschliff. Frontaufnahme mit gleichmäßiger Teilung des Schnittdruckes. Geometrie, die für die optimale Spanbildung und -entfernung geformt ist. Bestmögliche Feinbearbeitung der Oberflächen. Innovative Kantenverrundung.

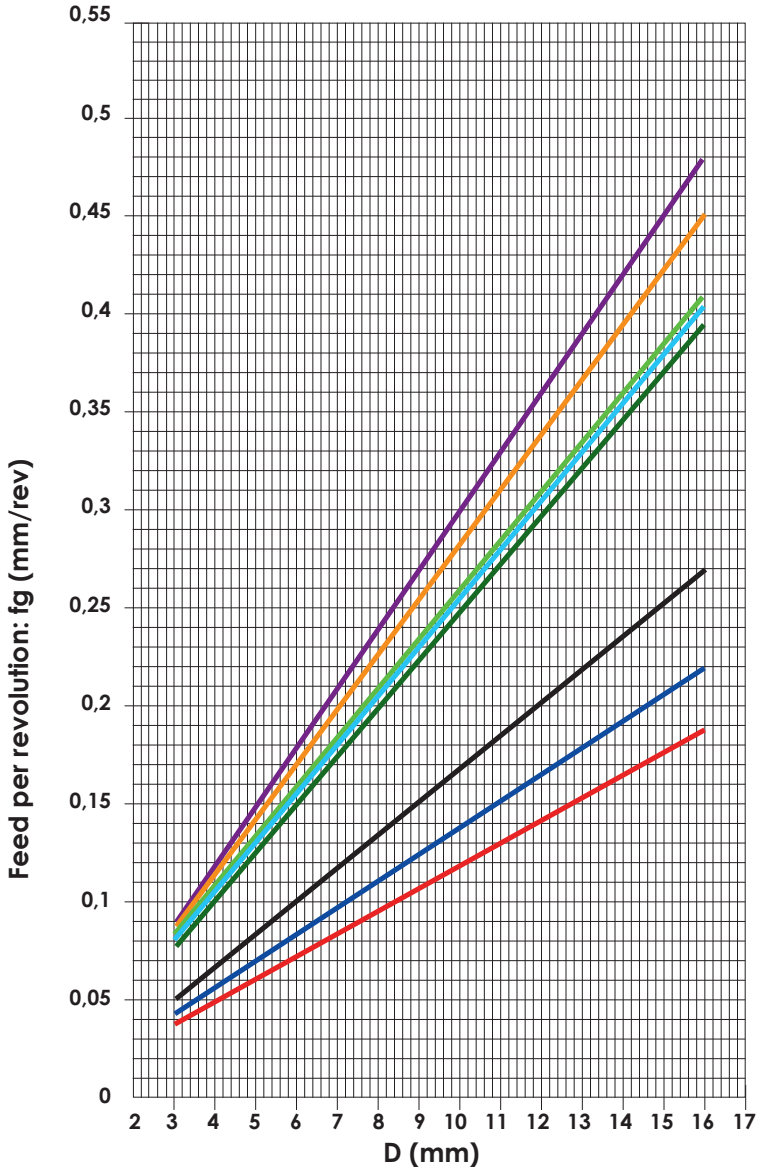
CHARAKTERY GEOMETRYCZNE

Nacięcie promienia frontalnie z działaniem równomiernym ciśnienia i cięcia.
Otwóry które mają swoją formę służą do wydalenia optymalnego wióry
Wykończenia powierzchni wysokim przeyściem.
Złagodzenie ostro nowoczesna z cięcia.



Senza fori di lubrificazione
Without Internal coolant
Ohne Innenkühlung
Bez chłodzenia wewnętrznego

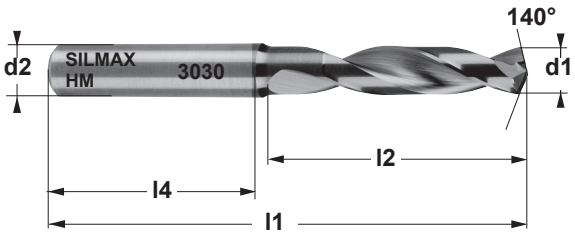
Ultra fine | DIN 6537K | 140°



3030

Punte 3xD senza fori

3xD drills without internal coolant



ATTACCHI DISPONIBILI CIL DIN 6535 HA

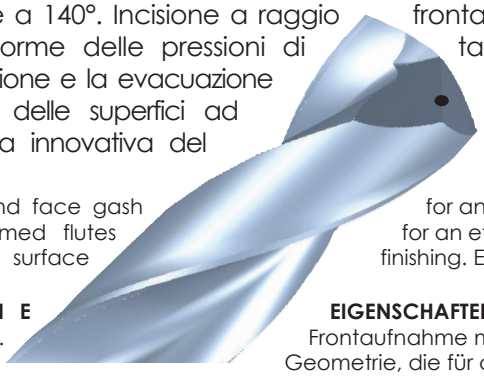
AVAILABLE SHANK STYLES WN DIN 6535 HE on demand

d1	d2	l1	l2	l4	3030	HMX	d1	d2	l1	l2	l4	3030	HMX
m7	h6					€	m7	h6					€
3,0	6	62	20	36	A030	35,80	14,0	14	107	60	45	A140	80,80
3,3	6	62	20	36	A033	35,80	14,5	16	115	65	48	A145	103,90
3,4	6	62	20	36	A034	35,80	14,8	16	115	65	48	A148	103,90
3,5	6	62	20	36	A035	35,80							
							15,0	16	115	65	48	A150	103,90
4,0	6	66	24	36	A040	35,80	15,5	16	115	65	48	A155	103,90
4,2	6	66	24	36	A042	35,80	15,8	16	115	65	48	A158	103,90
4,5	6	66	24	36	A045	35,80							
4,8	6	66	28	36	A048	35,80	16,0	16	115	65	48	A160	103,90
5,0	6	66	28	36	A050	35,80							
5,5	6	66	28	36	A055	35,80							
5,8	6	66	28	36	A058	35,80							
6,0	6	66	28	36	A060	35,80							
6,5	8	79	34	36	A065	43,30							
6,8	8	79	34	36	A068	43,30							
7,0	8	79	34	36	A070	43,30							
7,5	8	79	41	36	A075	43,30							
7,8	8	79	41	36	A078	43,30							
8,0	8	79	41	36	A080	43,30							
8,5	10	89	47	40	A085	56,30							
8,8	10	89	47	40	A088	56,30							
9,0	10	89	47	40	A090	56,30							
9,5	10	89	47	40	A095	56,30							
9,8	10	89	47	40	A098	56,30							
10,0	10	89	47	40	A100	56,30							
10,2	12	102	55	45	A102	66,40							
10,5	12	102	55	45	A105	66,40							
10,8	12	102	55	45	A108	66,40							
11,0	12	102	55	45	A110	66,40							
11,5	12	102	55	45	A115	66,40							
11,8	12	102	55	45	A118	66,40							
12,0	12	102	55	45	A120	66,40							
12,5	14	107	60	45	A125	80,80							
12,8	14	107	60	45	A128	80,80							
13,0	14	107	60	45	A130	80,80							
13,5	14	107	60	45	A135	80,80							
13,8	14	107	60	45	A138	80,80							

3031 DIN 6537K 3XD

CARATTERISTICHE GEOMETRICHE

Affilatura frontale a 140°. Incisione a raggio frontale con distribuzione uniforme delle pressioni di taglio. Gole sagomate per la formazione e la evacuazione ottimale del truciolo. Finitura delle superfici ad elevata scorrevolezza. Onatura innovativa del tagliente .



GEOMETRICAL HIGHLIGHTS

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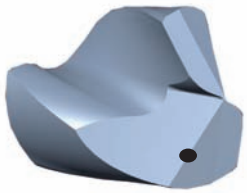
G E O M E T R I S C H E EIGENSCHAFTEN

140° Frontschliff. Frontaufnahme mit gleichmäßiger Teilung des Schnittdruckes. Geometrie, die für die optimale Spanbildung und -entfernung geformt ist. Bestmögliche Feinbearbeitung der Oberflächen. Innovative Kantenverrundung.

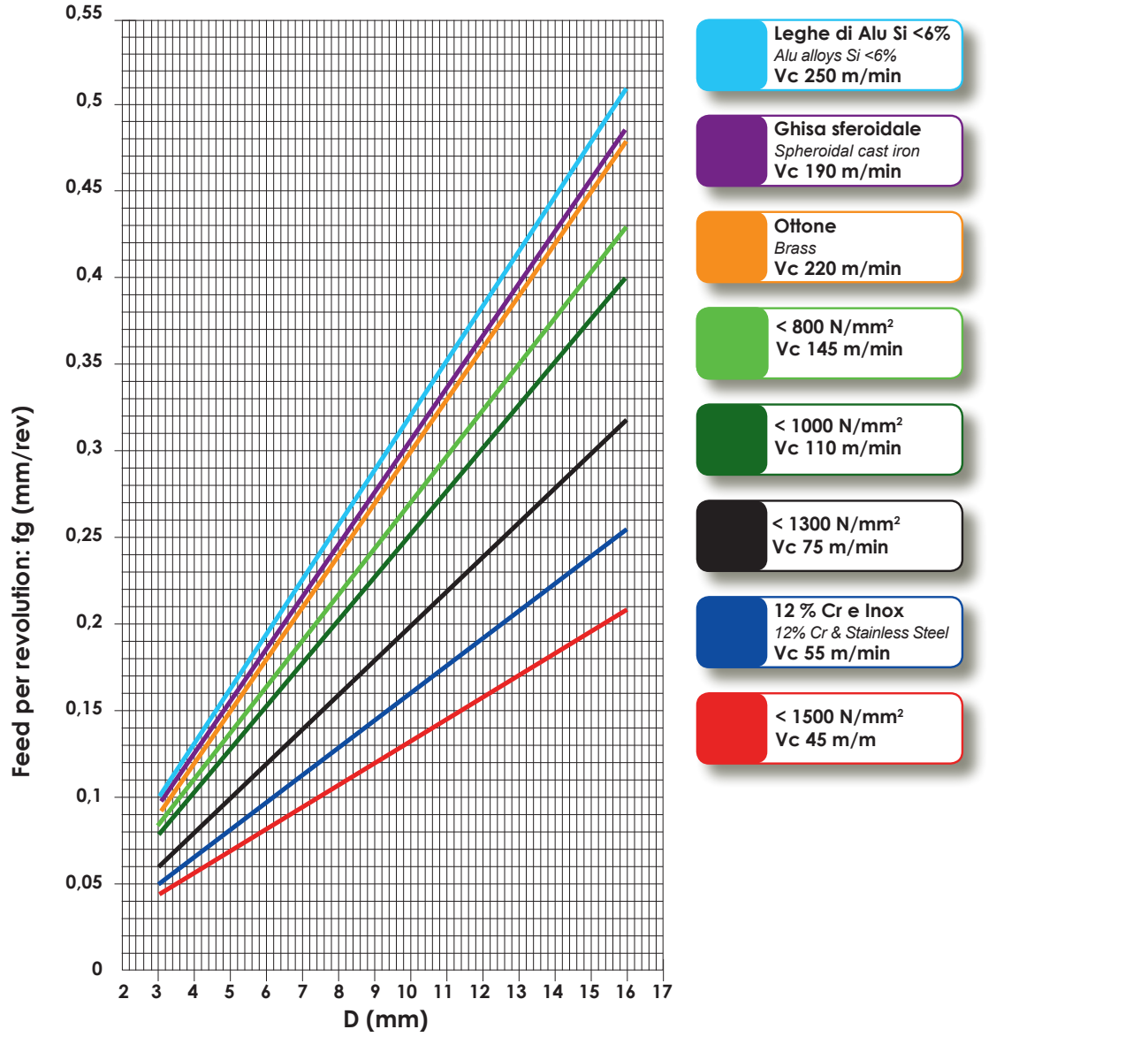
CHARAKTERY GEOMETRYCZNE

Nacięcie promienia frontalnie z działaniem równomiernym ciśnienia i cięcia.
Otwóry które mają swoją formę służą do wydalenia optymalnego wióry
Wykończenia powierzchni wysokim przeyściem.
Złagodzenie ostro nowoczesna z cięcia.



Con fori di lubrificazione
With Internal coolant supply

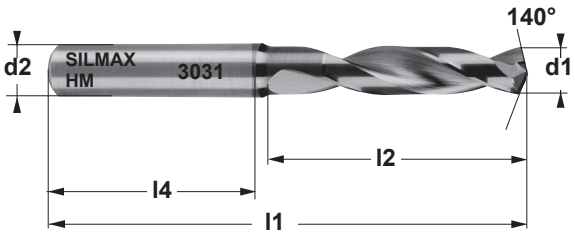
Ultra fine | DIN 6537K | 140°



3031

Punte 3xD con fori

3xD with internal coolant supply



ATTACCHI DISPONIBILI CIL DIN 6535 HA

AVAILABLE SHANK STYLES

d1	d2	l1	l2	l4	3031	HMX	d1	d2	l1	l2	l4	3031	HMX
m7	h6					€	m7	h6					€
3,0	6	62	20	36	A030	46,90	14,0	14	107	60	45	A140	125,40
3,3	6	62	20	36	A033	46,90	14,5	16	115	65	48	A145	154,50
3,4	6	62	20	36	A034	46,90	14,8	16	115	65	48	A148	154,50
3,5	6	62	20	36	A035	46,90							
							15,0	16	115	65	48	A150	154,50
4,0	6	66	24	36	A040	50,50	15,5	16	115	65	48	A155	154,50
4,2	6	66	24	36	A042	50,50	15,8	16	115	65	48	A158	154,50
4,5	6	66	24	36	A045	50,50							
4,8	6	66	28	36	A048	50,50	16,0	16	115	65	48	A160	154,50
5,0	6	66	28	36	A050	50,50							
5,5	6	66	28	36	A055	50,50							
5,8	6	66	28	36	A058	50,50							
6,0	6	66	28	36	A060	50,50							
6,5	8	79	34	36	A065	55,70							
6,8	8	79	34	36	A068	55,70							
7,0	8	79	34	36	A070	55,70							
7,5	8	79	41	36	A075	55,70							
7,8	8	79	41	36	A078	55,70							
8,0	8	79	41	36	A080	55,70							
8,5	10	89	47	40	A085	63,90							
8,8	10	89	47	40	A088	63,90							
9,0	10	89	47	40	A090	63,90							
9,5	10	89	47	40	A095	63,90							
9,8	10	89	47	40	A098	63,90							
10,0	10	89	47	40	A100	63,90							
10,2	12	102	55	45	A102	93,20							
10,5	12	102	55	45	A105	93,20							
10,8	12	102	55	45	A108	93,20							
11,0	12	102	55	45	A110	93,20							
11,5	12	102	55	45	A115	93,20							
11,8	12	102	55	45	A118	93,20							
12,0	12	102	55	45	A120	93,20							
12,5	14	107	60	45	A125	125,40							
12,8	14	107	60	45	A128	125,40							
13,0	14	107	60	45	A130	125,40							
13,5	14	107	60	45	A135	125,40							
13,8	14	107	60	45	A138	125,40							

DRILLS

CARATTERISTICHE GEOMETRICHE

Affilatura frontale a 140°. Incisione a raggio frontale con distribuzione uniforme delle pressioni di taglio. Gole sagomate per la formazione e la evacuazione ottimale del truciolo. Finitura delle superfici ad elevata scorrevolezza. Onatura innovativa del tagliente .

GEOMETRICAL HIGHLIGHTS

140° face sharpening. Round face gash for an even distribution of the cutting forces. Formed flutes for an effective chip evacuation. Low friction surface finishing. Exclusive edge honing.

GEOMETRISCHE EIGENSCHAFTEN

140° Frontschliff. Frontaufnahme mit gleichmäßiger Teilung des Schnittdruckes. Geometrie, die für die optimale Spanbildung und -entfernung geformt ist. Bestmögliche Feinbearbeitung der Oberflächen. Innovative Kantenverrundung.

CHARAKTERY GEOMETRYCZNE

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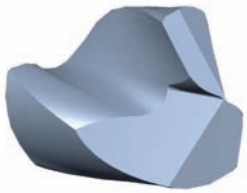
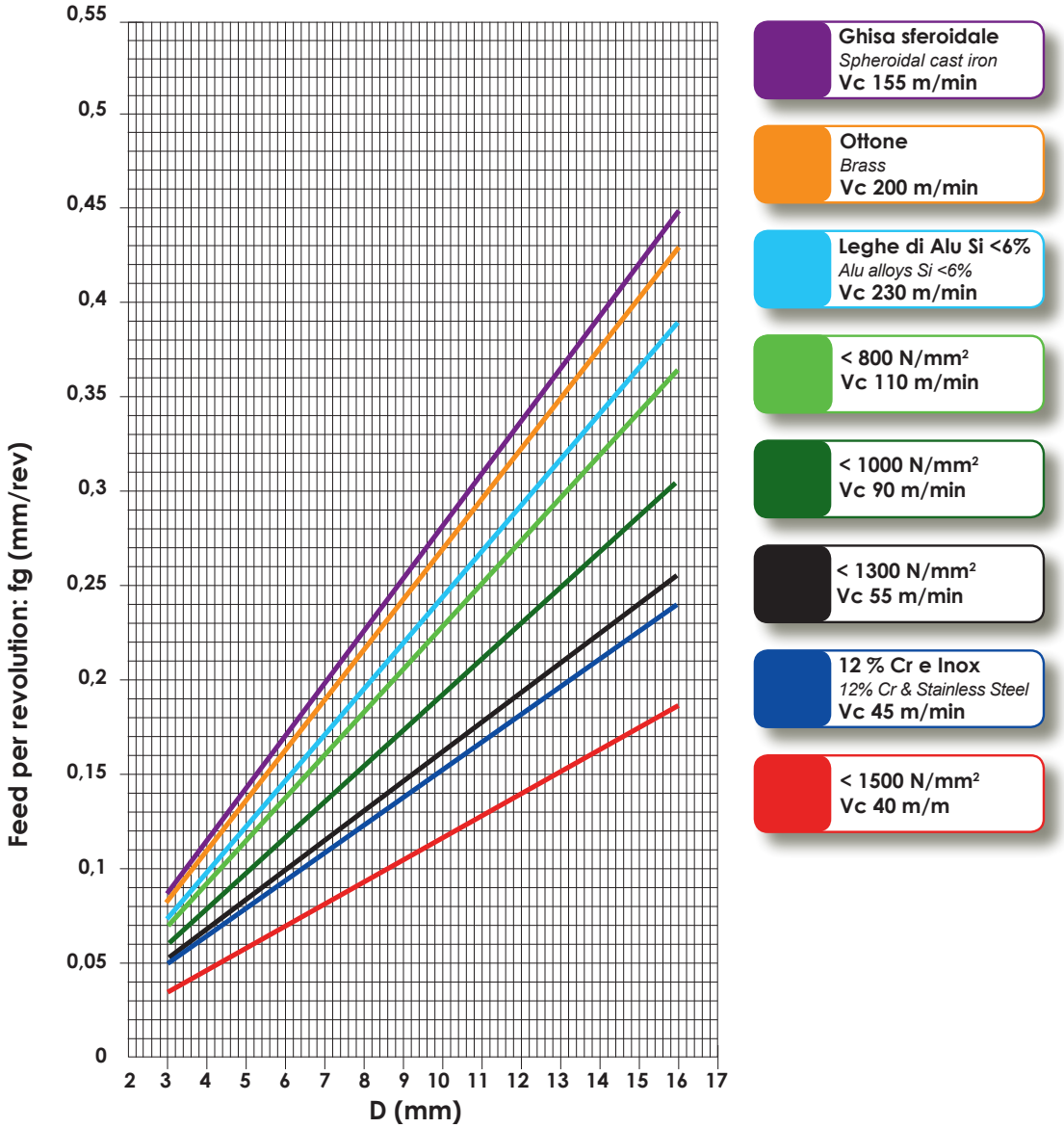
Złagodzenie ostro nowoczesna z cięcia.



Senza fori di lubrificazione
Without Internal coolant
Ohne Innenkühlung
Bez chłodzenia wewnętrznego

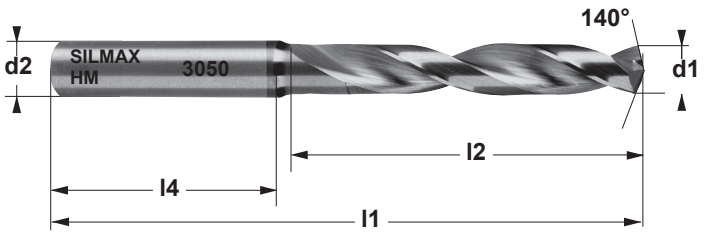
Ultra fine | DIN 6537L | 140°



3050

Punte 5xD senza fori

5xD drills without internal coolant



ATTACCHI DISPONIBILI CIL DIN 6535 HA

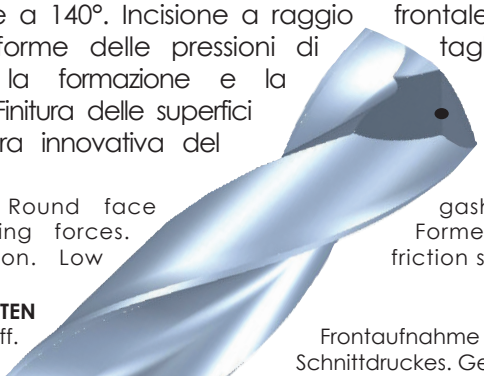
AVAILABLE SHANK STYLES WN DIN 6535 HE on demand

d1	d2	l1	l2	l4	3050	HMX	d1	d2	l1	l2	l4	3050	HMX
m7	h6					€	m7	h6					€
3,0	6	66	28	36	A030	41,10	13,0	14	124	77	45	A130	92,30
3,3	6	66	28	36	A033	41,10	13,5	14	124	77	45	A135	92,30
3,4	6	66	28	36	A034	41,10	13,8	14	124	77	45	A138	92,30
3,5	6	66	28	36	A035	41,10							
3,7	6	66	28	36	A037	41,10	14,0	14	124	77	45	A140	92,30
3,8	6	74	36	36	A038	41,10	14,5	16	133	83	48	A145	118,30
							14,8	16	133	83	48	A148	118,30
4,0	6	74	36	36	A040	41,10							
4,2	6	74	36	36	A042	41,10	15,0	16	133	83	48	A150	118,30
4,5	6	74	36	36	A045	41,10	15,5	16	133	83	48	A155	118,30
4,8	6	82	44	36	A048	41,10	15,8	16	133	83	48	A158	118,30
5,0	6	82	44	36	A050	41,10	16,0	16	133	83	48	A160	118,30
5,5	6	82	44	36	A055	41,10							
5,8	6	82	44	36	A058	41,10							
6,0	6	82	44	36	A060	41,10							
6,5	8	91	53	36	A065	49,10							
6,8	8	91	53	36	A068	49,10							
7,0	8	91	53	36	A070	49,10							
7,5	8	91	53	36	A075	49,10							
7,8	8	91	53	36	A078	49,10							
8,0	8	91	53	36	A080	49,10							
8,5	10	103	61	40	A085	60,60							
8,8	10	103	61	40	A088	60,60							
9,0	10	103	61	40	A090	60,60							
9,5	10	103	61	40	A095	60,60							
9,8	10	103	61	40	A098	60,60							
10,0	10	103	61	40	A100	60,60							
10,2	12	118	71	45	A102	77,20							
10,5	12	118	71	45	A105	77,20							
10,8	12	118	71	45	A108	77,20							
11,0	12	118	71	45	A110	77,20							
11,5	12	118	71	45	A115	77,20							
11,8	12	118	71	45	A118	77,20							
12,0	12	118	71	45	A120	77,20							
12,5	14	124	77	45	A125	92,30							
12,8	14	124	77	45	A128	92,30							

DRILLS

CARATTERISTICHE GEOMETRICHE

Affilatura frontale a 140°. Incisione a raggio frontale con distribuzione uniforme delle pressioni di taglio. Gole sagomate per la formazione e la evacuazione ottimale del truciolo. Finitura delle superfici ad elevata scorrevolezza. Onatura innovativa del tagliente.



GEOMETRICAL HIGHLIGHTS

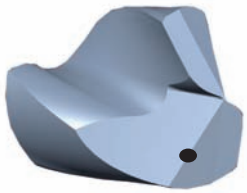
140° face sharpening. Round face gash for an even distribution of the cutting forces. Formed flutes for an effective chip evacuation. Low friction surface finishing. Exclusive edge honing.

GEOMETRISCHE EIGENSCHAFTEN

140° Frontschliff. Frontaufnahme mit gleichmäßiger Teilung des Schnittdruckes. Geometrie, die für die optimale Spanbildung und -entfernung geformt ist. Bestmögliche Feinbearbeitung der Oberflächen. Innovative Kantenverrundung.

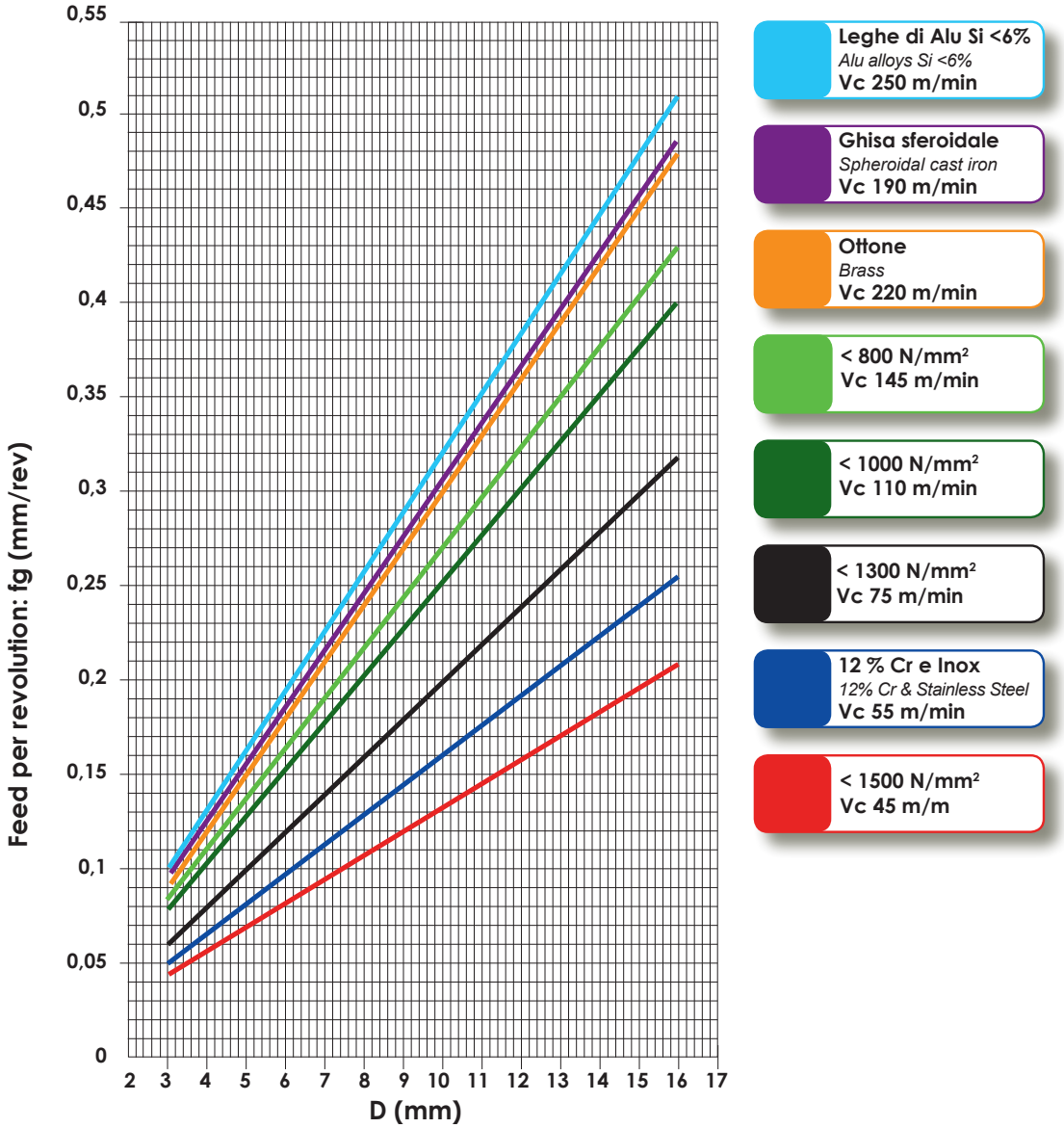
CHARAKTERY GEOMETRYCZNE

Nacięcie promienia frontalnie z działaniem równomiernym ciśnienia i cięcia. Otwóry które mają swoją formę służą do wydalenia optymalnego wióry Wykończenia powierzchni wysokim przeyściem. Złagodzenie ostro nowoczesna z cięcia.



Con fori di lubrificazione
With Internal coolant supply
Mit Innenkühlung
Chłodzeniem wewnętrznego

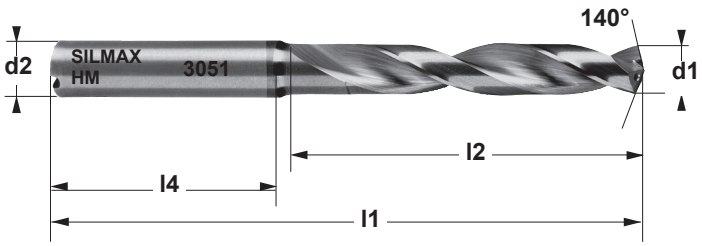
Ultra fine | DIN 6537L | 140°



3051

Punte 5xD con fori

5xD drills with internal coolant supply



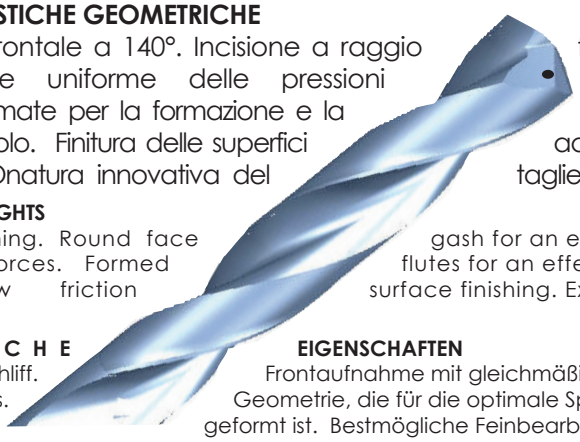
ATTACCHI DISPONIBILI CIL DIN 6535 HA

AVAILABLE SHANK STYLES

d1 m7	d2 h6	l1	l2	l4	3051	HMX €	d1 m7	d2 h6	l1	l2	l4	3051	HMX €
3,0	6	66	28	36	A030	58,60	8,0	8	91	53	36	A080	69,60
3,1	6	66	28	36	A031	58,60	8,1	10	103	61	40	A081	79,80
3,2	6	66	28	36	A032	58,60	8,2	10	103	61	40	A082	79,80
3,3	6	66	28	36	A033	58,60	8,3	10	103	61	40	A083	79,80
3,4	6	66	28	36	A034	58,60	8,4	10	103	61	40	A084	79,80
3,5	6	66	28	36	A035	58,60	8,5	10	103	61	40	A085	79,80
3,6	6	66	28	36	A036	58,60	8,6	10	103	61	40	A086	79,80
3,7	6	66	28	36	A037	58,60	8,7	10	103	61	40	A087	79,80
3,8	6	74	36	36	A038	58,60	8,8	10	103	61	40	A088	79,80
3,9	6	74	36	36	A039	58,60	8,9	10	103	61	40	A089	79,80
4,0	6	74	36	36	A040	63,10	9,0	10	103	61	40	A090	79,80
4,1	6	74	36	36	A041	63,10	9,1	10	103	61	40	A091	79,80
4,2	6	74	36	36	A042	63,10	9,2	10	103	61	40	A092	79,80
4,3	6	74	36	36	A043	63,10	9,3	10	103	61	40	A093	79,80
4,4	6	74	36	36	A044	63,10	9,4	10	103	61	40	A094	79,80
4,5	6	74	36	36	A045	63,10	9,5	10	103	61	40	A095	79,80
4,6	6	74	36	36	A046	63,10	9,6	10	103	61	40	A096	79,80
4,7	6	74	36	36	A047	63,10	9,7	10	103	61	40	A097	79,80
4,8	6	82	44	36	A048	63,10	9,8	10	103	61	40	A098	79,80
4,9	6	82	44	36	A049	63,10	9,9	10	103	61	40	A099	79,80
5,0	6	82	44	36	A050	63,10	10,0	10	103	61	40	A100	79,80
5,1	6	82	44	36	A051	63,10	10,1	12	118	71	45	A101	116,40
5,2	6	82	44	36	A052	63,10	10,2	12	118	71	45	A102	116,40
5,3	6	82	44	36	A053	63,10	10,5	12	118	71	45	A105	116,40
5,4	6	82	44	36	A054	63,10	10,8	12	118	71	45	A108	116,40
5,5	6	82	44	36	A055	63,10	11,0	12	118	71	45	A110	116,40
5,6	6	82	44	36	A056	63,10	11,2	12	118	71	45	A112	116,40
5,7	6	82	44	36	A057	63,10	11,5	12	118	71	45	A115	116,40
5,8	6	82	44	36	A058	63,10	11,6	12	118	71	45	A116	116,40
5,9	6	82	44	36	A059	63,10	11,8	12	118	71	45	A118	116,40
6,0	6	82	44	36	A060	63,10	12,0	12	118	71	45	A120	116,40
6,1	8	91	53	36	A061	69,60	12,2	14	124	77	45	A122	156,70
6,2	8	91	53	36	A062	69,60	12,5	14	124	77	45	A125	156,70
6,3	8	91	53	36	A063	69,60	12,8	14	124	77	45	A128	156,70
6,4	8	91	53	36	A064	69,60	13,0	14	124	77	45	A130	156,70
6,5	8	91	53	36	A065	69,60	13,1	14	124	77	45	A131	156,70
6,6	8	91	53	36	A066	69,60	13,2	14	124	77	45	A132	156,70
6,7	8	91	53	36	A067	69,60	13,5	14	124	77	45	A135	156,70
6,8	8	91	53	36	A068	69,60	13,8	14	124	77	45	A138	156,70
6,9	8	91	53	36	A069	69,60	14,0	14	124	77	45	A140	156,70
7,0	8	91	53	36	A070	69,60	14,2	16	133	83	48	A142	193,10
7,1	8	91	53	36	A071	69,60	14,5	16	133	83	48	A145	193,10
7,2	8	91	53	36	A072	69,60	14,8	16	133	83	48	A148	193,10
7,3	8	91	53	36	A073	69,60	15,0	16	133	83	48	A150	193,10
7,4	8	91	53	36	A074	69,60	15,2	16	133	83	48	A152	193,10
7,5	8	91	53	36	A075	69,60	15,5	16	133	83	48	A155	193,10
7,6	8	91	53	36	A076	69,60	15,8	16	133	83	48	A158	193,10
7,7	8	91	53	36	A077	69,60	16,0	16	133	83	48	A160	193,10
7,8	8	91	53	36	A078	69,60							
7,9	8	91	53	36	A079	69,60							

3081 Silmax Norm 8xD

CARATTERISTICHE GEOMETRICHE
Affilatura frontale a 140°. Incisione a raggio frontale con distribuzione uniforme delle pressioni di taglio. Gole sagomate per la formazione e la evacuazione ottimale del truciolo. Finitura delle superfici ad elevata scorrevolezza. Onatura innovativa del tagliente .



GEOMETRICAL HIGHLIGHTS
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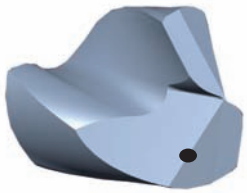
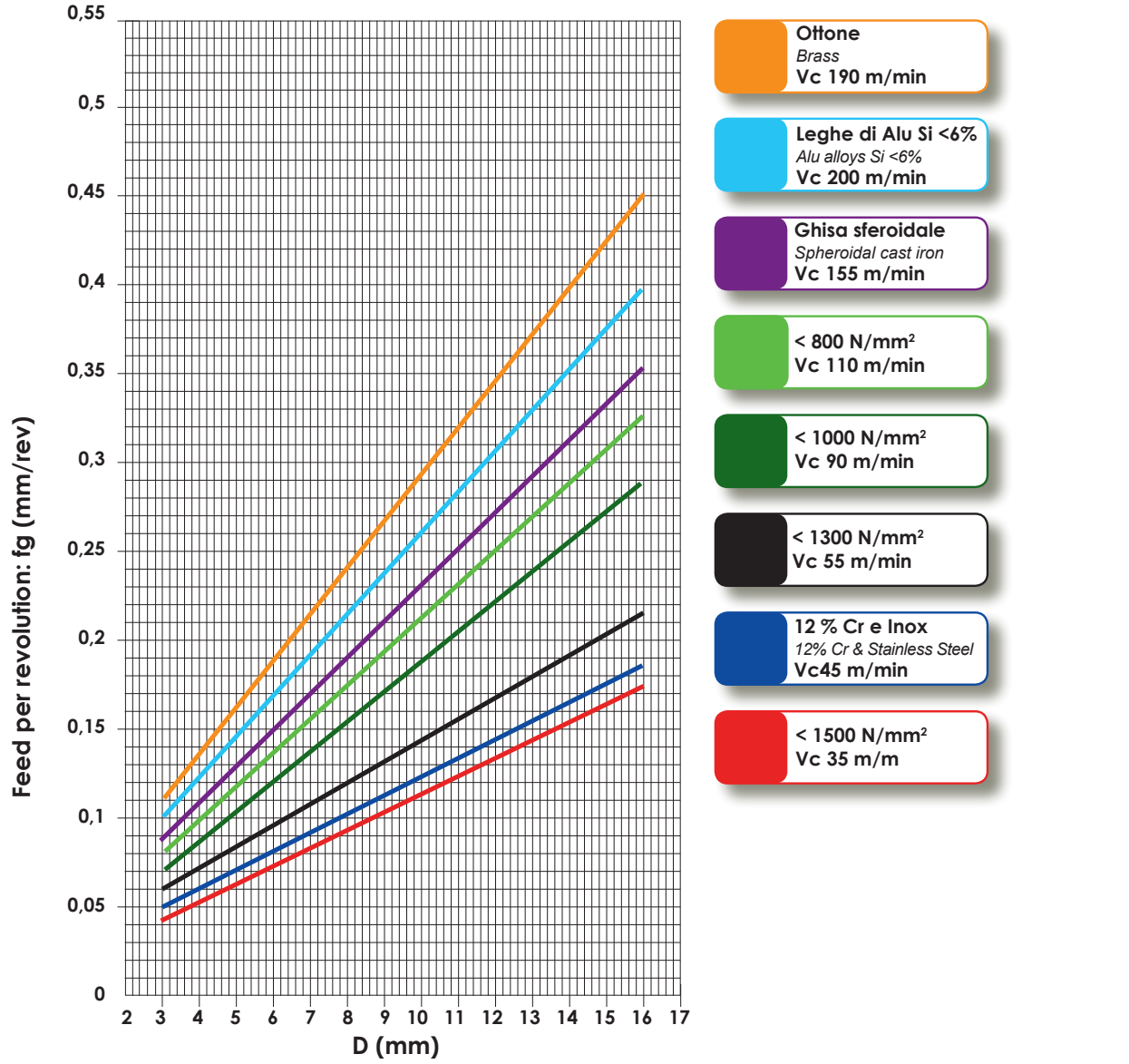


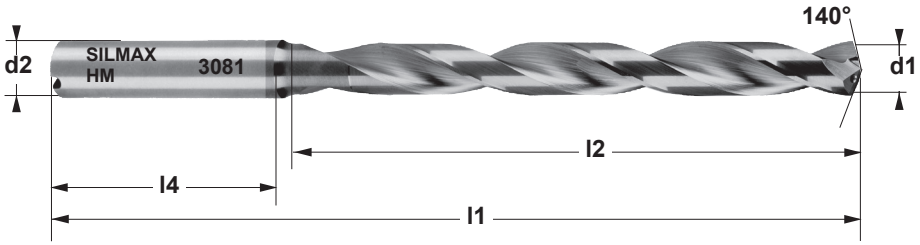
Con fori di lubrificazione
With Internal coolant supply
Mit Innenkühlung
Chłodzeniem wewnętrznego

Ultra fine | Silmax Norm | 140°



3081 Punte 8xD con fori

5xD drills with internal coolant supply



ATTACCHI DISPONIBILI CIL DIN 6535 HA

AVAILABLE SHANK STYLES

d1 h8	d2 h6	l1	l2	l4	3081	HMX €
4,0	6	82	44	36	A040	129,40
4,2	6	82	44	36	A042	129,40
4,5	6	82	44	36	A045	129,40
4,8	6	95	57	36	A048	129,40
5,0	6	95	57	36	A050	129,40
5,5	6	95	57	36	A055	129,40
5,8	6	95	57	36	A058	129,40
6,0	6	95	57	36	A060	129,40
6,5	8	114	76	36	A065	150,00
6,8	8	114	76	36	A068	150,00
7,0	8	114	76	36	A070	150,00
7,5	8	114	76	36	A075	150,00
7,8	8	114	76	36	A078	150,00
8,0	8	114	76	36	A080	150,00
8,5	10	138	96	40	A085	181,50
9,0	10	138	96	40	A090	181,50
9,5	10	138	96	40	A095	181,50
9,8	10	138	96	40	A098	181,50
10,0	10	138	96	40	A100	181,50
10,5	12	162	115	45	A105	239,40
11,0	12	162	115	45	A110	239,40
11,5	12	162	115	45	A115	239,40
12,0	12	162	115	45	A120	239,40
12,5	14	181	134	45	A125	338,20
13,0	14	181	134	45	A130	338,20
13,5	14	181	134	45	A135	338,20
14,0	14	181	134	45	A140	338,20
14,5	16	203	153	48	A145	423,60
15,0	16	203	153	48	A150	423,60
16,0	16	203	153	48	A160	423,60

Hss

Frese in Acciaio Super Rapido
Hss End Mills
HSS Fräser
Frezy ze stali HSS

FRESE IN ACCIAIO SINTERIZZATO PM

Powder Metal end mills
PM Fräser aus Sinterstahl
Frezy ze stali proszkowych

PM

FRESE A SGROSSARE

Roughing end mills
Schruppfräser
Frezy zgrubne

SGR

FRESE A FINIRE

Finishing end mills
Schlichtfräser
Frezy wykończeniowe

FIN

FRESE FRONTALI

Shell end mills
Stirnfräser
Frezy nasadzane

SHELL

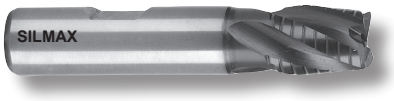
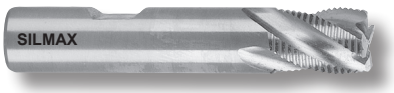
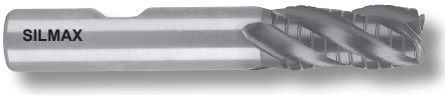
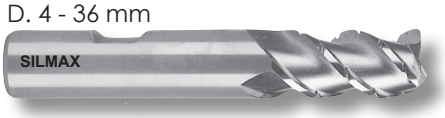
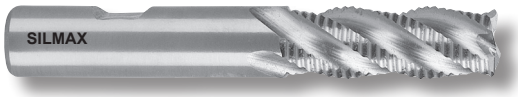
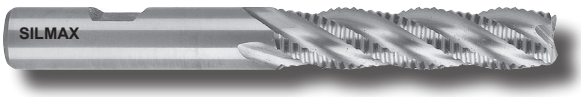
FRESE CON FORO

Shell end mills
Walzenstirnfräser
Frezy tarczowe

DISCO

PM FRESE A SGROSSARE IN POWDER METAL

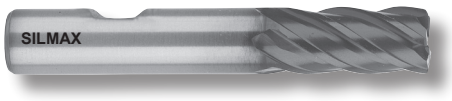
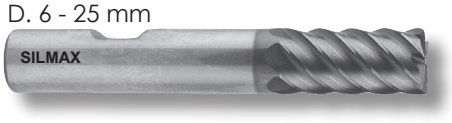
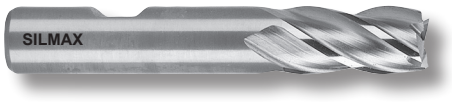
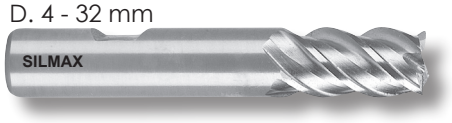
Powder Metal roughing end mills
PM Schruppfräser aus Sinterstahl
Frezy ze stali proszkowych

Cod.				Pag.
038S	D. 6 - 25 mm 	HSS PmCo	1641/I 327	135
		Z=4	λ 30°	
038A	D. 6 - 25 mm 	HSS PmCo	1641/I 327	135
		Z=4	λ 30°	
013S	D. 5 - 32 mm 	HSS PmCo	1641/I 844K	137
		Z=4/6	λ 30°	
013A	D. 5 - 40 mm 	HSS PmCo	1641/I 844K	137
		Z=4/6	λ 30°	
041A	D. 4 - 36 mm 	HSS PmCo	1641/I 844K	136
		Z=3/4	λ 40°	
093S	D. 6 - 25 mm 	HSS PmCo	Silmax Norm	138
		Z=4	λ 30°	
093A	D. 6 - 25 mm 	HSS PmCo	Silmax Norm	138
		Z=4	λ 30°	
023S	D. 6 - 32 mm 	HSS PmCo	1641/I 844L	139
		Z=4/6	λ 30°	
023A	D. 6 - 32 mm 	HSS PmCo	1641/I 844L	139
		Z=4/6	λ 30°	

PM

FRESE A FINIRE IN POWDER METAL

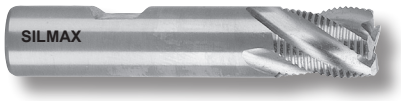
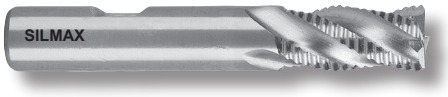
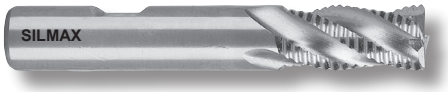
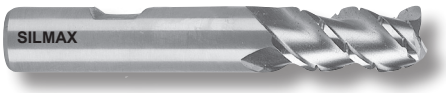
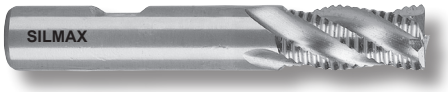
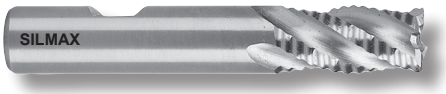
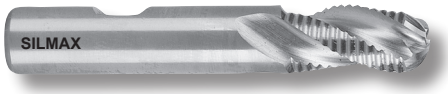
Powder Metal finishing end mills
PM Schlichtfräser aus Sinterstahl
Frezy ze stali proszkowych

Cod.				Pag.
113S	D. 6 - 32 mm 		HSS ASP2060 · 1641/I 844K · Z=5 · λ 28° 36°	141
143S	D. 6 - 25 mm 	HRC < 52	HSS ASP2060 · 1641/I 844K · Z=6 · λ 45° γ -10°	141
113A	D. 6 - 32 mm 		HSS PmCo · 1641/I 844K · Z=4/6 · λ 30°	142
118A	D. 4 - 32 mm 		HSS PmCo · 1641/I 844K · Z=4/6 · λ 40°	142
193A	D. 6 - 25 mm 		HSS PmCo · Silmax Norm · Z=4 · λ 30°	143
123A	D. 6 - 25 mm 		HSS PmCo · 1641/I 844L · Z=4 · λ 30°	143

SGR

FRESE A SGROSSARE IN M42Co8

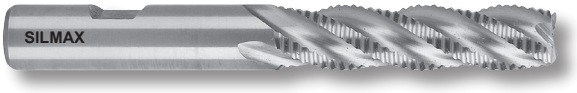
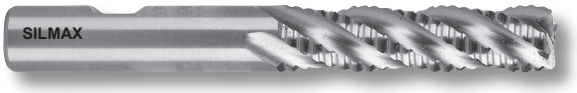
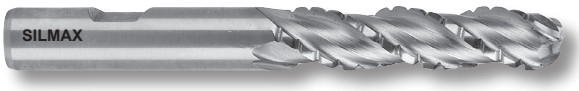
Roughing end mills
Schruppfräser
Frezy zgrubne

Cod.				Pag.
038F	D. 5 - 32 mm 	HSS M42Co8	1641/I 327	148
		Z=4/6	λ 30°	
011F	D. 6 - 40 mm 	HSS M42Co8	1641/I 844K	150
		Z=3	λ 30°	
015	D. 6 - 32 mm 	HSS M42Co8	1641/I 844K	152
		Z=3	λ 35°	
011B	D. 10 - 25 mm 	HSS M42Co8	1641/I 844K	152
		Z=3	λ 30°	
041	D. 6 - 32 mm 	HSS M42Co8	1641/I 844K	149
		Z=3/4	λ 40°	
013	D. 6 - 40 mm 	HSS M42Co8	1641/I 844K	151
		Z=4/6	λ 30°	
013F	D. 4,5 - 50 mm 	HSS M42Co8	1641/I 844K	151
		Z=4/6	λ 30°	
013R	D. 16 - 50 mm 	HSS M42Co8	1641/I 844K	149
		Z=4/6	λ 30°	
010B	D. 12 - 50 mm 	HSS M42Co8	1641/I 844K	150
		Z=4/6	λ 30°	
031F	D. 6 - 32 mm 	HSS M42Co8	1641/I 1889/1	153
		Z=3/6	λ 30°	

SGR

FRESE A SGROSSARE IN M42Co8

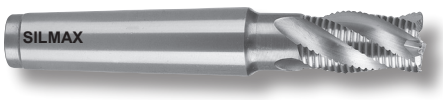
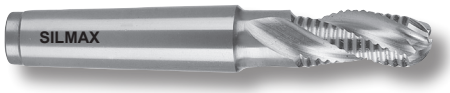
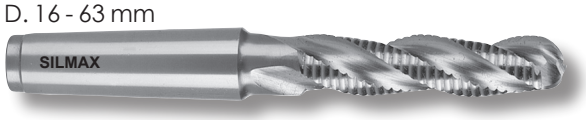
Roughing end mills
Schruppfräser
Frezy zgrubne

Cod.			Pag.
093F	D. 6 - 32 mm 	HSS M42Co8 · Silmax Norm · Z=4/6 · λ 30°	154
043	D. 6 - 25 mm 	HSS M42Co8 · Silmax Norm · Z=3/4 · λ 40°	154
023F	D. 6 - 40 mm 	HSS M42Co8 · 1641/I 844L · Z=4/6 · λ 30°	155
023	D. 6 - 25 mm 	HSS M42Co8 · 1641/I 844L · Z=4 · λ 30°	155
020B	D. 12 - 50 mm 	HSS M42Co8 · 1641/I 844L · Z=4/6 · λ 30°	156
025	D. 6 - 40 mm 	HSS M42Co8 · 1641/I 844L · Z=3 · λ 35°	156
030F	D. 6 - 32 mm 	HSS M42Co8 · 1641/I 1889/1 · Z=3/6 · λ 30°	157
035	D. 8 - 40 mm 	HSS M42Co8 · 1641/I 1889/1 · Z=3 · λ 35°	157

SGR

FRESE A SGROSSARE IN M42Co8

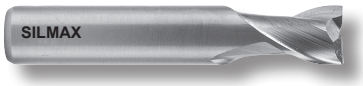
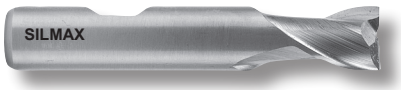
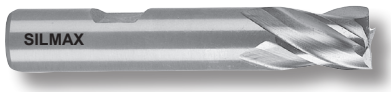
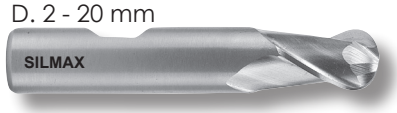
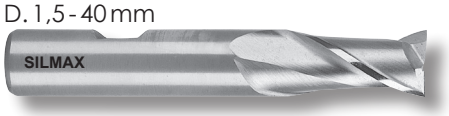
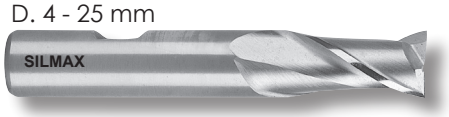
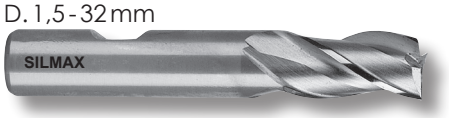
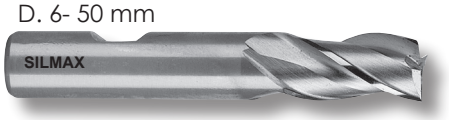
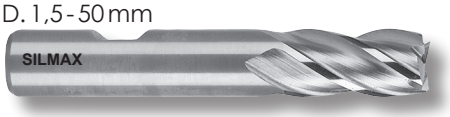
Roughing end mills
Schruppfräser
Frezy zgrubne

Cod.				Pag.
052F	D. 16 - 40 mm 	HSS M42Co8	1641/II 845K	158
		Z=4/6	λ 30°	
058B	D. 16 - 36 mm 	HSS M42Co8	1641/II 845K	159
		Z=3	λ 30°	
050B	D. 16 - 63 mm 	HSS M42Co8	1641/II 845K	159
		Z=4/6	λ 30°	
068B	D. 16 - 36 mm 	HSS M42Co8	1641/I 845L	160
		Z=3	λ 30°	
060B	D. 16 - 50 mm 	HSS M42Co8	1641/I 845L	160
		Z=4/6	λ 30°	
075F	D. 16 - 50 mm 	HSS M42Co8	1641/II 1889/2	161
		Z=4/6	λ 30°	
070F	D. 16 - 63 mm 	HSS M42Co8	1641/II 1889/2	161
		Z=4/8	λ 30°	

FIN

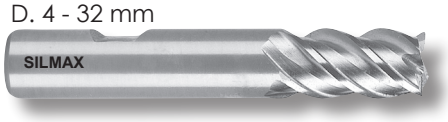
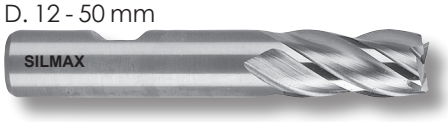
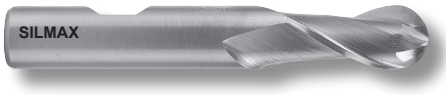
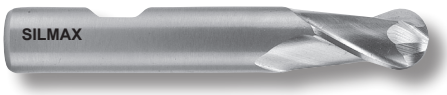
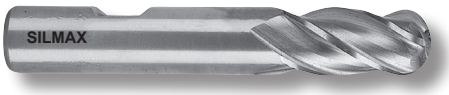
FRESE A FINIRE IN M42Co8

Finishing end mills
Schlichtfräser
Frezy wykończeniowe

Cod.			Pag.
730	D. 0,5 - 5,5 mm 	HSS M42Co8 · Silmax Norm · Z=2 · λ 30°	168
731	D. 1,5 - 40 mm 	HSS M42Co8 · 1641/I 327 · Z=2 · λ 30°	166
735	D. 1,5 - 20 mm 	HSS M42Co8 · 1641/I 327 · Z=2 · λ 30°	166
108	D. 1,0 - 20 mm 	HSS M42Co8 · 1641/I 327 · Z=3 · λ 30°	169
138	D. 5 - 32 mm 	HSS M42Co8 · 1641/I 327 · Z=4/6 · λ 30°	169
738	D. 2 - 20 mm 	HSS M42Co8 · 1641/I 327 · Z=2 · λ 30°	175
171	D. 1,5 - 40 mm 	HSS M42Co8 · 1641/I 844K · Z=2 · λ 30°	170
173	D. 4 - 25 mm 	HSS M42Co8 · 1641/I 844K · Z=2 · λ 35°	170
111	D. 1,5 - 32 mm 	HSS M42Co8 · 1641/I 844K · Z=3 · λ 30°	171
115	D. 6- 50 mm 	HSS M42Co8 · 1641/I 844K · Z=3 · λ 35°	172
113	D. 1,5 - 50 mm 	HSS M42Co8 · 1641/I 844K · Z=4/6 · λ 30°	173
113R	D. 16-25 mm 	HSS M42Co8 · 1641/I 844K · Z=4 · λ 30°	173

FIN
FRESE A FINIRE IN M42Co8

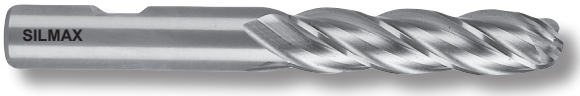
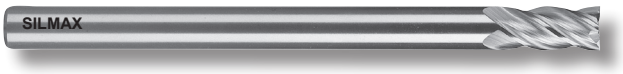
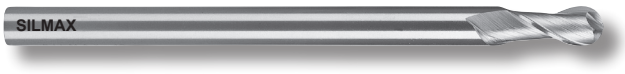
Finishing end mills
Schlichtfräser
Frezy wykończeniowe

Cod.				Pag.
118	D. 4 - 32 mm 	HSS M42Co8	1641/I 844K	174
		Z=4/6	λ 40°	
110	D. 12 - 50 mm 	HSS M42Co8	1641/I 844K	172
		Z=4/8	λ 30°	
737	D. 0,5 - 20 mm 	HSS M42Co8	1641/I 1889/1	176
		Z=2	λ 30°	
134	D. 4 - 20 mm 	HSS M42Co8	1641/I 1889/1	176
		Z=2	λ 35°	
131	D. 6 - 32 mm 	HSS M42Co8	1641/I 1889/1	177
		Z=4/6	λ 30°	
193	D. 6 - 32 mm 	HSS M42Co8	Silmax Norm	178
		Z=4/6	λ 30°	
121	D. 6 - 25 mm 	HSS M42Co8	Silmax Norm	178
		Z=4/6	λ 40°	
1712	D. 6 - 40 mm 	HSS M42Co8	1641/I 844L	179
		Z=2	λ 30°	
174	D. 6 - 25 mm 	HSS M42Co8	1641/I 844L	179
		Z=2	λ 35°	
128	D. 3 - 20 mm 	HSS M42Co8	1641/I 844L	180
		Z=3	λ 30°	
125	D. 6 - 40 mm 	HSS M42Co8	1641/I 844L	180
		Z=3	λ 35°	

FIN

FRESE A FINIRE IN M42Co8

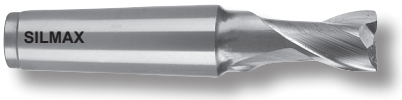
Finishing end mills
Schlichtfräser
Frezy wykończeniowe

Cod.			Pag.
120	D. 12 - 50 mm 	HSS M42Co8 · 1641/I 844L · Z=4/8 · λ 30°	181
123	D. 6 - 50 mm 	HSS M42Co8 · 1641/I 844L · Z=4/6 · λ 30°	181
130	D. 6 - 32 mm 	HSS M42Co8 · 1641/I 1889/1 · Z=4/6 · λ 30°	182
135	D. 8 - 40 mm 	HSS M42Co8 · 1641/I 1889/1 · Z=3 · λ 35°	182
145	D. 6 - 25 mm 	HSS M42Co8 · Silmax Norm · Z=4 · λ 30°	188
146	D. 6 - 20 mm 	HSS M42Co8 · Silmax Norm · Z=2 · λ 30°	188
147	D. 6 - 25 mm 	HSS M42Co8 · Silmax Norm · Z=4 · λ 30°	189
148	D. 6 - 20 mm 	HSS M42Co8 · Silmax Norm · Z=2 · λ 30°	189

FIN

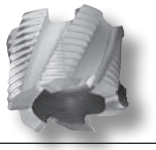
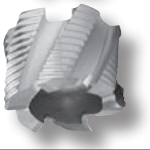
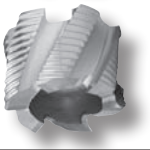
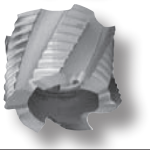
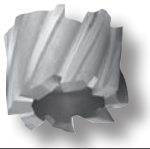
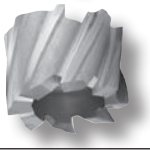
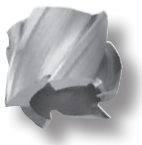
FRESE A FINIRE IN M42Co8

Finishing end mills
Schlichtfräser
Frezy wykończeniowe

Cod.			Pag.
750	D. 10 - 40 mm 	HSS M42Co8 · 1641/II 326 · Z=2 · λ 30°	183
158	D. 16 - 32 mm 	HSS M42Co8 · 1641/II 845K · Z=3 · λ 35°	185
152	D. 16 - 45 mm 	HSS M42Co8 · 1641/II 845K · Z=4/6 · λ 30°	185
175	D. 16 - 40 mm 	HSS M42Co8 · 1641/II 1889/2 · Z=4/6 · λ 30°	184
160	D. 16 - 50 mm 	HSS M42Co8 · 1641/II 845L · Z=4/8 · λ 30°	186
168	D. 16 - 32 mm 	HSS M42Co8 · 1641/II 845L · Z=3 · λ 35°	186
170	D. 16 - 50 mm 	HSS M42Co8 · 1641/II 1889/2 · Z=4/8 · λ 30°	187

SHELL FRESE FRONTALI

Shell end mills
Stirnfräser
Frezy nasadzane

Cod.				Pag.
080S	D. 40 - 100 mm		HSS PmCo, λ 30°, ISO 2586, DIN 1880	193
080A	D. 40 - 100 mm		HSS PmCo, λ 30°, ISO 2586, DIN 1880	193
080F	D. 40 - 125 mm		HSS M42Co8, λ 30°, ISO 2586, DIN 1880 841	194
080B	D. 40 - 160 mm		HSS M42Co8, λ 30°, ISO 2586, DIN 1880 841	194
080	D. 40 - 100 mm		HSS M42Co8, λ 30°, ISO 2586, DIN 1880 841	192
085	D. 40 - 100 mm		HSS M42Co8, λ 38°, ISO 2586, DIN 1880	192
180A	D. 40 - 100 mm		HSS PmCo, λ 30°, ISO 2586, DIN 1880	195
180	D. 40 - 160 mm		HSS M42Co8, λ 30°, ISO 2586, DIN 1880 841	195
185	D. 40 - 100 mm		HSS M42Co8, λ 38°, ISO 2586, DIN 1880	196

DISCO FRESE CON FORO

Shell end mills
Walzenstirnfräser
Frezy tarczowe

Cod.				Pag.
101		**Frese a disco** Side milling cutters Scheibenfräser Frezy krążkowe	HSSCo λ 12° ISO 2587 DIN 885A	199
102		**Frese a disco** Side milling cutters Scheibenfräser Frezy krążkowe	HSSCo λ 0° ISO 2587 DIN 885B	198
10A		**Frese ad angolo** Double angle cutters Prismenfräser Frezy krążkowe kątowe	HSSCo λ 0° ISO 6108 DIN 847	201
10B		**Frese ad angolo** Double angle cutters Prismenfräser Frezy krążkowe kątowe	HSSCo λ 0° DIN 842A	201
10E		**Frese semicircolari** Half circle cutters Halbkreisfräser Frezy krążkowe półokrągłe	HSSCo λ 0° ISO 3860 DIN 856 CONVESSO	200
10F		**Frese semicircolari** Half circle cutters Halbkreisfräser Frezy krążkowe półokrągłe	HSSCo λ 0° ISO 3860 DIN 855A CONCAVO	200

PM

FRESE IN ACCIAIO SINTERIZZATO POWDER METAL

POWDER METAL END MILLS

PM FRÄSER AUS SINTERSTAHL

FREZY ZE STALI PROSZKOWYCH

Steel <800 N/mm²

AIR MQL MAX

	PMCoS NIG			*SIL F2000* NIG			PMCoS SIL			PMCoS NIG			*SIL F2000* NIG			PMCoS SIL		
																		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,012	220	4460	0,021	380	4460	0,012	130	2670	0,025	450	4460	0,042	750	4460	0,024	260	2670
8,0	0,019	250	3340	0,031	420	3340	0,018	140	2000	0,035	470	3340	0,059	790	3340	0,035	280	2000
10,0	0,029	310	2680	0,049	520	2680	0,028	180	1600	0,045	480	2680	0,076	810	2680	0,044	280	1600
12,0	0,037	330	2230	0,063	560	2230	0,036	190	1330	0,056	500	2230	0,094	840	2230	0,055	290	1330
16,0	0,049	330	1670	0,084	560	1670	0,048	190	1000	0,075	500	1670	0,126	840	1670	0,073	290	1000
20,0	0,063	340	1340	0,104	560	1340	0,063	200	800	0,095	510	1340	0,159	850	1340	0,094	300	800
25,0	0,077	330	1070	0,131	560	1070	0,074	190	640	0,117	500	1070	0,199	850	1070	0,113	290	640

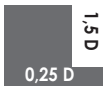
Steel <1000 N/mm²

AIR MQL MAX

	PMCoS NIG			*SIL F2000* NIG			PMCoS SIL			PMCoS NIG			*SIL F2000* NIG			PMCoS SIL		
																		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,012	190	4030	0,020	290	3660	0,011	110	2410	0,024	380	4030	0,040	580	3660	0,023	220	2410
8,0	0,018	220	3030	0,030	330	2750	0,018	130	1810	0,033	400	3030	0,056	620	2750	0,032	230	1810
10,0	0,027	260	2420	0,045	400	2200	0,026	150	1450	0,042	410	2420	0,072	630	2200	0,041	240	1450
12,0	0,036	290	2020	0,060	440	1830	0,035	170	1210	0,053	430	2020	0,089	650	1830	0,052	250	1210
16,0	0,048	290	1510	0,080	440	1370	0,047	170	900	0,071	430	1510	0,119	650	1370	0,069	250	900
20,0	0,060	290	1210	0,100	440	1100	0,059	170	720	0,091	440	1210	0,150	660	1100	0,090	260	720
25,0	0,075	290	970	0,125	440	880	0,073	170	580	0,113	440	970	0,188	660	880	0,112	260	580

Steel <1300 N/mm²

AIR MQL MAX

	PMCoS NIG			*SIL F2000* NIG			PMCoS SIL			PMCoS NIG			*SIL F2000* NIG			PMCoS SIL		
																		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	min	mm/z	mm/min	min	mm/z	mm/min	min	mm/z	mm/min	min	mm/z	mm/min	min	mm/z	mm/min	min
6,0	0,011	130	3080	0,018	200	2810	0,010	70	1840	0,021	260	3080	0,036	400	2810	0,020	150	1840
8,0	0,016	150	2310	0,027	230	2110	0,014	80	1380	0,029	270	2310	0,050	420	2110	0,029	160	1380
10,0	0,024	180	1850	0,041	280	1690	0,023	100	1110	0,038	280	1850	0,064	430	1690	0,036	160	1110
12,0	0,032	200	1540	0,053	300	1410	0,030	110	920	0,047	290	1540	0,080	450	1410	0,046	170	920
16,0	0,043	200	1150	0,071	300	1050	0,043	120	690	0,063	290	1150	0,107	450	1050	0,062	170	690
20,0	0,054	200	920	0,089	300	840	0,050	110	550	0,082	300	920	0,137	460	840	0,077	170	550
25,0	0,064	190	740	0,110	300	680	0,063	110	440	0,101	300	740	0,169	460	680	0,097	170	440

Steel 12 % Cr

MAX

	PMCoS NIG			*SIL F2000* NIG			PMCoS SIL			PMCoS NIG			*SIL F2000* NIG			PMCoS SIL		
																		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	min	mm/z	mm/min	min	mm/z	mm/min	min	mm/z	mm/min	min	mm/z	mm/min	min	mm/z	mm/min	min
6,0	0,009	70	1910	0,015	110	1800	0,009	40	1140	0,018	140	1910	0,032	230	1800	0,018	80	1140
8,0	0,014	80	1430	0,024	130	1350	0,012	40	850	0,026	150	1430	0,044	240	1350	0,024	80	850
10,0	0,022	100	1150	0,037	160	1080	0,022	60	690	0,035	160	1150	0,056	240	1080	0,033	90	690
12,0	0,029	110	960	0,047	170	900	0,026	60	570	0,042	160	960	0,069	250	900	0,039	90	570
16,0	0,038	110	720	0,063	170	680	0,035	60	430	0,056	160	720	0,096	260	680	0,052	90	430
20,0	0,048	110	570	0,079	170	540	0,044	60	340	0,070	160	570	0,120	260	540	0,066	90	340
25,0	0,060	110	460	0,099	170	430	0,056	60	270	0,087	160	460	0,151	260	430	0,083	90	270

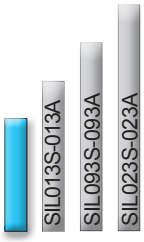
+20%	Serie CORTA	SHORT	KURZ	KRÓTKA
=	Serie NORMALE,	REGULAR	NORMAL	NORMALNA
-20%	Serie MEDIA,	MEDIUM	MITTLERE	WYD□U□ONA
-40%	Serie LUNGA	LONG	LANG	D□UGA

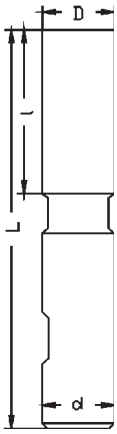
SILMAX

038S Frese a sgrossare serie corta
Roughing end mills, short series

SIL F2000

038A Frese a sgrossare serie corta
Roughing end mills, short series





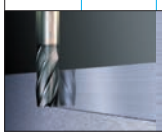
ISO 1641/I
DIN 327

HSS PMCoS
HPC SILF2000
λ 30°
45°

HSS PMCoS
HR X Fine
λ 30°
45°

Uncoated

D	d	L	l			038S		NIG	Z	038A	SIL	NIG	Z
k12	h6							€			€	€	
6	6	52	8			038S06		46,60	4	038A06	32,30	37,20	4
8	10	61	11			038S08		58,10	4	038A08	37,60	46,90	4
10	10	63	13			038S10		59,20	4	038A10	38,60	47,80	4
12	12	73	16			038S12		68,30	4	038A12	45,10	54,90	4
14	12	73	16			038S14		81,20	4	038A14	55,30	65,10	4
						038S16		90,20	4				
16	16	79	19			038S18		106,80	4	038A16	60,30	72,90	4
18	16	79	19			038S20		120,10	4	038A18	71,00	86,10	4
20	20	88	22			038S25		175,00	4	038A20	78,00	97,30	4
25	25	102	26							038A25	114,80	141,70	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.134

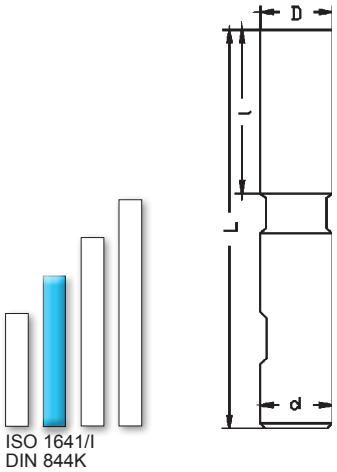
Lavorazioni, Machining Process

Lavorazioni, Machining Process

SILMAX

041A Frese a sgrossare e semifinire serie normale

Roughing and semifinishing end mills



ISO 1641/I
DIN 844K

HSS PMCoS

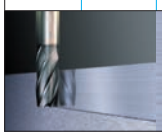
HN40

λ 40°

45°

Uncoated

D	d	L	l	041A	SIL	NIG	Z
k10	h6				€	€	
4	6	55	11	041A04	28,60	34,00	3
5	6	57	13	041A05	28,60	34,00	3
6	6	57	13	041A06	28,60	34,00	3
7	10	66	16	041A07	43,10	52,10	3
8	10	69	19	041A08	37,60	46,90	3
9	10	69	19	041A09	44,60	53,80	3
10	10	72	22	041A10	38,60	47,80	3
11	12	79	22	041A11	52,60	62,40	3
12	12	83	26	041A12	46,20	56,00	3
14	12	83	26	041A14	60,30	71,80	3
16	16	92	32	041A16	65,00	80,20	3
18	16	92	32	041A18	79,00	98,40	3
20	20	104	38	041A20	85,50	105,50	4
22	20	104	38	041A22	120,20	145,80	4
24	25	121	45	041A24	123,70	152,50	4
25	25	121	45	041A25	129,40	157,30	4
26	25	121	45	041A26	147,00	180,70	4
28	25	121	45	041A28	156,80	189,60	4
30	25	121	45	041A30	169,50	201,90	4
32	32	133	53	041A32	213,40	245,60	4
36	32	133	53	041A36	236,60	279,10	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.134

Lavorazioni, Machining Process

SILMAX

013S Frese a sgrossare serie normale
Roughing end mills, standard series

SIL F2000

HSS PMCoS

HPC SILF2000

λ 30°

45°

013A Frese a sgrossare serie normale
Roughing end mills, standard series

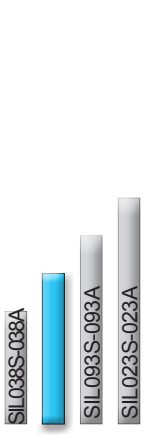
HSS PMCoS

HR X Fine

λ 30°

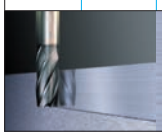
45°

Uncoated



ISO 1641/I
DIN 844K

D	d	L	l			013S		NIG	Z	013A	SIL	NIG	Z
k12	h6							€			€	€	
5	6	57	13			013S05		49,30	4	013A05	33,90	39,40	4
6	6	57	13			013S06		49,30	4	013A06	33,90	39,40	4
7	10	66	16			013S07		66,50	4	013A07	44,00	53,30	4
8	10	69	19			013S08		61,10	4	013A08	39,80	48,90	4
9	10	69	19			013S09		66,50	4	013A09	44,00	53,30	4
10	10	72	22			013S10		62,80	4	013A10	40,90	50,10	4
11	12	79	22			013S11		75,60	4	013A11	50,00	59,60	4
12	12	83	26			013S12		74,50	4	013A12	49,30	59,10	4
13	12	83	26			013S13		96,40	4	013A13	66,00	75,80	4
14	12	83	26			013S14		91,60	4	013A14	63,30	74,40	4
15	12	83	26			013S15		101,80	4	013A15	71,40	82,40	4
16	16	92	32			013S16		101,80	4	013A16	66,50	81,90	4
17	16	92	32			013S17		133,60	4	013A17	86,90	106,50	4
18	16	92	32			013S18		123,70	4	013A18	80,00	99,50	4
19	16	92	32			013S19		147,00	4	013A19	97,60	117,20	4
20	20	104	38			013S20		136,10	4	013A20	89,10	108,60	4
22	20	104	38			013S22		178,10	4	013A22	117,10	142,00	4
25	25	121	45			013S25		199,40	4	013A25	131,50	159,50	4
28	25	121	45			013S28		236,60	6	013A28	164,70	197,70	6
30	25	121	45			013S30		256,70	6	013A30	182,90	215,90	6
32	32	133	53			013S32		304,90	6	013A32	216,70	249,60	6
36	32	133	53							013A36	252,20	296,60	6
40	40	155	63							013A40	302,40	384,30	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.134

Lavorazioni, Machining Process

Lavorazioni, Machining Process

SILMAX

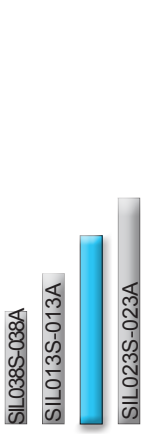
093S Frese a sgrossare serie media
Roughing end mills, medium series
SIL F2000

HSS PMCoS
HPC SILF2000
λ 30°
45°

093A Frese a sgrossare serie media
Roughing end mills, medium series

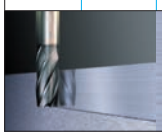
HSS PMCoS
HR X Fine
λ 30°
45°

Uncoated



Silmax Norm

D	d	L	l			093S		NIG	Z	093A	SIL	NIG	Z
k12	h6							€			€	€	
6	6	62	18			093S06		51,90	4	093A06	34,90	41,60	4
8	10	75	25			093S08		64,70	4	093A08	43,10	52,10	4
10	10	83	33			093S10		70,90	4	093A10	44,60	58,10	4
12	12	96	39			093S12		84,30	4	093A12	54,70	68,20	4
14	12	96	39			093S14		103,70	4	093A14	68,80	83,30	4
16	16	105	45			093S16		114,70	4	093A16	76,20	92,70	4
18	16	105	45			093S18		130,50	4	093A18	89,50	108,90	4
20	20	121	55			093S20		158,50	4	093A20	106,60	132,10	4
22	20	121	55			093S22		193,80	4	093A22	131,00	164,50	4
25	25	141	65			093S25		252,50	4	093A25	167,90	203,30	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.134

Lavorazioni, Machining Process

Lavorazioni, Machining Process

SILMAX

023S Frese a sgrossare serie lunga
Roughing end mills, long series

SIL F2000

HSS PMCoS

HPC SILF2000

λ 30°

45°

023A Frese a sgrossare serie lunga
Roughing end mills, long series

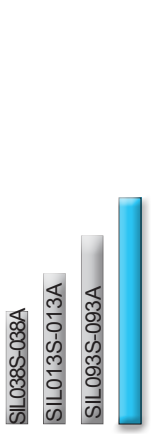
HSS PMCoS

HR X Fine

λ 30°

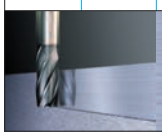
45°

Uncoated



ISO 1641/I
DIN 844L

D	d	L	l			023S		NIG	Z	023A		SIL	NIG	Z
k12	h6							€				€	€	
6	6	68	24			023S06		66,50	4	023A06		45,60	52,90	4
8	10	88	38			023S08		81,80	4	023A08		53,30	65,90	4
10	10	95	45			023S10		84,80	4	023A10		54,30	67,80	4
12	12	110	53			023S12		100,60	4	023A12		66,50	80,00	4
14	12	110	53			023S14		122,10	4	023A14		84,30	110,70	4
16	16	123	63			023S16		132,50	4	023A16		88,00	105,20	4
18	16	123	63			023S18		165,80	4	023A18		107,40	133,00	4
20	20	141	75			023S20		180,60	4	023A20		118,60	144,20	4
22	20	141	75			023S22		245,70	4	023A22		162,00	195,60	4
25	25	166	90			023S25		286,40	4	023A25		192,60	228,00	4
30	25	166	90			023S30		379,90	6	023A30		266,60	320,10	6
32	32	186	106			023S32		455,40	6	023A32		292,80	380,60	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.134

Lavorazioni, Machining Process

Lavorazioni, Machining Process

Steel <800 N/mm² — AIR MQL MAX

	NIG113S			NIG113A			NIG118A		
									
D	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,020	1080	9600	0,020	330	4460	0,020	330	4460
8,0	0,030	1120	7200	0,040	500	3340	0,040	500	3340
10,0	0,040	1170	5700	0,050	540	2680	0,050	540	2680
12,0	0,050	1230	4800	0,060	540	2230	0,060	540	2230
16,0	0,070	1260	3600	0,080	540	1670	0,080	540	1670
20,0	0,090	1320	2900	0,100	550	1340	0,070	550	1340
25,0	0,120	1420	2300	0,130	540	1070	0,080	540	1070

Steel <1000 N/mm² — AIR MQL MAX

	NIG113S			NIG113A			NIG118A		
									
D	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,020	1080	9600	0,020	290	4030	0,020	290	4030
8,0	0,030	1120	7200	0,040	430	3030	0,040	430	3030
10,0	0,040	1170	5700	0,050	460	2420	0,050	460	2420
12,0	0,050	1230	4800	0,060	460	2020	0,060	460	2020
16,0	0,070	1260	3600	0,080	470	1510	0,080	470	1510
20,0	0,090	1320	2900	0,100	470	1210	0,060	470	1210
25,0	0,120	1420	2300	0,120	460	970	0,080	460	970

Steel <1300 N/mm² — AIR MQL MAX

	NIG113S			NIG113A			NIG118A			NIG143S		
												
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,015	650	8000	0,020	200	3080	0,020	200	3080	0,035	1670	8000
8,0	0,020	700	6000	0,030	290	2310	0,030	290	2310	0,040	1430	6000
10,0	0,030	750	4800	0,040	310	1850	0,040	310	1850	0,050	1420	4800
12,0	0,040	800	4000	0,050	310	1540	0,050	310	1540	0,060	1400	4000
16,0	0,060	850	3000	0,070	320	1150	0,070	320	1150	0,075	1350	3000
20,0	0,075	900	2400	0,090	320	920	0,060	320	920	0,090	1300	2400
25,0	0,100	1000	1900	0,100	310	740	0,070	310	740	0,100	1150	1900

HRC < 52 — AIR

	NIG143S		
			
D	fz	F	n
mm	mm/z	mm/min	rpm
6,0	0,025	800	5300
8,0	0,030	720	4000
10,0	0,040	770	3200
12,0	0,040	640	2700
16,0	0,050	600	2000
20,0	0,060	580	1600
25,0	0,070	550	1300

Steel 12 % Cr — MAX

	NIG113S			NIG113A					
									
D	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,020	400	4800	0,010	110	1910	0,010	110	1910
8,0	0,020	440	3600	0,030	160	1430	0,030	160	1430
10,0	0,030	455	2900	0,040	170	1150	0,040	170	1150
12,0	0,040	465	2400	0,040	170	960	0,040	170	960
16,0	0,060	495	1800	0,060	180	720	0,060	180	720
20,0	0,070	525	1500	0,080	180	570	0,050	180	570
25,0	0,090	545	1200	0,090	170	460	0,060	170	460

+20%	Serie CORTA	SHORT	KURZ	KRÓTKA
=	Serie NORMALE,	REGULAR	NORMAL	NORMALNA
-20%	Serie MEDIA,	MEDIUM	MITTLERE	WYD□U□ONA
-40%	Serie LUNGA	LONG	LANG	D□UGA

SILMAX

113S Frese per finitura HPC ad Alta Velocità
End mills for finishing HPC in high speed

HSS ASP2060

HPC SILF2000

λ28°/36°

90°

143S Frese per finitura HPC fino a 52 HRC
End mills for finishing HPC up to 52 HRC

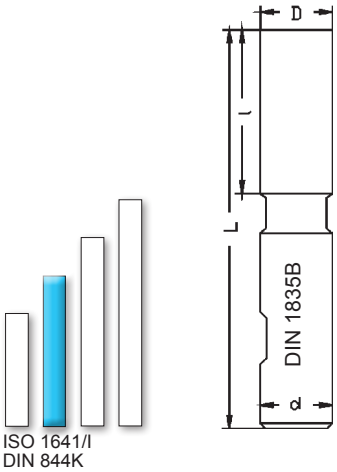
HRC < 52

HSS ASP2060

HPC SILF2000

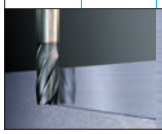
λ 45°
γ-10°

90°



ISO 1641/I
DIN 844K

D	d	L	l	113S	NIG	Z	143S	NIG	Z
k10	h6				€			€	
6	6	57	13	113S06	33,10	5	143S06	33,10	6
7	10	66	16	113S07	44,70	5			
8	10	69	19	113S08	40,90	5	143S08	40,90	6
9	10	69	19	113S09	45,50	5			
10	10	72	22	113S10	42,10	5	143S10	42,10	6
11	12	79	22	113S11	52,30	5			
12	12	83	26	113S12	49,30	5	143S12	49,30	6
13	12	83	26	113S13	69,10	5			
14	12	83	26	113S14	66,10	5			
15	12	83	26	113S15	74,60	5			
16	16	92	32	113S16	75,90	5	143S16	75,90	6
17	16	92	32	113S17	96,60	5			
18	16	92	32	113S18	90,00	5			
19	16	92	32	113S19	107,50	5			
20	20	104	38	113S20	100,00	5	143S20	103,50	6
22	20	104	38	113S22	136,80	5			
25	25	121	45	113S25	156,10	5	143S25	164,50	6
28	25	121	45	113S28	194,10	5			
30	25	121	45	113S30	217,90	5			
32	25	133	53	113S32	255,10	5			



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.140

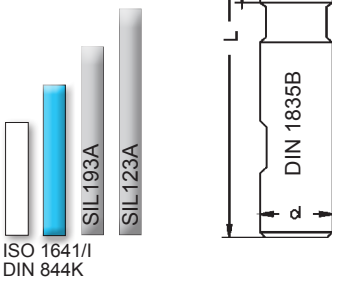
Lavorazioni, Machining Process

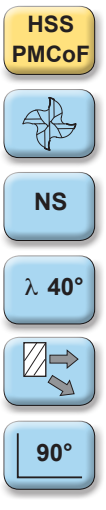
Lavorazioni, Machining Process

SILMAX

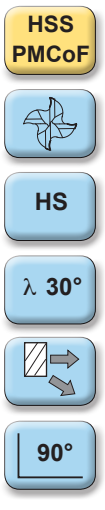
118A Frese a finire serie normale
End mills for finishing, standard series

113A Frese a finire serie normale
End mills for finishing, standard series



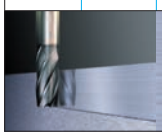


Uncoated



Uncoated

D	d	L	l			118A	SIL	NIG	Z	113A	SIL	NIG	Z
k10	h6						€	€			€	€	
4	6	55	11			118A04	25,50	31,00	4				
5	6	57	13			118A05	25,50	31,00	4				
6	6	57	13			118A06	25,50	31,00	4	113A06	24,40	30,00	4
7	10	66	16			118A07	35,10	44,40	4	113A07	31,00	40,60	4
8	10	69	19			118A08	31,30	40,50	4	113A08	27,90	37,20	4
9	10	69	19			118A09	35,60	44,70	4	113A09	32,20	41,40	4
10	10	72	22			118A10	33,00	42,10	4	113A10	29,10	38,20	4
11	12	79	22							113A11	37,10	47,60	4
12	12	83	26			118A12	39,80	49,60	4	113A12	35,20	44,90	4
13	12	83	26							113A13	51,70	62,70	4
14	12	83	26			118A14	49,30	60,50	4	113A14	49,10	60,30	4
15	12	83	26							113A15	56,50	67,80	4
16	16	92	32			118A16	60,30	75,40	4	113A16	52,30	68,90	4
17	16	92	32							113A17	68,00	87,80	4
18	16	92	32			118A18	74,80	93,00	4	113A18	62,30	81,80	4
19	16	92	32							113A19	78,10	97,60	4
20	20	104	38			118A20	99,40	118,90	6	113A20	71,60	90,80	4
22	20	104	38			118A22	125,10	149,50	6	113A22	99,40	124,30	4
25	25	121	45			118A25	144,30	172,40	6	113A25	119,10	147,20	4
28	25	121	45			118A28	168,50	200,70	6	113A28	143,50	176,30	6
30	25	121	45			118A30	181,20	244,40	6	113A30	161,60	198,20	6
32	32	133	53			118A32	250,50	283,50	6	113A32	195,50	231,90	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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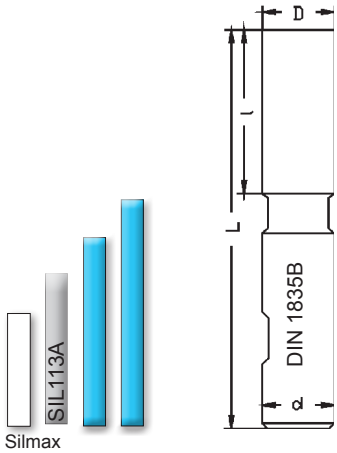
Lavorazioni, Machining Process

Lavorazioni, Machining Process



193A Frese a finire serie media
End mills for finishing, medium series

HSS PMCoF
HS
λ 30°
90°

123A Frese a finire serie lunga
End mills for finishing, long series

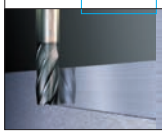
HSS PMCoF
HS
λ 30°
90°

Uncoated

D	d	L	l	193A	SIL	NIG	Z
k10	h6				€	€	
6	6	62	18	193A06	25,50	32,20	4
8	10	75	25	193A08	31,20	40,40	4
10	10	83	33	193A10	32,90	46,20	4
12	12	96	39	193A12	43,00	56,30	4
14	12	96	39	193A14	54,60	69,10	4
16	16	105	45	193A16	62,10	78,50	4
18	16	105	45	193A18	71,80	91,20	4
20	20	121	55	193A20	88,90	114,40	4
22	20	121	55	193A22	113,30	146,80	4
25	25	141	65	193A25	150,30	185,60	4

Uncoated

D	d	L	l	123A	SIL	NIG	Z
k10	h6				€	€	
6	6	68	24	123A06	36,30	43,60	4
8	10	88	38	123A08	41,40	54,20	4
10	10	95	45	123A10	42,40	55,90	4
12	12	110	53	123A12	52,30	65,80	4
14	12	110	53	123A14	58,10	73,30	4
16	16	123	63	123A16	73,90	90,90	4
18	16	123	63	123A18	89,70	115,30	4
20	20	141	75	123A20	100,80	126,50	4
22	20	141	75	123A22	144,30	177,90	4
25	25	166	90	123A25	174,90	210,30	4



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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Lavorazioni, Machining Process

Lavorazioni, Machining Process

Lavorazione di Acciai

Steels, Stähle, Stale

Gruppo		Nr	DIN	Gruppo	Nr	DIN
Steel < 800 N/mm²	Non legati < 800 N/mm²	1.1231	Ck67	Legati < 800 N/mm²	1.5026	55Si7
		1.1248	Ck75		1.7176	55Cr3
		1.1274	Ck101		1.8159	50CrV4
		1.0402	C22		1.3505	100Cr6
		1.0406	C25		1.6546	40NiCrMo2 2
		1.0501	C35		1.7218	25CrMo4
		1.0503	C45		1.7220	34CrMo4
		1.1133	20Mn5		1.7223	41CrMo4
	Legati < 800 N/mm²	1.7015	15Cr3			
		1.5752	14NiCr14			
		1.5919	15CrNi6			
		1.6523	21NiCrMo2			
		1.6587	17CrNiMo6			
		1.7131	16MnCr5			
Steel < 1000 N/mm²	Non legati < 1000 N/mm²	1.0535	C55	Legati < 1000 N/mm²	1.7225	42CrMo4
		1.0601	C60		1.8159	50CrV4
		1.1203	Ck55		1.7045	42Cr4
		1.1206	Ck50		1.8507	34CrAlMo5
		1.1221	Ck60		1.8509	41CrAlMo7
		1.1157	40Mn4		1.8515	31CrMo12
		1.1165	30Mn5			
		1.1167	36Mn5	Acciai legati per utensili	1.2067	100Cr6
		1.1170	28Mn6		1.2330	35CrMo4
	Legati < 1000 N/mm²	1.5710	36NiCr6		1.2332	47CrMo4
		1.5755	31NiCr14		1.2510	100MnCrW4
		1.6511	36CrNiMo4		1.2516	120WV4
		1.7033	34Cr4		1.2542	45WCrV7
		1.7034	37Cr4		1.2833	100V1
		1.7035	41Cr4		1.2842	90MnCrV8
		1.7218	25CrMo4	Ghisa	0.6015	GG-15
		1.7220	34CrMo4		0.6010	GG-10
		1.7223	41CrMo4		0.6020	GG-20
Steel < 1300 N/mm²	Legati < 1300 N/mm²	1.5710	36NiCr6	Acciai legati per utensili	1.2311	40CrMnMo7
		1.6511	36CrNiMo4		1.2344	X40CrMoV5 1
		1.6580	30CrNiMo8		1.2365	X32CrMoV3 3
		1.6582	34CrNiMo6		1.2581	X30WCrV9 3
		1.7220	34CrMo4		1.2343	X38 CrMoV5 1
		1.7223	41CrMo4		1.2344	X40CrMoV5 1
		1.7225	42CrMo4		1.2714	56NiCrMoV7
		1.7361	32CrMo12			
		1.8159	50CrV4			
				Ghisa	0.6030	GG-30
					0.6040	GG-40
12% Cr	Acciai legati per utensili	1.2080	X210Cr12	Acciai resistenti al calore	1.4914	-
		1.2436	X210CrW12		1.4920	X15CrMo12 1
		1.2601	X165CrMoV12		1.4924	-
		1.2706	X3NiCrMo18 8 5		1.4718	X45CrSi9 3
		1.2709	X2NiCoMoTi18 9 5		1.4845	X12CrNi25 21
		1.2201	X165CrV12		1.4878	X12CrNiTi18 9
		1.2376	X96CrMoV12		1.4742	X10CrAl18
		1.2379	X155CrMo12 1		1.4923	X22CrMoV12 1
		1.2609	X165CrVMo12 1			
		1.2631	X50CrMoW9 1 1			
		1.2880	X165CrCoMo12			

SGR

FRESE A SGROSSARE

ROUGHING END MILLS

SCHRUPPFRÄSER

FREZY ZGRUBNE

Steel <800 N/mm² — AIR MQL MAX

	NIG Z=3			NIG Z=4			NIG Z=3			NIG Z=4		
												
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,010	107	3560	0,010	180	3560	0,030	320	3560	0,030	360	3560
8,0	0,020	160	2670	0,020	200	2670	0,030	240	2670	0,030	370	2670
10,0	0,030	192	2130	0,030	240	2130	0,040	256	2130	0,040	380	2130
12,0	0,040	214	1780	0,040	270	1780	0,060	320	1780	0,060	400	1780
16,0	0,050	200	1330	0,050	270	1330	0,080	319	1330	0,080	400	1330
20,0	0,060	193	1070	0,060	270	1070	0,100	321	1070	0,100	410	1070
25,0	0,080	204	850	0,080	260	850	0,120	306	850	0,120	400	850

Steel <1000 N/mm² — AIR MQL MAX

	NIG Z=3			NIG Z=4			NIG Z=3			NIG Z=4		
												
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,010	97	3240	0,010	150	3240	0,020	194	3240	0,020	310	3240
8,0	0,020	146	2430	0,020	170	2430	0,030	219	2430	0,030	320	2430
10,0	0,030	175	1940	0,030	210	1940	0,040	233	1940	0,040	330	1940
12,0	0,040	194	1620	0,040	230	1620	0,050	243	1620	0,050	350	1620
16,0	0,050	182	1210	0,050	230	1210	0,070	254	1210	0,070	340	1210
20,0	0,060	175	970	0,060	230	970	0,090	262	970	0,090	350	970
25,0	0,070	164	780	0,070	230	780	0,110	257	780	0,110	350	780

Steel <1300 N/mm² — AIR MQL MAX

	NIG Z=3			NIG Z=4			NIG Z=3			NIG Z=4		
												
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,010	73	2440	0,010	73	2440	0,020	146	2440	0,020	210	2440
8,0	0,020	110	1830	0,020	110	1830	0,030	165	1830	0,030	220	1830
10,0	0,020	88	1460	0,020	88	1460	0,040	175	1460	0,040	220	1460
12,0	0,030	110	1220	0,030	110	1220	0,050	183	1220	0,050	230	1220
16,0	0,040	110	920	0,040	110	920	0,060	166	920	0,060	230	920
20,0	0,050	110	730	0,050	110	730	0,080	175	730	0,080	240	730
25,0	0,070	124	590	0,070	124	590	0,100	177	590	0,100	240	590

Steel 12 % Cr — MAX

	NIG Z=3			NIG Z=4			NIG Z=3			NIG Z=4		
												
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,010	46	1540	0,010	60	1540	0,020	92	1540	0,020	120	1540
8,0	0,010	35	1150	0,010	60	1150	0,030	104	1150	0,030	120	1150
10,0	0,020	55	920	0,020	80	920	0,030	83	920	0,030	120	920
12,0	0,030	69	770	0,030	90	770	0,040	92	770	0,040	130	770
16,0	0,040	70	580	0,040	90	580	0,060	104	580	0,060	130	580
20,0	0,050	69	460	0,050	90	460	0,070	97	460	0,070	130	460
25,0	0,060	67	370	0,060	90	370	0,090	100	370	0,090	130	370

+20%	Serie CORTA	SHORT	KURZ	KRÓTKA
=	Serie NORMALE,	REGULAR	NORMAL	NORMALNA
-20%	Serie MEDIA,	MEDIUM	MITTLERE	WYD□U□ONA
-40%	Serie LUNGA	LONG	LANG	D□UGA

Alu & alloys < 6% Si

AIR MQL MAX

	NIG Z=3			SIL Z=3			NIG Z=3			SIL Z=3		
												
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,019	530	9500	0,015	200	4510	0,038	1070	9500	0,030	410	4510
8,0	0,028	600	7130	0,023	230	3380	0,052	1120	7130	0,042	430	3380
10,0	0,043	740	5700	0,034	280	2710	0,067	1150	5700	0,054	440	2710
12,0	0,056	800	4750	0,044	300	2260	0,084	1200	4750	0,068	460	2260
16,0	0,075	800	3560	0,059	300	1690	0,112	1200	3560	0,091	460	1690
20,0	0,094	800	2850	0,074	300	1350	0,140	1200	2850	0,114	460	1350
25,0	0,117	800	2280	0,093	300	1080	0,175	1200	2280	0,142	460	1080

Alu & alloys > 6% Si

AIR MQL MAX

	NIG Z=3			SIL Z=3			NIG Z=3			SIL Z=3		
												
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,015	300	6580	0,012	110	3130	0,030	590	6580	0,024	230	3130
8,0	0,022	330	4940	0,018	130	2350	0,042	620	4940	0,034	240	2350
10,0	0,035	410	3950	0,028	160	1880	0,054	640	3950	0,043	240	1880
12,0	0,045	440	3290	0,036	170	1570	0,068	670	3290	0,053	250	1570
16,0	0,059	440	2470	0,048	170	1170	0,090	670	2470	0,071	250	1170
20,0	0,074	440	1970	0,060	170	940	0,113	670	1970	0,089	250	940
25,0	0,093	440	1580	0,077	170	740	0,141	670	1580	0,113	250	740

Copper & alloys

AIR MQL MAX

	NIG Z=3			SIL Z=3			NIG Z=3			SIL Z=3		
												
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,012	240	6900	0,012	130	3710	0,018	200	3710	0,018	200	3710
8,0	0,019	290	5170	0,019	150	2780	0,030	250	2780	0,030	250	2780
10,0	0,026	320	4140	0,026	170	2220	0,045	290	2220	0,045	290	2220
12,0	0,040	410	3450	0,040	220	1850	0,065	360	1850	0,065	360	1850
16,0	0,055	420	2580	0,055	220	1390	0,085	350	1390	0,085	350	1390
20,0	0,075	460	2070	0,075	240	1110	0,115	380	1110	0,115	380	1110
25,0	0,090	440	1650	0,090	240	890	0,155	410	890	0,155	410	890

Thermo Plastics

AIR MQL MAX

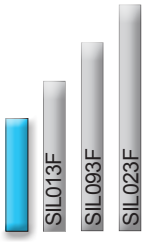
	NIG Z=3			SIL Z=3			NIG Z=3			SIL Z=3		
												
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,020	500	8490	0,020	250	4240	0,050	1270	8490	0,050	630	4240
8,0	0,030	570	6360	0,030	280	3180	0,070	1330	6360	0,070	660	3180
10,0	0,040	610	5090	0,040	300	2540	0,080	1220	5090	0,080	600	2540
12,0	0,050	630	4240	0,050	310	2120	0,090	1140	4240	0,090	570	2120
16,0	0,065	620	3180	0,065	310	1590	0,120	1140	3180	0,120	570	1590
20,0	0,075	570	2540	0,075	280	1270	0,150	1140	2540	0,150	570	1270
25,0	0,090	540	2030	0,090	270	1010	0,170	1030	2030	0,170	510	1010

+20%	Serie CORTA	SHORT	KURZ	KRÓTKA
=	Serie NORMALE,	REGULAR	NORMAL	NORMALNA
-20%	Serie MEDIA,	MEDIUM	MITTLERE	WYD□U□ONA
-40%	Serie LUNGA	LONG	LANG	D□UGA

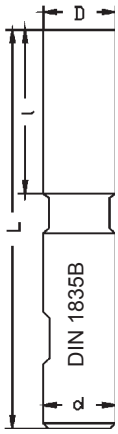
SILMAX

038F Frese a sgrossare serie corta

Roughing end mills, short series



ISO 1641/I
DIN 327



HSS M42Co8

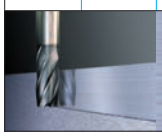
NRF F Form

λ 30°
γ 12°

45°

Uncoated

D	d	L	l	038F	SIL	NIG	Z
k12	h6						
5	6	52	8	038F05	28,60	33,40	4
6	6	52	8	038F06	28,60	33,40	4
7	10	60	10	038F07	33,50	42,80	4
8	10	61	11	038F08	31,00	40,30	4
9	10	61	11	038F09	33,50	42,80	4
10	10	63	13	038F10	32,30	41,50	4
11	12	70	13	038F11	43,00	53,30	4
12	12	73	16	038F12	37,30	47,20	4
13	12	73	16	038F13	42,30	55,80	4
14	12	73	16	038F14	43,50	49,70	4
15	12	73	16	038F15	51,20	61,10	4
16	16	79	19	038F16	48,70	61,60	4
17	16	79	19	038F17	64,20	80,20	4
18	16	79	19	038F18	60,40	75,80	4
19	16	79	19	038F19	71,70	86,90	4
20	20	88	22	038F20	63,20	82,90	4
22	20	88	22	038F22	82,30	104,50	4
25	25	102	26	038F25	94,00	121,30	4
30	25	102	26	038F30	128,60	157,50	6
32	32	112	32	038F32	145,80	179,00	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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Lavorazioni, Machining Process

041 Frese a sgrossare semifinire serie normale

Roughing end mills, semifinishing, standard series

HSS M42Co8

HN40

λ 40° γ 14°

45°

042 Din 1835D

013R Frese a sgrossare serie normale

Roughing end mills, standard series

Con fori di lubrificazione
Internal Coolant supply
Mit innerer Kühlmittelzufuhr
Z otworami do dostarczania chlodziwa

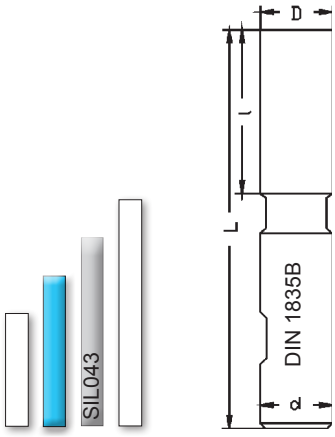
HSS M42Co8

NRF F Form

λ 30° γ 12°

45°

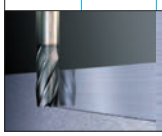
Rain Mill



ISO 1641/I
DIN 844K

Uncoated

D	d h6	L	l	041 Toll.D=k10	SIL €	NIG €	Z	013R Toll.D=k12	RMG €	Z
6	6	57	13	041006	27,20	32,10	3			
8	10	69	19	041008	32,30	41,50	3			
10	10	72	22	041010	33,00	42,10	3			
12	12	83	26	041012	38,00	47,80	3			
14	12	83	26	041014	42,30	54,10	3			
16	16	92	32	041016	50,00	65,40	3	013F16	95,30	4
18	16	92	32					013F18	107,50	4
20	20	104	38	041020	75,80	95,60	4	013F20	121,20	4
22	20	104	38					013F22	147,00	4
25	25	121	45	041025	112,80	141,10	4	013F25	166,90	4
28	25	121	45	041028	130,80	162,60	4	013F28	197,10	6
30	25	121	45	041030	135,10	169,60	4	013F30	220,90	6
32	32	133	53	041032	189,50	223,90	4	013F32	230,50	6
36	32	133	53					013F36	311,10	6
40	40	155	63					013F40	421,40	6
50	50	177	75					013F50	572,60	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.146 - 147

Lavorazioni, Machining Process

Lavorazioni, Machining Process

SILMAX

011F Frese a sgrossare serie normale
Roughing end mills, standard series

HSS M42Co8

NRF F Form

λ 30° γ 12°

45°

014F Din 1835D

010B Frese a sgrossare serie normale
Roughing end mills, standard series

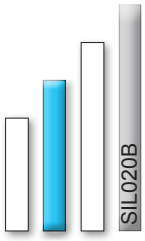
HSS M42Co8

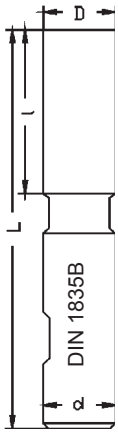
NRB B Form

λ 30° γ 12°

45°

012B Din 1835D



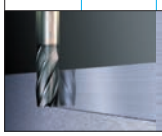


ISO 1641/I
DIN 844K

Uncoated

Uncoated

D	d	L	l			011F	SIL	NIG	Z	010B	SIL	NIG	Z
k12	h6						€	€			€	€	
6	6	57	13			011F06	29,80	35,20	3				
8	10	69	19			011F08	34,80	44,00	3				
9	10	69	19			011F09	38,50	49,00	3				
10	10	72	22			011F10	35,30	44,70	3				
11	12	79	22			011F11	44,30	53,50	3				
12	12	83	26			011F12	39,90	49,70	3	010B12	39,90	49,70	4
13	12	83	26			011F13	48,70	60,50	3	010B13	48,70	60,50	4
14	12	83	26			011F14	44,90	55,90	3	010B14	44,90	55,90	4
15	12	83	26							010B15	57,00	69,80	4
16	16	92	32			011F16	51,20	66,60	3	010B16	51,20	66,60	4
17	16	92	32							010B17	66,30	86,10	4
18	16	92	32			011F18	60,70	80,40	3	010B18	60,70	80,40	4
19	16	92	32							010B19	78,60	98,40	4
20	20	104	38			011F20	70,00	89,90	3	010B20	70,00	89,90	4
22	20	104	38			011F22	87,80	113,10	3	010B22	87,80	113,10	4
24	25	121	45							010B24	111,80	140,10	5
25	25	121	45			011F25	103,60	131,90	3	010B25	103,60	131,90	5
26	25	121	45							010B26	130,60	163,40	5
28	25	121	45							010B28	126,30	159,50	5
30	25	121	45			011F30	137,50	170,90	3	010B30	137,50	170,90	5
32	32	133	53			011F32	173,70	206,10	3	010B32	173,70	206,10	5
36	32	133	53							010B36	182,70	226,60	5
40	40	155	63			011F40	245,60	328,30	3	010B40	245,60	328,30	5
50	50	177	75							010B50	397,50	525,50	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.146 - 147

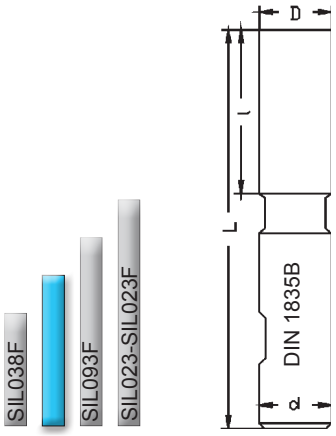
Lavorazioni, Machining Process

Lavorazioni, Machining Process

SILMAX

013 Frese a sgrossare serie normale
Roughing end mills, standard series

013F Frese a sgrossare serie normale
Roughing end mills, standard series



ISO 1641/I
DIN 844K

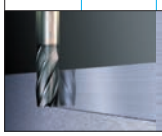
HSS M42Co8
NF2 Sil F2
λ 30° γ 10°
45°
016 Din 1835D

Uncoated

HSS M42Co8
NRF F Form
λ 30° γ 12°
45°
016F Din 1835D

Uncoated

D	d	L	l			013	SIL	NIG	Z	013F	SIL	NIG	Z
k12	h6						€	€			€	€	
4,5	6	55	11							013F045	31,20	36,90	4
5	6	57	13							013F05	31,00	36,60	4
5,5	6	57	13							013F055	31,20	36,90	4
6	6	57	13			013006	31,00	36,60	4	013F06	31,00	36,60	4
6,5	10	66	16							013F065	40,30	49,40	4
7	10	66	16							013F07	39,90	49,00	4
7,5	10	69	19							013F075	40,30	49,40	4
8	10	69	19			013008	36,20	45,30	4	013F08	36,20	45,30	4
8,5	10	69	19							013F085	40,30	49,40	4
9	10	69	19							013F09	39,90	49,00	4
9,5	10	72	22							013F095	37,70	47,10	4
10	10	72	22			013010	37,30	46,70	4	013F10	37,30	46,70	4
10,5	12	79	22							013F105	44,80	54,60	4
11	12	79	22							013F11	44,30	54,10	4
12	12	83	26			013012	42,30	52,20	4	013F12	42,30	52,20	4
13	12	83	26							013F13	51,20	62,80	4
14	12	83	26			013014	47,50	58,50	4	013F14	47,50	58,50	4
15	12	83	26							013F15	58,20	73,00	4
16	16	92	32			013016	55,50	70,50	4	013F16	55,50	70,50	4
17	16	92	32							013F17	72,00	92,40	4
18	16	92	32			013018	65,70	85,50	4	013F18	65,70	85,50	4
19	16	92	32							013F19	86,70	105,20	4
20	20	104	38			013020	79,60	99,30	4	013F20	79,60	99,30	4
22	20	104	38			013022	88,40	113,80	4	013F22	88,40	113,80	4
24	25	121	45							013F24	116,20	144,40	4
25	25	121	45			013025	111,80	140,10	4	013F25	111,80	140,10	4
26	25	121	45							013F26	140,80	173,20	4
28	25	121	45							013F28	137,50	170,90	6
30	25	121	45			013030	147,00	180,30	6	013F30	147,00	180,30	6
32	32	133	53			013032	173,70	206,10	6	013F32	173,70	206,10	6
36	32	133	53							013F36	211,50	255,00	6
40	40	155	63			013040	253,00	340,40	6	013F40	253,00	340,40	6
45	40	155	63							013F45	372,30	507,40	6
50	50	177	75							013F50	410,90	545,70	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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Lavorazioni, Machining Process

Lavorazioni, Machining Process

SILMAX

015 Frese a sgrossare serie normale
Roughing end mills, standard series

HSS M42Co8

WF Alu Form

λ 35° γ 17°

45°

ALU

017 Din 1835D

Uncoated

011B Frese a sgrossare serie normale
Roughing end mills, standard series

HSS M42Co8

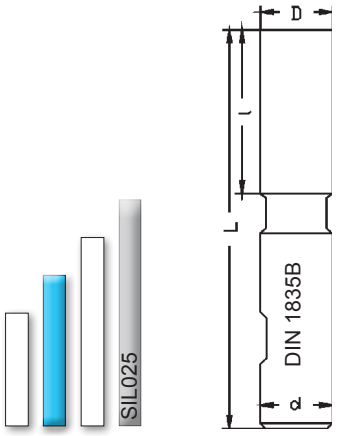
WF B Form

λ 30° γ 14°

45°

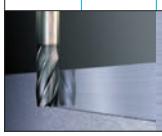
ALU

Uncoated



ISO 1641/I
DIN 844K

D	d	L	l			015	SIL	NIG	Z	011B	SIL	NIG	Z
k12	h6						€	€			€	€	
6	6	57	13			015006	30,40	35,90	3				
8	10	69	19			015008	34,80	44,00	3				
10	10	72	22			015010	37,30	46,70	3	011B10	35,30	44,70	3
12	12	83	26			015012	41,10	51,00	3	011B12	39,90	49,70	3
14	12	83	26							011B14	44,90	55,90	3
16	16	92	32			015016	54,40	69,10	3	011B16	51,20	66,60	3
18	16	92	32							011B18	60,70	80,40	3
20	20	104	38			015020	72,70	92,40	3	011B20	70,00	89,90	3
25	25	121	45			015025	106,70	135,10	3	011B25	103,60	131,90	3
30	25	121	45			015030	140,80	173,20	3				
32	32	133	53			015032	160,40	192,80	3				



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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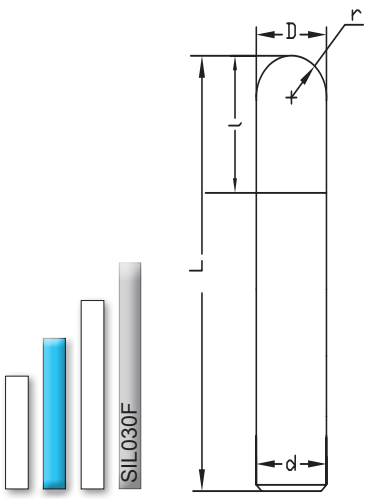
Lavorazioni, Machining Process

Lavorazioni, Machining Process

031F Frese a sgrossare serie normale
Roughing end mills, standard series



ISO 1641/I
DIN 1889/1

HSS M42Co8

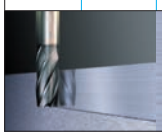
NRF
F Form

λ 30°
γ 12°

Uncoated

033F
Din 1835D

D	d	L	l	r	031F	SIL	NIG	Z
k12	h6					€	€	
6	6	57	13	3,0	031F06	39,90	45,30	3
8	10	69	19	4,0	031F08	51,20	60,50	3
10	10	72	22	5,0	031F10	52,40	61,60	3
12	12	83	26	6,0	031F12	58,20	68,00	3
14	12	83	26	7,0	031F14	65,10	76,10	4
16	16	92	32	8,0	031F16	77,00	92,40	4
18	16	92	32	9,0	031F18	90,20	110,00	4
20	20	104	38	10,0	031F20	96,60	116,20	4
22	20	104	38	11,0	031F22	113,70	138,20	4
25	25	121	45	12,5	031F25	138,90	167,20	6
30	25	121	45	15,0	031F30	184,80	217,10	6
32	32	133	53	16,0	031F32	188,90	221.30	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

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Lavorazioni, Machining Process

SILMAX

043 Frese a sgrossare serie media
Roughing end mills, medium series

HSS M42Co8

HN40

λ 40°
γ 14°

45°

044
Din 1835D

Uncoated

093F Frese a sgrossare serie media
Roughing end mills, medium series

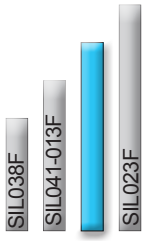
HSS M42Co8

NRF
F Form

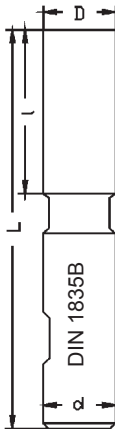
λ 30°
γ 12°

45°

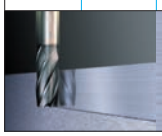
Uncoated



Silmax Norm



D	d	L	l	043	SIL	NIG	Z	093F	SIL	NIG	Z
	h6			Toll.D=k10	€	€		Toll.D=k12	€	€	
6	6	62	18	043006	29,80	35,20	3	093F06	33,50	39,10	4
8	10	75	25	043008	37,30	46,70	3	093F08	39,20	48,50	4
10	10	83	33	043010	38,50	51,60	3	093F10	39,90	53,50	4
12	12	96	39	043012	45,50	59,10	3	093F12	47,50	61,10	4
14	12	96	39	043014	50,00	65,40	3	093F14	54,40	69,10	4
16	16	105	45	043016	59,30	76,60	3	093F16	64,50	81,10	4
18	16	105	45					093F18	75,20	94,90	4
20	20	121	55	043020	85,90	111,90	4	093F20	87,80	113,80	4
22	20	121	55					093F22	99,20	145,20	4
25	25	141	65	043025	121,00	183,60	4	093F25	127,30	189,50	4
28	25	141	65					093F28	157,20	236,10	6
30	25	141	65					093F30	167,90	246,90	6
32	32	158	78					093F32	196,90	287,10	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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Lavorazioni, Machining Process

Lavorazioni, Machining Process

SILMAX

023 Frese a sgrossare serie lunga
Roughing end mills, long series

HSS M42Co8

NF2 Sil F2

λ 30° γ 10°

45°

026 Din 1835D

023F Frese a sgrossare serie lunga
Roughing end mills, long series

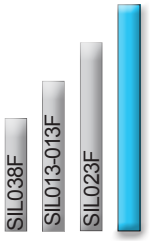
HSS M42Co8

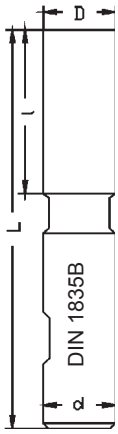
NRF F Form

λ 30° γ 12°

45°

026F Din 1835D

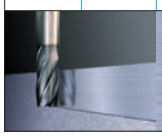




ISO 1641/I
DIN 844L

Uncoated

D	d	L	l			023	SIL	NIG	Z	023F	SIL	NIG	Z
k12	h6						€	€			€	€	
6	6	68	24			023006	39,90	47,20	4	023F06	39,90	47,20	4
8	10	88	38			023008	47,50	60,50	4	023F08	47,50	60,50	4
10	10	95	45			023010	50,00	63,40	4	023F10	50,00	63,40	4
12	12	110	53			023012	57,50	71,10	4	023F12	57,50	71,10	4
14	12	110	53			023014	63,90	78,60	4	023F14	63,90	78,60	4
16	16	123	63			023016	74,60	91,80	4	023F16	74,60	91,80	4
18	16	123	63			023018	86,50	112,50	4	023F18	86,50	112,50	4
20	20	141	75			023020	99,20	125,10	4	023F20	99,20	125,10	4
22	20	141	75			023022	120,00	165,70	4	023F22	120,00	165,70	4
25	25	166	90			023025	143,90	206,10	4	023F25	143,90	206,10	4
30	25	166	90							023F30	201,30	279,50	6
32	32	186	106							023F32	230,40	319,70	6
36	32	186	106							023F36	258,00	351,60	6
40	40	217	125							023F40	336,90	435,90	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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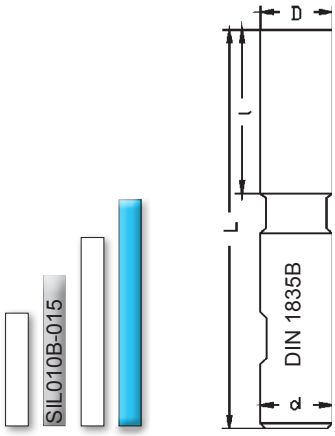
Lavorazioni, Machining Process

Lavorazioni, Machining Process



ISO 1641/I
DIN 844L

020B Frese a sgrossare serie lunga
Roughing end mills, long series

HSS M42Co8

NRB B Form

λ 30° γ 12°

45°

022B Din 1835D

Uncoated

D	d	L	l	020B	SIL	NIG	Z
k12	h6				€	€	
6	6	68	24				
8	10	88	38				
10	10	95	45				
12	12	110	53	020B12	48,70	62,80	4
14	12	110	53	020B14	60,90	75,60	4
16	16	123	63	020B16	66,30	83,50	4
18	16	123	63	020B18	80,30	105,70	4
20	20	141	75	020B20	90,20	116,20	4
22	20	141	75	020B22	108,60	154,60	4
25	25	166	90	020B25	135,50	197,80	5
28	25	166	90	020B28	155,20	233,00	5
30	25	166	90	020B30	171,10	249,40	5
32	32	186	106	020B32	193,10	282,60	5
36	32	186	106	020B36	241,70	335,40	5
40	40	217	125	020B40	325,00	423,80	6
50	50	252	150	020B50	524,90	659,90	6

025 Frese a sgrossare serie lunga
Roughing end mills, long series

HSS M42Co8

WF Alu Form

λ 35° γ 17°

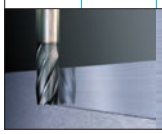
45°

ALU

027 Din 1835D

Uncoated

025	SIL	NIG	Z
	€	€	
025006	37,30	43,90	3
025008	43,80	57,40	3
025010	47,50	60,50	3
025012	54,40	68,00	3
025016	70,90	88,00	3
025020	94,00	120,00	3
025025	132,70	195,30	3
025030	183,00	261,90	3
025032	212,00	302,10	3
025040	321,20	420,70	3



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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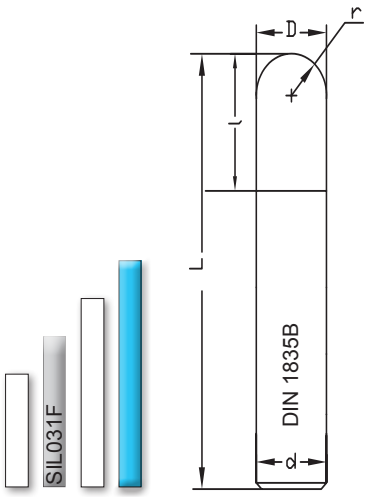
Lavorazioni, Machining Process

Lavorazioni, Machining Process



ISO 1641/I
DIN 1889/1

030F Frese semisferiche a sgrossare serie lunga

Ball nose end mills for roughing, long series

HSS M42Co8

NRF F Form

λ 30° γ 12°

032F Din 1835D

Uncoated

D	d	L	l	r	030F	SIL	NIG	Z
k12	h6					€	€	
6	6	68	24	3,0	030F06	45,50	52,20	3
8	10	88	38	4,0	030F08	55,50	68,60	3
10	10	95	45	5,0	030F10	61,90	75,40	3
12	12	110	53	6,0	030F12	69,50	83,50	3
16	16	123	63	8,0	030F16	98,50	115,70	4
20	20	141	75	10,0	030F20	114,90	140,80	4
25	25	166	90	12,5	030F25	179,20	241,20	6
32	32	186	106	16,0	030F32	245,40	335,40	6
40	32	217	125	20,0				

035 Frese semisferiche a sgrossare serie lunga

Ball nose end mills for roughing, long series

HSS M42Co8

WF Alu Form

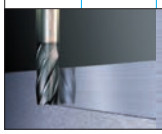
λ 35° γ 17°

ALU

037 Din 1835D

Uncoated

035	SIL	NIG	Z
	€	€	
035008	55,50	68,60	3
035010	61,90	75,40	3
035012	69,50	87,30	3
035016	92,90	110,00	3
035020	110,20	136,10	3
035025	163,50	226,10	3
035032	227,20	317,00	3
035040	366,00	464,60	3



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

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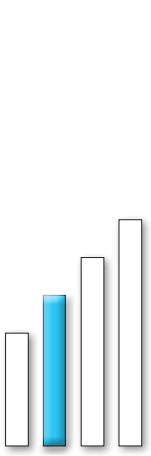
Lavorazioni, Machining Process

Lavorazioni, Machining Process

052F Frese a sgrossare serie normale
Roughing end mills, standard series



ISO 1641/II
DIN 845K

HSS M42Co8

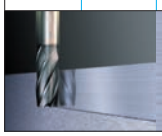
NRF F Form

λ 30°
γ 12°

45°

Uncoated

D	L	l	Mk	052F	SIL	NIG	Z
k12					€	€	
16	117	32	2	052F16	70,90	103,10	4
18	117	32	2	052F18	80,20	112,50	4
20	123	38	2	052F20	92,20	133,80	4
22	140	38	3	052F22	121,20	224,70	4
25	147	45	3	052F25	147,70	251,80	4
28	147	45	3	052F28	166,00	275,60	6
30	147	45	3	052F30	187,60	303,20	6
32	155	53	3	052F32	205,10	344,70	6
36	178	53	4	052F36	273,90	424,60	6
40	188	63	4	052F40	328,80	487,20	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

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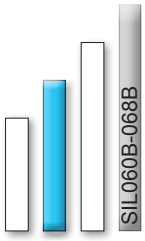
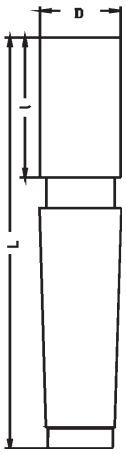
Lavorazioni, Machining Process

SILMAX

058B Frese a sgrossare serie normale
Roughing end mills, standard series

050B Frese a sgrossare serie normale
Roughing end mills, standard series





ISO 1641/II
DIN 845K

HSS M42Co8
WF B Form
λ 30° γ 14°
45°

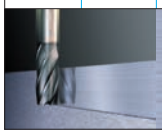
ALU

Uncoated

HSS M42Co8
NRB B Form
λ 30° γ 12°
45°

Uncoated

D	L	l	Mk	058B	SIL	NIG	Z	050B	SIL	NIG	Z
k12					€	€			€	€	
16	117	32	2	058B16	72,90	103,10	3	050B16	72,90	103,10	4
18	117	32	2	058B18	80,20	112,50	3	050B18	80,20	112,50	4
20	123	38	2	058B20	92,20	133,80	3	050B20	92,20	133,80	4
22	140	38	3	058B22	121,20	224,70	3	050B22	121,20	224,70	4
25	147	45	3	058B25	147,70	251,80	3	050B25	147,70	251,80	5
28	147	45	3	058B28	166,00	275,60	3	050B28	166,00	275,60	5
30	147	45	3	058B30	187,60	303,20	3	050B30	187,60	303,20	5
32	155	53	3	058B32	205,10	344,70	3	050B32	205,10	344,70	5
36	178	53	4	058B36	273,90	424,60	3	050B36	273,90	424,60	5
40	188	63	4					050B40	328,80	487,20	5
50	233	75	5					050B50	489,00	741,50	6
63	248	90	5					050B63	690,80	973,10	6
Mk - DIN2207								**Mk - DIN2207**			
32	201	53	4					051B32	305,30	314,50	5
36	201	53	4					051B36	302,90	312,00	5
40	211	63	4					051B40	364,10	375,00	6
50	261	75	5					051B50	622,00	640,70	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.146 - 147

Lavorazioni, Machining Process

Lavorazioni, Machining Process

SILMAX

068B Frese a sgrossare serie lunga
Roughing end mills, long series

HSS M42Co8

WF Alu Form

λ 30° γ 14°

45°

ALU

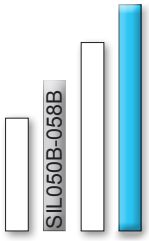
060B Frese a sgrossare serie lunga
Roughing end mills, long series

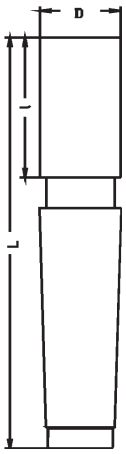
HSS M42Co8

NRB B Form

λ 30° γ 12°

45°



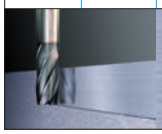


ISO 1641/I
DIN 845L

Uncoated

Uncoated

D	L	l	Mk			068B	SIL	NIG	Z	060B	SIL	NIG	Z
k12							€	€			€	€	
16	148	63	2			068B16	87,10	125,10	3	060B16	87,10	125,10	4
18	148	63	2			068B18	97,20	135,10	3	060B18	97,20	135,10	4
20	177	75	3			068B20	132,40	233,00	3	060B20	132,40	233,00	4
22	177	75	3			068B22	144,50	252,50	3	060B22	144,50	252,50	4
25	192	90	3			068B25	173,70	281,30	3	060B25	173,70	281,30	5
28	192	90	3			068B28	202,60	313,90	3	060B28	202,60	313,90	5
30	192	90	3			068B30	239,20	364,10	3	060B30	239,20	364,10	5
32	231	106	4			068B32	259,40	407,60	3	060B32	259,40	407,60	5
36	231	106	4			068B36	343,30	497,30	3	060B36	343,30	497,30	5
40	250	125	4							060B40	396,30	556,30	6
50	308	150	5							060B50	626,50	879,00	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

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Lavorazioni, Machining Process

Lavorazioni, Machining Process

075F Frese semisferiche a sgrossare serie normale

Ball nose end mills for roughing, standard series

HSS M42Co8

NRF F Form

λ 30° γ 12°

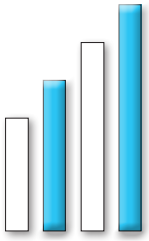
070F Frese semisferiche a sgrossare serie lunga

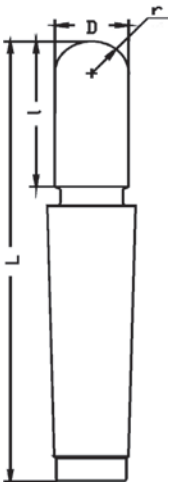
Ball nose end mills for roughing, long series

HSS M42Co8

NRF F Form

λ 30° γ 12°





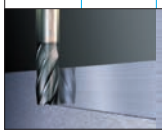
ISO 1641/II
DIN 1889/2

Uncoated

D	L	l	Mk	r	075F	SIL	NIG	Z
k12						€	€	
16	117	32	2	8,0	075F16	106,80	139,10	3
20	123	38	2	10,0	075F20	145,70	189,20	3
25	147	45	3	12,5	075F25	184,20	288,20	3
28	147	45	3	14,0	075F28	201,50	311,20	3
30	147	45	3	15,0	075F30	216,10	331,20	3
32	155	53	3	16,0	075F32	242,40	381,70	3
36	178	53	4	18,0	075F36	312,40	462,70	3
40	188	63	4	20,0	075F40	373,00	530,70	3
50	233	75	5	25,0	075F50	598,10	850,80	3

Uncoated

D	L	l	Mk	r	070F	SIL	NIG	Z
k12						€	€	
16	148	63	2	8,0	070F16	132,10	170,00	4
20	177	75	3	10,0	070F20	165,40	273,90	4
25	192	90	3	12,5	070F25	210,60	318,30	6
32	231	106	4	16,0	070F32	317,70	466,10	6
40	250	125	4	20,0	070F40	461,90	621,50	6
50	308	150	5	25,0	070F50	734,40	986,30	8
63	338	180	5	31,5	070F63	1121,80	1402,60	8



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.146 - 147

Lavorazioni, Machining Process

Lavorazioni, Machining Process

Lavorazione di Acciai

Steels, Stähle, Stale

Gruppo		Nr	DIN	Gruppo	Nr	DIN
Steel < 800 N/mm²	Non legati < 800 N/mm²	1.1231	Ck67	Legati < 800 N/mm²	1.5026	55Si7
		1.1248	Ck75		1.7176	55Cr3
		1.1274	Ck101		1.8159	50CrV4
		1.0402	C22		1.3505	100Cr6
		1.0406	C25		1.6546	40NiCrMo2 2
		1.0501	C35		1.7218	25CrMo4
		1.0503	C45		1.7220	34CrMo4
		1.1133	20Mn5		1.7223	41CrMo4
	Legati < 800 N/mm²	1.7015	15Cr3			
		1.5752	14NiCr14			
		1.5919	15CrNi6			
		1.6523	21NiCrMo2			
		1.6587	17CrNiMo6			
		1.7131	16MnCr5			
Steel < 1000 N/mm²	Non legati < 1000 N/mm²	1.0535	C55	Legati < 1000 N/mm²	1.7225	42CrMo4
		1.0601	C60		1.8159	50CrV4
		1.1203	Ck55		1.7045	42Cr4
		1.1206	Ck50		1.8507	34CrAlMo5
		1.1221	Ck60		1.8509	41CrAlMo7
		1.1157	40Mn4		1.8515	31CrMo12
		1.1165	30Mn5			
		1.1167	36Mn5	Acciai legati per utensili	1.2067	100Cr6
		1.1170	28Mn6		1.2330	35CrMo4
	Legati < 1000 N/mm²	1.5710	36NiCr6		1.2332	47CrMo4
		1.5755	31NiCr14		1.2510	100MnCrW4
		1.6511	36CrNiMo4		1.2516	120WV4
		1.7033	34Cr4		1.2542	45WCrV7
		1.7034	37Cr4		1.2833	100V1
		1.7035	41Cr4		1.2842	90MnCrV8
		1.7218	25CrMo4	Ghisa	0.6015	GG-15
		1.7220	34CrMo4		0.6010	GG-10
		1.7223	41CrMo4		0.6020	GG-20
Steel < 1300 N/mm²	Legati < 1300 N/mm²	1.5710	36NiCr6	Acciai legati per utensili	1.2311	40CrMnMo7
		1.6511	36CrNiMo4		1.2344	X40CrMoV5 1
		1.6580	30CrNiMo8		1.2365	X32CrMoV3 3
		1.6582	34CrNiMo6		1.2581	X30WCrV9 3
		1.7220	34CrMo4		1.2343	X38 CrMoV5 1
		1.7223	41CrMo4		1.2344	X40CrMoV5 1
		1.7225	42CrMo4		1.2714	56NiCrMoV7
		1.7361	32CrMo12			
		1.8159	50CrV4	Ghisa	0.6030	GG-30
					0.6040	GG-40
12% Cr	Acciai legati per utensili	1.2080	X210Cr12	Acciai resistenti al calore	1.4914	-
		1.2436	X210CrW12		1.4920	X15CrMo12 1
		1.2601	X165CrMoV12		1.4924	-
		1.2706	X3NiCrMo18 8 5		1.4718	X45CrSi9 3
		1.2709	X2NiCoMoTi18 9 5		1.4845	X12CrNi25 21
		1.2201	X165CrV12		1.4878	X12CrNiTi18 9
		1.2376	X96CrMoV12		1.4742	X10CrAl18
		1.2379	X155CrMo12 1		1.4923	X22CrMoV12 1
		1.2609	X165CrVMo12 1			
		1.2631	X50CrMoW9 1 1			
		1.2880	X165CrCoMo12			

ALU & ALLOYS , COPPER & ALLOYS, THERMO PLASTICS pag. ???

FIN

FRESE A FINIRE

FINISHING END MILLS

SCHLICHTFRÄSER

FREZY WYKOŃCZENIOWE

FIN

Steel <800 N/mm² — AIR MQL MAX

	NIG Z=4			SIL Z=4			NIG Z=4			SIL Z=4			NIG 731			SIL 731		
																		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,023	330	3560	0,018	120	1700	0,019	270	3560	0,015	100	1700	0,022	160	3560	0,018	60	1700
8,0	0,045	480	2670	0,035	180	1270	0,037	400	2670	0,030	150	1270	0,032	170	2670	0,028	70	1270
10,0	0,061	520	2130	0,049	200	1020	0,050	430	2130	0,039	160	1020	0,042	180	2130	0,034	70	1020
12,0	0,073	520	1780	0,059	200	850	0,060	430	1780	0,047	160	850	0,053	190	1780	0,041	70	850
16,0	0,098	520	1330	0,082	210	640	0,081	430	1330	0,066	170	640	0,071	190	1330	0,055	70	640
20,0	0,124	530	1070	0,103	210	510	0,103	440	1070	0,083	170	510	0,079	170	1070	0,059	60	510
25,0	0,153	520	850	0,122	200	410	0,126	430	850	0,098	160	410	0,088	150	850	0,067	55	410

Steel <1000 N/mm² — AIR MQL MAX

	NIG Z=4			SIL Z=4			NIG Z=4			SIL Z=4			NIG 731			SIL 731		
																		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,022	280	3240	0,018	110	1540	0,018	230	3240	0,015	90	1540	0,023	150	3240	0,019	60	1540
8,0	0,043	420	2430	0,035	160	1150	0,036	350	2430	0,028	130	1150	0,035	170	2430	0,030	70	1150
10,0	0,058	450	1940	0,046	170	920	0,048	370	1940	0,038	140	920	0,046	180	1940	0,038	70	920
12,0	0,069	450	1620	0,055	170	770	0,057	370	1620	0,045	140	770	0,059	190	1620	0,045	70	770
16,0	0,093	450	1210	0,073	170	580	0,076	370	1210	0,060	140	580	0,074	180	1210	0,060	70	580
20,0	0,119	460	970	0,092	170	460	0,098	380	970	0,076	140	460	0,082	160	970	0,065	60	460
25,0	0,144	450	780	0,115	170	370	0,119	370	780	0,095	140	370	0,090	140	780	0,068	50	370

Steel <1300 N/mm² — AIR MQL MAX

	NIG Z=4			SIL Z=4			NIG Z=4			SIL Z=4			NIG 731			SIL 731		
																		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,020	200	2440	0,017	80	1170	0,016	160	2440	0,013	60	1170	0,020	100	2440	0,017	40	1170
8,0	0,038	280	1830	0,031	110	880	0,031	230	1830	0,026	90	880	0,033	120	1830	0,023	40	880
10,0	0,051	300	1460	0,043	120	700	0,043	250	1460	0,036	100	700	0,041	120	1460	0,036	50	700
12,0	0,061	300	1220	0,052	120	580	0,051	250	1220	0,043	100	580	0,053	130	1220	0,043	50	580
16,0	0,082	300	920	0,068	120	440	0,068	250	920	0,057	100	440	0,065	120	920	0,057	50	440
20,0	0,103	300	730	0,086	120	350	0,086	250	730	0,071	100	350	0,068	100	730	0,057	40	350
25,0	0,127	300	590	0,107	120	280	0,106	250	590	0,089	100	280	0,068	80	590	0,063	35	280

Steel 12 % Cr — MAX

	NIG Z=4			SIL Z=4			NIG Z=4			SIL Z=4			NIG 731			SIL 731		
																		
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,018	110	1540	0,014	40	740	0,015	90	1540	0,010	30	740	0,019	60	1540	0,020	30	740
8,0	0,035	160	1150	0,027	60	560	0,028	130	1150	0,022	50	560	0,026	60	1150	0,027	30	560
10,0	0,046	170	920	0,033	60	450	0,038	140	920	0,028	50	450	0,038	70	920	0,033	30	450
12,0	0,055	170	770	0,041	60	370	0,045	140	770	0,034	50	370	0,045	70	770	0,041	30	370
16,0	0,073	170	580	0,054	60	280	0,060	140	580	0,045	50	280	0,060	70	580	0,054	30	280
20,0	0,092	170	460	0,068	60	220	0,076	140	460	0,057	50	220	0,065	60	460	0,056	25	220
25,0	0,115	170	370	0,083	60	180	0,095	140	370	0,069	50	180	0,068	50	370	0,061	22	180

+20%	Serie CORTA	SHORT	KURZ	KRÓTKA
=	Serie NORMALE,	REGULAR	NORMAL	NORMALNA
-20%	Serie MEDIA,	MEDIUM	MITTLERE	WYD□U□ONA
-40%	Serie LUNGA	LONG	LANG	D□UGA

Alu & alloys < 6% Si

AIR MQL MAX

	NIG Z=3			SIL Z=3			NIG Z=2			SIL Z=2		
												
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,028	900	10620	0,022	340	5040	0,028	600	10620	0,022	227	5040
8,0	0,056	1340	7960	0,045	510	3780	0,056	893	7960	0,045	340	3780
10,0	0,075	1430	6370	0,061	550	3030	0,075	953	6370	0,061	367	3030
12,0	0,090	1430	5310	0,073	550	2520	0,090	953	5310	0,073	367	2520
16,0	0,122	1460	3980	0,097	550	1890	0,122	973	3980	0,097	367	1890
20,0	0,154	1470	3180	0,124	560	1510	0,154	980	3180	0,124	373	1510
25,0	0,187	1430	2550	0,152	550	1210	0,187	953	2550	0,152	367	1210

Alu & alloys > 6% Si

AIR MQL MAX

	NIG Z=3			SIL Z=3			NIG Z=2			SIL Z=2		
												
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,023	500	7380	0,018	190	3500	0,023	333	7380	0,018	127	3500
8,0	0,045	750	5530	0,035	280	2630	0,045	500	5530	0,035	187	2630
10,0	0,060	800	4430	0,048	300	2100	0,060	533	4430	0,048	200	2100
12,0	0,072	800	3690	0,057	300	1750	0,072	533	3690	0,057	200	1750
16,0	0,097	810	2770	0,079	310	1310	0,097	540	2770	0,079	207	1310
20,0	0,122	810	2210	0,098	310	1050	0,122	540	2210	0,098	207	1050
25,0	0,151	800	1770	0,119	300	840	0,151	533	1770	0,119	200	840

Copper & alloys

AIR MQL MAX

	NIG Z=3			SIL Z=3			NIG Z=2			SIL Z=2		
												
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,018	370	6900	0,012	130	3710	0,018	240	6900	0,012	80	3710
8,0	0,030	460	5170	0,019	150	2780	0,030	310	5170	0,019	100	2780
10,0	0,045	550	4140	0,026	170	2220	0,045	370	4140	0,026	110	2220
12,0	0,065	670	3450	0,040	220	1850	0,065	440	3450	0,040	140	1850
16,0	0,085	650	2580	0,055	220	1390	0,085	430	2580	0,055	150	1390
20,0	0,115	710	2070	0,075	240	1110	0,115	470	2070	0,075	160	1110
25,0	0,155	760	1650	0,090	240	890	0,155	510	1650	0,090	160	890

Thermo Plastics

AIR MQL MAX

	NIG Z=3			SIL Z=3			NIG Z=2			SIL Z=2		
												
D	fz	F	n	fz	F	n	fz	F	n	fz	F	n
mm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm	mm/z	mm/min	rpm
6,0	0,050	1270	8490	0,020	250	4240	0,050	840	8490	0,020	160	4240
8,0	0,070	1330	6360	0,030	280	3180	0,070	890	6360	0,030	190	3180
10,0	0,080	1220	5090	0,040	300	2540	0,080	810	5090	0,040	200	2540
12,0	0,090	1140	4240	0,050	310	2120	0,090	760	4240	0,050	210	2120
16,0	0,120	1140	3180	0,065	310	1590	0,120	760	3180	0,065	200	1590
20,0	0,150	1140	2540	0,075	280	1270	0,150	760	2540	0,075	190	1270
25,0	0,170	1030	2030	0,090	270	1010	0,170	690	2030	0,090	180	1010

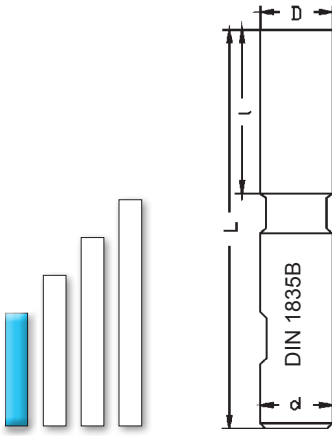
+20%	Serie CORTA	SHORT	KURZ	KRÓTKA
=	Serie NORMALE,	REGULAR	NORMAL	NORMALNA
-20%	Serie MEDIA,	MEDIUM	MITTLERE	WYD□U□ONA
-40%	Serie LUNGA	LONG	LANG	D□UGA

FIN

SILMAX

731 Frese a finire serie corta
Finishing end mills, short series

735 Frese a finire serie corta
Finishing end mills, short series



ISO 1641/I
DIN 327

HSS M42Co8

NK

λ 30°
γ 12°

Toll.D. e8

732
Din 1835D

HSS M42Co8

NK

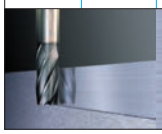
λ 30°
γ 12°

Per h7 - h9

736
Din 1835D

Uncoated

D	d h6	L	l	731	VAN €	NIG €	Z	735	NIG €	Z
1,5	6	49	4	731015	20,30	25,90	2	735015	27,10	2
2	6	49	4	731020	16,50	21,50	2	735020	25,20	2
2,5	6	49	5	731025	16,50	21,50	2	735025	25,20	2
3	6	49	5	731030	15,20	20,20	2	735030	23,40	2
3,5	6	51	7	731035	18,40	23,40	2	735035	26,50	2
4	6	51	7	731040	16,00	20,80	2	735040	24,50	2
4,5	6	51	7	731045	18,40	23,40	2	735045	26,50	2
5	6	52	8	731050	15,20	20,20	2	735050	22,80	2
5,5	6	52	8	731055	17,80	22,80	2	735055	25,20	2
6	6	52	8	731060	16,00	20,80	2	735060	22,80	2
6,5	10	60	10	731065	22,80	32,10	2	735065	33,40	2
7	10	60	10	731070	22,80	32,10	2	735070	33,40	2
7,5	10	61	11	731075	22,80	32,10	2	735075	33,40	2
8	10	61	11	731080	19,70	29,00	2	735080	31,40	2
8,5	10	61	11	731085	22,80	32,10	2	735085	34,60	2
9	10	61	11	731090	22,80	32,10	2	735090	34,60	2
9,5	10	63	13	731095	22,80	32,10	2	735095	34,60	2
10	10	63	13	731100	20,70	30,10	2	735100	31,40	2
10,5	12	70	13	731105	28,60	38,30	2			
11	12	70	13	731110	27,80	37,70	2	735110	40,90	2
11,5	12	73	16	731115	28,80	38,80	2			
12	12	73	16	731120	26,00	35,90	2	735120	39,10	2
12,5	12	73	16	731125	30,10	40,10	2			
13	12	73	16	731130	29,80	39,70	2	735130	42,10	2
13,5	12	73	16	731135	32,00	42,00	2			



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

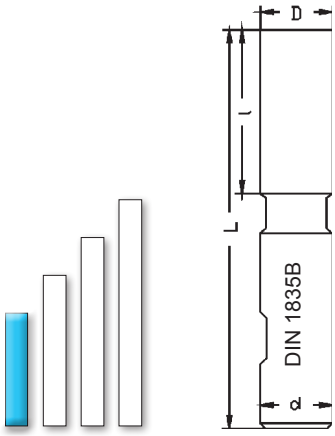
Pag.164 - 165

Lavorazioni, Machining Process

Lavorazioni, Machining Process

731 Frese a finire serie corta
Finishing end mills, short series

735 Frese a finire serie corta
Finishing end mills, short series



ISO 1641/I
DIN 327

HSS M42Co8

NK

λ 30°
γ 12°

Toll.D. e8

732
Din 1835D

HSS M42Co8

NK

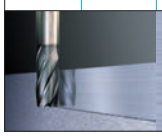
λ 30°
γ 12°

Per h7 - h9

736
Din 1835D

Uncoated

D	d	L	l	731	VAN	NIG	Z	735	NIG	Z
	h6				€	€			€	
14	12	73	16	731140	28,60	38,30	2	735140	40,90	2
14,5	12	73	16	731145	35,00	45,00	2			
15	12	73	16	731150	37,30	47,20	2	735150	49,70	2
16	16	79	19	731160	35,30	48,50	2	735160	51,00	2
17	16	79	19	731170	44,90	60,50	2	735170	61,60	2
18	16	79	19	731180	39,20	55,30	2	735180	56,50	2
19	16	79	19	731190	51,80	68,00	2	735190	70,50	2
20	20	88	22	731200	50,00	69,70	2	735200	71,70	2
22	20	88	22	731220	60,70	83,50	2			
25	25	102	26	731250	81,60	108,70	2			
28	25	102	26	731280	102,30	131,40	2			
30	25	102	26	731300	105,50	134,30	2			
32	32	112	32	731320	134,60	167,20	2			
36	32	112	32	731360	158,40	202,30	2			
40	40	130	38	731400	195,70	245,60	2			



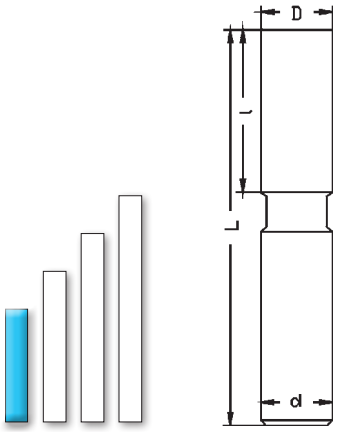
PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.164 - 165

Lavorazioni, Machining Process

Lavorazioni, Machining Process

730 Frese a finire serie corta
Finishing end mills, short series



Silmax Norm

HSS M42Co8

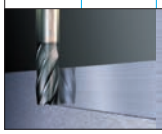
NK

λ 30°
γ 12°

Toll.D. ±0,01

Uncoated

D	d	L	l	730	VAN	NIG	Z
±0,01	h6				€	€	
0,5	3	37	1,5	730005	27,90	32,80	2
0,6	3	37	1,5	730006	27,90	32,80	2
0,7	4	37	2	730007	27,90	32,80	2
0,8	4	37	2	730008	27,90	32,80	2
0,9	4	37	2,5	730009	27,90	32,80	2
1,0	4	37	3	730010	27,90	32,80	2
1,2	4	37	4	730012	27,90	32,80	2
1,4	4	37	4	730014	28,40	33,30	2
1,5	4	37	4	730015	28,40	33,30	2
1,6	4	37	4	730016	28,40	33,30	2
1,7	4	37	5	730017	28,40	33,30	2
1,8	4	37	5	730018	28,40	33,30	2
2,0	4	37	5	730020	28,40	33,30	2
2,5	4	40	7	730025	28,40	33,30	2
3,0	5	44	8	730030	28,40	33,30	2
3.5	5	44	10	730035	28,40	33,30	2
4,0	6	51	12	730040	31,40	36,50	2
4,5	6	51	12	730045	31,40	36,50	2
5,0	6	52	14	730050	31,40	36,50	2
5,5	6	52	14	730055	32,20	37,70	2



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.164 - 165

Lavorazioni, Machining Process

108 Frese a finire serie corta
Finishing end mills, short series

HSS M42Co8

NK

λ 30°
γ 12°

Toll.D. e8

Uncoated

138 Frese a finire serie corta
Finishing end mills, short series

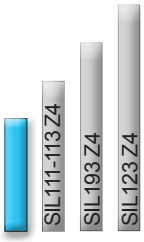
HSS M42Co8

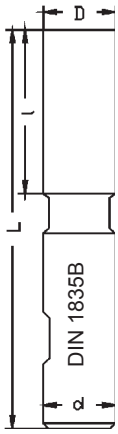
NS

λ 30°
γ 12°

90°

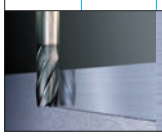
Uncoated





ISO 1641/I
DIN 327

D	d	L	l			108	SIL	NIG	Z	138	SIL	NIG	Z
	h6						€	€		Toll.D = k10	€	€	
1	6	49	4			108010	19,00	24,50	3				
1,5	6	49	4			108015	19,00	24,50	3				
2	6	49	4			108020	19,00	24,50	3				
2,5	6	49	5			108025	19,00	24,50	3				
3	6	49	5			108030	19,00	24,50	3				
3,5	6	51	7			108035	19,00	24,50	3				
3,8	6	51	7			108038	19,00	24,50	3				
4	6	51	7			108040	19,00	24,50	3				
4,5	6	51	7			108045	19,00	24,50	3				
4,8	6	52	8			108048	19,00	24,50	3				
5	6	52	8			108050	16,50	21,50	3	138005	18,40	23,40	4
5,5	6	52	8			108055	20,30	25,90	3				
6	6	52	8			108060	17,10	22,00	3	138006	18,40	23,40	4
6,5	10	60	10			108065	22,20	31,40	3				
7	10	60	10			108070	24,00	33,40	3	138007	23,50	32,90	4
7,5	10	61	11			108075	24,00	33,40	3				
8	10	61	11			108080	20,80	30,20	3	138008	20,30	29,70	4
8,5	10	61	11			108085	24,00	33,40	3				
9	10	61	11			108090	24,00	33,40	3	138009	24,60	34,00	4
9,5	10	63	13			108095	24,00	33,40	3				
10	10	63	13			108100	20,80	30,20	3	138010	21,60	30,90	4
11	12	70	13			108110	28,60	38,30	3	138011	30,30	40,30	4
12	12	73	16			108120	26,70	36,60	3	138012	27,20	37,20	4
13	12	73	16			108130	30,40	40,90	3	138013	32,30	42,10	4
14	12	73	16			108140	30,40	40,30	3	138014	29,80	39,70	4
15	12	73	16			108150	39,20	49,00	3	138015	39,90	49,70	4
16	16	79	19			108160	37,30	50,40	3	138016	37,30	50,40	4
17	16	79	19			108170	46,10	62,30	3	138017	45,50	61,10	4
18	16	79	19			108180	40,50	56,50	3	138018	41,10	57,30	4
19	16	79	19			108190	53,80	69,70	3	138019	54,40	69,70	4
20	20	88	22			108200	51,80	71,70	3	138020	50,70	70,50	4
22	20	88	22							138022	64,50	86,70	4
25	25	102	26							138025	81,60	108,70	4
28	25	102	26							138028	107,40	136,30	6
30	25	102	26							138030	109,90	138,90	6
32	32	112	32							138032	135,80	168,90	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.164 - 165

Lavorazioni, Machining Process

Lavorazioni, Machining Process

SILMAX

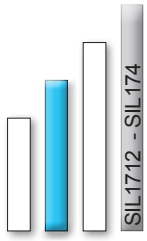
171 Frese a finire serie normale
Finishing end mills, standard series

HSS M42Co8

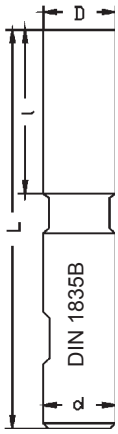
NS

λ 30°
γ 12°

90°



ISO 1641/I
DIN 844K



172
Din 1835D

Uncoated

D	d	L	l	171	SIL	NIG	Z
k10	h6				€	€	
1,5	6	52	7	1710015	18,40	23,40	2
2	6	52	7	1710020	16,50	21,50	2
2,5	6	52	8	1710025	16,50	21,50	2
3	6	52	8	171003	16,50	21,50	2
3,5	6	54	10	1710035	18,50	23,40	2
4	6	55	11	171004	17,10	22,00	2
4,5	6	55	11	1710045	20,40	25,20	2
5	6	57	13	171005	16,50	21,50	2
5,5	6	57	13	1710055	20,90	26,00	2
6	6	57	13	171006	16,50	21,50	2
7	10	66	16	171007	26,70	35,90	2
8	10	69	19	171008	22,20	31,40	2
9	10	69	19	171009	26,70	35,90	2
10	10	72	22	171010	22,20	31,40	2
11	12	79	22	171011	29,80	39,70	2
12	12	83	26	171012	27,20	37,20	2
13	12	83	26	171013	36,20	47,20	2
14	12	83	26	171014	33,00	44,70	2
15	12	83	26	171015	41,70	53,50	2
16	16	92	32	171016	39,20	54,70	2
17	16	92	32	171017	50,70	70,50	2
18	16	92	32	171018	46,10	66,00	2
19	16	92	32	171019	59,30	79,20	2
20	20	104	38	171020	56,20	76,10	2
22	20	104	38	171022	69,00	93,40	2
25	25	121	45	171025	90,90	119,40	2
28	25	121	45	171028	121,20	153,90	2
30	25	121	45	171030	127,60	160,90	2
32	32	133	53	171032	148,60	179,00	2
36	32	133	53	171036	187,20	231,00	2
40	40	155	63	171040	224,60	312,70	2

173 Frese a finire serie normale
Finishing end mills, standard series

HSS M42Co8

W

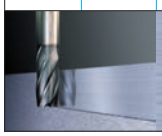
λ 35°
γ 17°

90°

ALU

Uncoated

173	SIL	NIG	Z
	€	€	
173004	18,30	23,30	2
173005	17,60	22,70	2
173006	17,60	22,70	2
173007	28,40	37,60	2
173008	24,40	33,80	2
173009	28,40	37,60	2
173010	24,40	33,80	2
173011	33,60	43,50	2
173012	31,70	41,60	2
173013	38,40	49,60	2
173014	35,20	47,10	2
173015	44,10	55,80	2
173016	41,50	57,20	2
173017	54,20	74,00	2
173018	49,70	69,60	2
173019	62,80	82,70	2
173020	61,50	81,30	2
173025	94,50	123,00	2



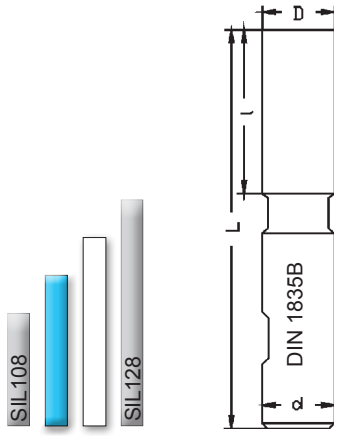
PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.164 - 165

Lavorazioni, Machining Process

Lavorazioni, Machining Process

SILMAX

111 Frese a finire serie normale
Finishing end mills, standard series



ISO 1641/I
DIN 844K

HSS M42Co8

NS

λ 30°
γ 12°

90°

Uncoated

114
Din 1835D

111 Frese a finire serie normale
Finishing end mills, standard series

HSS M42Co8

NS

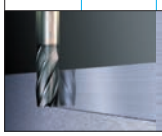
λ 30°
γ 12°

90°

Uncoated

D	d	L	l			111	SIL	NIG	Z	111	SIL	NIG	Z
k10	h6						€	€			€	€	
1,5	6	52	7			111015	18,30	23,40	3				
2	6	52	7			111020	16,50	21,50	3				
2,5	6	52	8			111025	17,80	22,80	3				
3	6	52	8			111030	16,50	21,50	3				
3,5	6	54	10			111035	18,40	23,40	3				
4	6	55	11			111040	17,10	22,00	3	111038	19,70	25,20	3
4,5	6	55	11			111045	19,70	25,20	3				
5	6	57	13			111050	16,50	21,50	3	111048	19,70	25,20	3
5,5	6	57	13			111055	20,80	26,50	3				
6	6	57	13			111060	16,50	21,50	3	111057	20,80	26,50	3
6,5	10	66	16			111065	26,70	35,90	3				
7	10	66	16			111070	26,70	35,90	3	111067	26,70	35,90	3
7,5	10	69	19			111075	26,70	35,90	3				
8	10	69	19			111080	22,20	31,40	3	111077	26,70	35,90	3
8,5	10	69	19			111085	26,70	35,90	3				
9	10	69	19			111090	26,70	35,90	3	111087	26,70	35,90	3
9,5	10	72	22			111095	26,70	35,90	3	111097	26,70	35,90	3
10	10	72	22			111100	22,20	31,40	3	111107	29,80	39,70	3
11	12	79	22			111110	29,80	39,70	3				
12	12	83	26			111120	27,20	37,20	3	111117	29,80	39,70	3
13	12	83	26			111130	38,00	49,00	3	111127	38,00	49,00	3
14	12	83	26			111140	33,00	44,70	3	111137	38,00	49,00	3
15	12	83	26			111150	41,70	53,50	3	111147	41,70	53,50	3
16	16	92	32			111160	39,20	54,70	3	111157	41,70	57,30	3
17	16	92	32			111170	51,80	71,70	3				
18	16	92	32			111180	47,50	67,20	3	111177	51,80	71,70	3
19	16	92	32			111190	60,00	79,90	3				
20	20	104	38			111200	57,50	77,30	3	111197	63,60	83,40	3
22	20	104	38			111220	72,10	98,10	3				
25	25	121	45			111250	95,80	124,80	3				
28	25	121	45			111280	123,60	153,90	3				
30	25	121	45			111300	130,00	164,00	3				
32	32	133	53			111320	151,70	185,70	3				

D. < 5 mm. Nom. -0,20 mm.
D. > 5 < 8 mm. Nom. -0,25 mm.
D. > 8 mm. Nom. -0,30 mm.



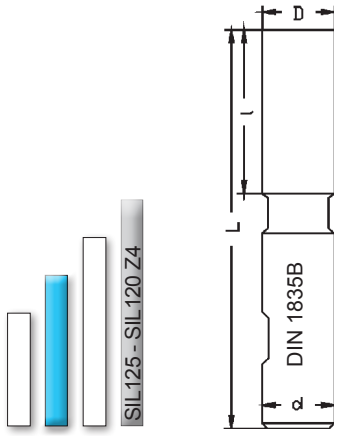
PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.164 - 165

Lavorazioni, Machining Process

SILMAX

115 Frese a finire serie normale
Finishing end mills, standard series

110 Frese a finire serie normale
Finishing end mills, standard series



ISO 1641/I
DIN 844K

HSS M42Co8 | W | λ 35° γ 17° | 90°

ALU

117 Din 1835D

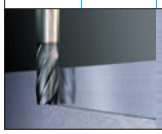
Uncoated

HSS M42Co8 | NS | λ 30° γ 14° | 90°

112 Din 1835D

Uncoated

D	d	L	l			115	SIL	NIG	Z	110	SIL	NIG	Z
k10	h6						€	€			€	€	
6	6	57	13			115006	19,00	24,50	3				
8	10	69	19			115008	27,20	36,60	3				
10	10	72	22			115010	28,60	37,70	3				
12	12	83	26			115012	31,00	40,90	3	110012	30,40	40,30	4
14	12	83	26			115014	44,90	55,90	3	110014	36,20	47,20	4
16	16	92	32			115016	46,90	62,30	3	110016	41,10	56,50	4
18	16	92	32			115018	56,20	76,10	3	110018	55,80	75,60	5
20	20	104	38			115020	65,70	85,50	3	110020	65,80	85,70	5
22	20	104	38							110022	74,60	99,30	5
25	25	121	45			115025	90,90	119,40	3	110025	97,20	125,70	5
28	25	121	45							110028	130,80	164,80	6
30	25	121	45			115030	124,90	158,30	3	110030	137,00	170,40	6
32	32	133	53			115032	156,40	186,50	3	110032	171,10	203,50	6
36	32	133	53							110036	200,70	243,60	6
40	32	155	63			115040	229,10	317,00	3				
40	40	155	63							110040	268,20	355,50	6
50	32	177	75			115050	376,30	504,30	3				
50	40	177	75							110050	393,20	528,10	8



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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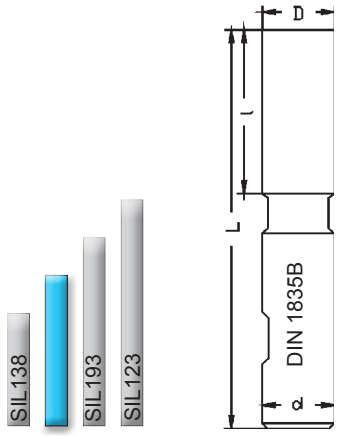
Lavorazioni, Machining Process

Lavorazioni, Machining Process

113 Frese a finire serie normale
Finishing end mills, standard series

113R Frese a finire serie normale
Finishing end mills, standard series

Con fori di lubrificazione
Internal Coolant supply
Mit innerer Kühlmittelzufuhr
Z otworami do dostarczania chlodziwa



ISO 1641/I
DIN 844K

HSS M42Co8
NS
λ 30°
γ 12°
90°

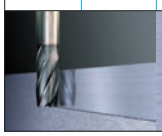
116
Din 1835D

Uncoated

HSS M42Co8
NS
λ 30°
γ 12°
90°

Rain Mill

D	d	L	l			113	SIL	NIG	Z	113R		RMG	Z
k10	h6						€	€				€	
1,5	6	52	7			1130015	20,80	26,50	4				
2	6	52	7			1130020	20,80	26,50	4				
2,5	6	52	8			1130025	19,70	25,20	4				
3	6	52	8			1130030	19,70	25,20	4				
3,5	6	54	10			1130035	20,80	26,50	4				
4	6	55	11			1130040	19,70	25,20	4				
4,5	6	55	11			1130045	20,80	26,50	4				
5	6	57	13			1130050	19,70	25,20	4				
5,5	6	57	13			1130055	20,80	26,50	4				
6	6	57	13			113006	19,70	25,20	4				
7	10	66	16			113007	27,80	37,20	4				
8	10	69	19			113008	26,00	35,20	4				
9	10	69	19			113009	28,60	37,70	4				
10	10	72	22			113010	26,00	35,20	4				
11	12	79	22			113011	33,50	44,00	4				
12	12	83	26			113012	30,40	40,30	4				
13	12	83	26			113013	38,50	49,70	4				
14	12	83	26			113014	36,20	47,20	4				
15	12	83	26			113015	44,30	55,30	4				
16	16	92	32			113016	41,10	56,50	4	113016		93,50	4
17	16	92	32			113017	55,50	75,40	4				
18	16	92	32			113018	50,00	69,70	4	113018		107,10	4
19	16	92	32			113019	63,90	83,50	4				
20	20	104	38			113020	58,70	78,60	4	113020		118,20	4
22	20	104	38			113022	74,60	99,30	4	113022		145,00	4
24	25	121	45			113024	102,40	131,20	4				
25	25	121	45			113025	104,30	128,10	4	113025		165,00	4
26	25	121	45			113026	120,90	151,90	4				
28	25	121	45			113028	130,60	164,50	6				
30	25	121	45			113030	139,70	173,70	6				
32	32	133	53			113032	174,40	207,40	6				
36	32	133	53			113036	204,70	248,30	6				
40	40	155	63			113040	241,00	329,90	6				
50	50	177	75			113050	400,70	538,30	6				



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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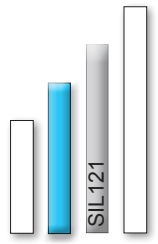
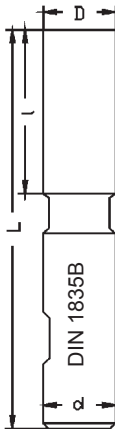
Lavorazioni, Machining Process

Lavorazioni, Machining Process

118 Frese a finire serie normale
Finishing end mills, standard series



ISO 1641/I
DIN 844K



HSS M42Co8

NS

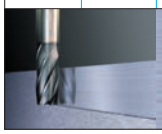
λ 40°
γ 14°

90°

Uncoated

119
Din 1835D

D	d	L	l			118	SIL	NIG	Z				
k10	h6						€	€					
4	6	55	11			118004	22,80	28,20	4				
5	6	57	13			118005	22,80	28,20	4				
6	6	57	13			118006	22,80	28,20	4				
7	10	66	16			118007	32,30	41,50	4				
8	10	69	19			118008	28,60	37,70	4				
9	10	69	19			118009	33,50	42,80	4				
10	10	72	22			118010	29,80	39,10	4				
11	12	79	22			118011	39,90	49,70	4				
12	12	83	26			118012	33,50	44,00	4				
13	12	83	26			118013	46,10	57,30	4				
14	12	83	26			118014	39,90	51,00	4				
15	12	83	26			118015	54,40	68,00	4				
16	16	92	32			118016	46,90	61,60	4				
17	16	92	32			118017	66,30	86,10	4				
18	16	92	32			118018	57,50	77,30	4				
19	16	92	32			118019	80,80	100,50	4				
20	20	104	38			118020	75,80	95,60	6				
22	20	104	38			118022	87,80	113,10	6				
25	25	121	45			118025	110,50	138,90	6				
28	25	121	45			118028	132,70	165,20	6				
30	25	121	45			118030	138,90	172,10	6				
32	32	133	53			118032	189,40	224,70	6				

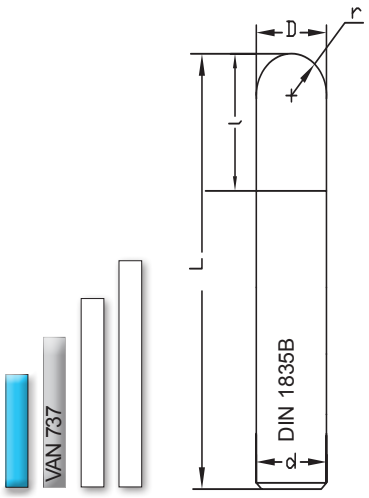


PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.164 - 165

Lavorazioni, Machining Process

738 Frese semisferiche a finire serie corta

Ball nose end mills for finishing, short series



ISO 1641/I
DIN 327

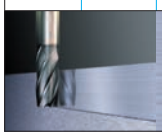
HSS M42Co8

NS

λ 30°
γ 12°

Uncoated

D	d	L	l	r	738	VAN	NIG	Z
k10	h6					€	€	
2	6	49	4	1,0	738020	22,80	28,20	2
2,5	6	49	5	1,25	738025	30,40	35,90	2
3	6	49	5	1,5	738030	30,40	35,90	2
4	6	51	7	2,0	738040	27,80	32,90	2
5	6	52	8	2,5	738050	27,20	32,10	2
5,5	6	52	8	2,75	738055	31,00	36,60	2
6	6	52	8	3,0	738060	27,20	32,10	2
7	10	60	10	3,5	738070	38,50	47,80	2
8	10	61	11	4,0	738080	31,60	40,90	2
10	10	63	13	5,0	738100	34,80	44,00	2
12	12	73	16	6,0	738120	39,90	49,70	2
14	12	73	16	7,0	738140	52,40	54,70	2
15	12	73	16	7,5	738150	53,60	63,30	2
16	16	79	19	8,0	738160	56,20	71,10	2
18	16	79	19	9,0	738180	63,20	78,60	2
20	20	88	22	10,0	738200	69,50	89,20	2



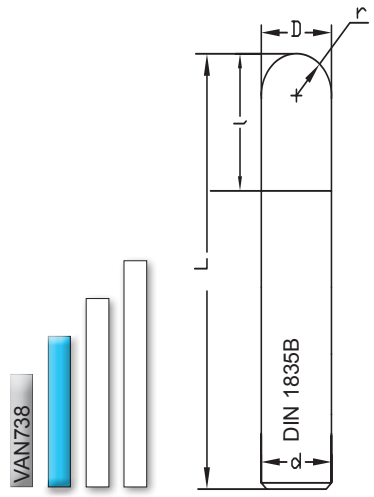
PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.164 - 165

Lavorazioni, Machining Process

SILMAX

737 Frese semisferiche a finire serie normale

Ball nose end mills for finishing, standard series



ISO 1641/I
DIN 1889/1

HSS M42Co8

NS

λ 30°
γ 12°

Uncoated

134 Frese semisferiche a finire serie normale

Ball nose end mills for finishing, standard series

HSS M42Co8

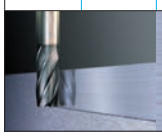
W

λ 35°
γ 17°

Uncoated

ALU

D	d	L	l	r	737	VAN	NIG	Z	134	SIL	NIG	Z
k10	h6					€	€			€	€	
0,5	3	37	1.5	0,25	737005	33,60	38,30	2				
0,8	4	37	2	0,4	737008	33,60	38,30	2				
1	4	37	3	0,5	737010	33,60	38,30	2				
1,2	4	37	4	0,6	737012	33,60	38,30	2				
1,5	4	37	4	0,75	737015	33,60	38,30	2				
1,8	4	37	5	0,9	737018	33,60	38,30	2				
2	6	52	7	1,0	737020	22,80	28,20	2				
2,5	6	52	8	1,25	737025	30,40	35,90	2				
3	6	52	8	1,5	737030	30,40	35,90	2				
4	6	55	11	2,0	737040	27,80	32,90	2	134004	29,00	34,00	2
5	6	57	13	2,5	737050	27,20	32,10	2	134005	28,40	33,30	2
6	6	57	13	3,0	737060	27,20	32,10	2	134006	28,40	33,30	2
7	10	66	16	3,5	737070	38,50	47,80	2				
8	10	69	19	4,0	737080	31,60	40,90	2	134008	34,80	44,10	2
10	10	72	22	5,0	737100	34,80	44,00	2	134010	38,30	47,60	2
12	12	83	26	6,0	737120	39,90	49,70	2	134012	43,90	53,80	2
14	12	83	26	7,0	737140	52,40	63,40	2	134014	57,80	68,80	2
16	16	92	32	8,0	737160	56,20	71,10	2	134016	61,90	76,60	2
18	16	92	32	9,0	737180	65,70	85,50	2	134018	72,30	92,10	2
20	20	104	38	10,0	737200	69,50	89,20	2	134020	76,40	96,20	2



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

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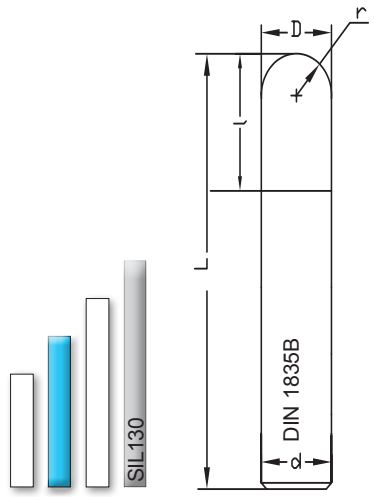
Lavorazioni, Machining Process

Lavorazioni, Machining Process

131 Frese semisferiche a finire serie normale

Ball nose end mills for finishing, standard series

Con fori di lubrificazione
Internal Coolant supply
Mit innerer Kühlmittelzufuhr
Z otworami do dostarczania chlodziwa



ISO 1641/I
DIN 1889/1

HSS M42Co8

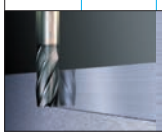
NS

λ 30°
γ 12°

133
Din 1835D

Uncoated

D	d	L	l	r	131	SIL	NIG	Z
k10	h6					€	€	
6	6	57	13	3,0	131006	30,90	35,70	4
8	10	69	19	4,0	131008	44,30	53,50	4
10	10	72	22	5,0	131010	48,00	57,30	4
12	12	83	26	6,0	131012	54,40	64,20	4
14	12	83	26	7,0	131014	58,20	69,10	4
16	16	92	32	8,0	131016	69,50	84,80	4
18	16	92	32	9,0	131018	75,20	94,90	4
20	20	104	38	10,0	131020	86,50	106,30	6
22	20	104	38	11,0	131022	102,30	126,90	6
25	25	121	45	12,5	131025	121,20	149,60	6
30	25	121	45	15,0	131030	153,40	186,00	6
32	32	133	53	16,0	131032	183,50	213,50	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

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Lavorazioni, Machining Process

Lavorazioni, Machining Process

FIN

SILMAX

121 Frese a finire serie media
Finishing end mills, medium series

HSS M42Co8

NS

λ 40° γ 14°

90°

Uncoated

193 Frese a finire serie media
Finishing end mills, medium series

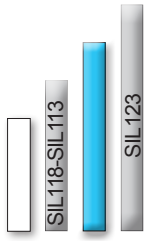
HSS M42Co8

NS

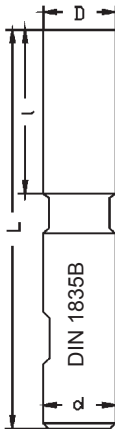
λ 30° γ 12°

90°

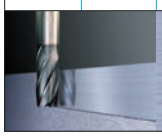
Uncoated



Silmax Norm



D	d	L	l		121	SIL	NIG	Z	193	SIL	NIG	Z
k10	h6					€	€			€	€	
6	6	62	18		121006	24,10	29,10	4	193006	22,20	27,70	4
8	10	75	25		121008	30,80	40,00	4	193008	27,80	37,20	4
10	10	83	33		121010	34,30	47,30	4	193010	29,80	42,80	4
12	12	96	39		121012	39,30	53,60	4	193012	35,30	49,00	4
14	12	96	39		121014	43,30	58,10	4	193014	39,90	55,30	4
16	16	105	45		121016	52,00	68,70	4	193016	50,00	67,20	4
18	16	105	45		121018	58,80	78,70	4	193018	52,40	72,90	4
20	20	121	55		121020	73,40	99,50	6	193020	67,00	93,00	4
22	20	121	55						193022	79,60	125,70	4
25	25	141	65		121025	119,50	175,80	6	193025	115,40	177,80	4
28	25	141	65						193028	138,90	217,90	6
30	25	141	65						193030	145,20	223,60	6
32	32	158	78						193032	177,20	263,90	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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Lavorazioni, Machining Process

Lavorazioni, Machining Process

1712 Frese a finire serie lunga
Finishing end mills, long series

HSS M42Co8

NS

λ 30° γ 12°

90°

1722 Din 1835D

Uncoated

174 Frese a finire serie lunga
Finishing end mills, long series

HSS M42Co8

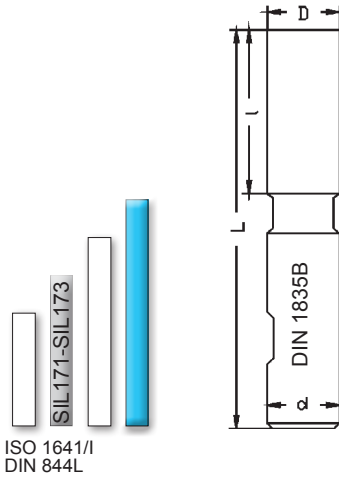
W

λ 35° γ 17°

90°

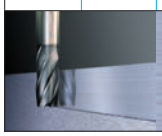
ALU

Uncoated



ISO 1641/I
DIN 844L

D	d	L	l	1712	SIL	NIG	Z	174	SIL	NIG	Z
k10	h6				€	€			€	€	
6	6	68	24	171206	20,80	28,20	2	174006	22,20	29,70	2
8	10	88	38	171208	26,70	39,70	2	174008	29,80	43,50	2
10	10	95	45	171210	27,20	40,30	2	174010	32,20	45,70	2
12	12	110	53	171212	34,80	48,50	2	174012	38,40	52,10	2
14	12	110	53	171214	41,10	56,50	2	174014	45,50	60,50	2
16	16	123	63	171216	53,80	70,50	2	174016	55,00	72,30	2
18	16	123	63	171218	59,30	85,50	2	174018	63,90	89,20	2
20	20	141	75	171220	78,40	104,30	2	174020	79,60	105,60	2
22	20	141	75	171222	86,50	128,00	2				
25	25	166	90	171225	131,40	193,40	2	174025	133,70	196,50	2
28	25	166	90	171228	168,50	247,40	2				
30	25	166	90	171230	173,70	251,80	2				
32	32	186	106	171232	217,70	307,00	2				
36	32	186	106	171236	260,00	353,50	2				
40	40	217	125	171240	330,10	429,60	2				



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

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Lavorazioni, Machining Process

Lavorazioni, Machining Process

SILMAX

128 Frese a finire serie lunga
Finishing end mills, long series

HSS M42Co8

NS

λ 30° γ 12°

90°

125 Frese a finire serie lunga
Finishing end mills, long series

HSS M42Co8

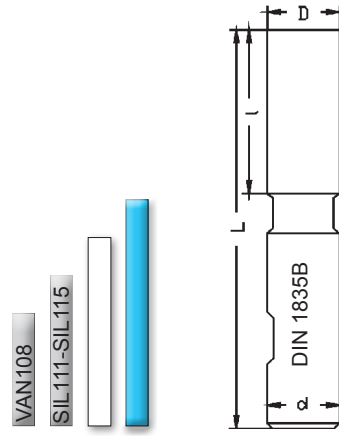
W

λ 35° γ 17°

90°

ALU

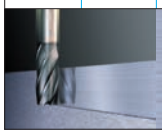
127 Din 1835D



ISO 1641/I
DIN 844L

Uncoated

D	d	L	l			128	SIL	NIG	Z	125	SIL	NIG	Z
k10	h6						€	€			€	€	
3	6	56	12			128003	26,70	31,40	3				
4	6	63	19			128004	26,70	33,40	3				
5	6	68	24			128005	22,80	30,20	3				
6	6	68	24			128006	22,80	30,20	3	125006	23,50	30,90	3
7	10	80	30			128007	31,60	45,30	3				
8	10	88	38			128008	27,80	40,90	3	125008	31,00	44,70	3
9	10	88	38			128009	32,30	45,80	3				
10	10	95	45			128010	28,60	41,50	3	125010	33,00	46,70	3
12	12	110	53			128012	36,70	50,40	3	125012	38,50	52,80	3
14	12	110	53			128014	42,30	57,80	3	125014	45,60	61,20	3
15	12	110	53			128015	61,40	78,60	3				
16	16	123	63			128016	55,00	71,70	3	125016	56,20	73,40	3
18	16	123	63			128018	61,90	88,00	3	125018	66,30	92,40	3
20	20	141	75			128020	81,50	107,40	3	125020	81,60	107,50	3
25	25	166	90							125025	136,80	199,50	3
30	25	166	90							125030	160,70	229,30	3
32	32	186	106							125032	189,80	275,60	3
40	32	217	125							125040	281,70	381,50	3



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

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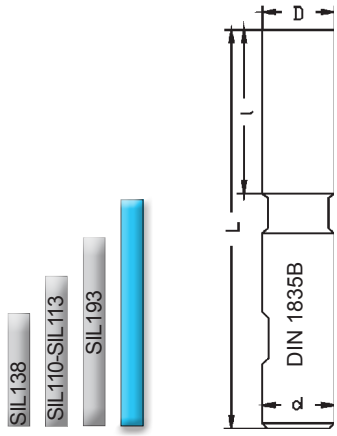
Lavorazioni, Machining Process

Lavorazioni, Machining Process



ISO 1641/I
DIN 844L

120 Frese a finire serie lunga
Finishing end mills, long series

HSS M42Co8

NS

λ 30°
γ 12°

90°

122 Din 1835D

Uncoated

123 Frese a finire serie lunga
Finishing end mills, long series

HSS M42Co8

NS

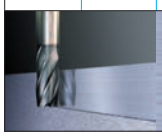
λ 30°
γ 12°

90°

126 Din 1835D

Uncoated

D	d	L	l	120	SIL	NIG	Z	123	SIL	NIG	Z
k10	h6				€	€			€	€	
6	6	68	24					123006	27,20	34,60	4
8	10	88	38					123008	31,60	45,30	4
10	10	95	45					123010	33,00	46,70	4
12	12	110	53	120012	35,30	49,00	4	123012	39,90	54,10	4
14	12	110	53	120014	42,30	57,80	4	123014	48,70	64,20	4
16	16	123	63	120016	53,80	70,50	4	123016	57,50	74,90	4
18	16	123	63	120018	60,00	86,10	5	123018	65,10	90,50	4
20	20	141	75	120020	77,60	103,70	5	123020	82,70	108,00	4
22	20	141	75	120022	87,80	133,80	5	123022	94,80	140,80	4
25	25	166	90	120025	129,50	192,20	6	123025	130,20	192,50	4
28	25	166	90	120028	167,40	246,20	6	123028	183,50	261,90	6
30	25	166	90	120030	181,20	259,40	6	123030	191,40	269,40	6
32	32	186	106	120032	214,50	304,60	6	123032	212,80	302,70	6
36	32	186	106	120036	242,40	335,90	6	123036	240,40	333,90	6
40	40	217	125	120040	292,70	403,90	6	123040	318,80	418,30	6
50	50	252	150	120050	476,80	614,20	8	123050	551,50	685,60	6

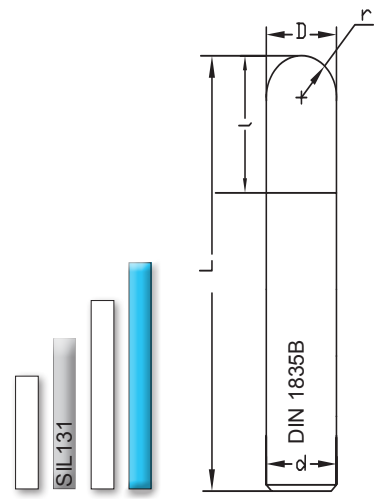


PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.164 - 165

Lavorazioni, Machining Process

Lavorazioni, Machining Process

SILMAX



ISO 1641/I
DIN 1889/1

130 Frese semisferiche a finire serie lunga

Ball nose end mills for finishing, long series

HSS M42Co8

NS

λ 30° γ 12°

132 Din 1835D

Uncoated

135 Frese semisferiche a finire serie lunga

Ball nose end mills for finishing, long series

HSS M42Co8

W

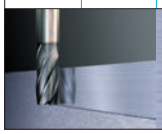
λ 35° γ 17°

ALU

137 Din 1835D

Uncoated

D	d	L	l	r	130	SIL	NIG	Z	135	SIL	NIG	Z
k10	h6					€	€			€	€	
6	6	68	24	3,0	130006	37,30	44,70	4				
8	10	88	38	4,0	130008	51,00	63,90	4	135008	49,00	62,60	3
10	10	95	45	5,0	130010	57,50	70,50	4	135010	55,50	68,60	3
12	12	110	53	6,0	130012	60,00	74,20	4	135012	56,80	71,00	3
16	16	123	63	8,0	130016	73,90	90,50	4	135016	71,30	88,60	3
20	20	141	75	10,0	130020	102,30	127,70	6	135020	93,10	119,00	3
25	25	166	90	12,5	130025	165,30	228,00	6	135025	141,40	204,20	3
32	32	186	106	16,0	130032	225,50	313,90	6	135032	203,80	290,30	3
40	32	217	125	20,0					135040	321,20	420,70	3



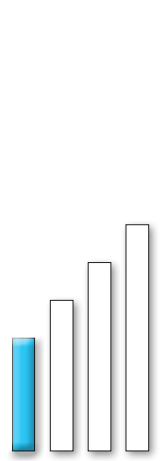
PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.164 - 165

Lavorazioni, Machining Process

Lavorazioni, Machining Process

750 Frese a finire serie corta
Finishing end mills, short series



ISO 1641/II
DIN 326

HSS M42Co8

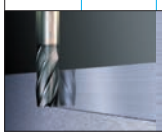
NK

λ 30°
γ 12°

Toll.D. e8

Uncoated

D e8	L	l	Mk	750	VAN €	NIG €	Z
10	83	13	1	750010	56,20	73,00	2
12	86	16	1	750012	56,40	73,20	2
14	86	16	1	750014	59,20	84,70	2
16	104	19	2	750016	60,30	91,90	2
18	104	19	2	750018	62,60	95,00	2
20	107	22	2	750020	66,30	108,00	2
22	107	22	2	750022	85,90	127,60	2
24	128	26	3	750024	102,30	206,10	2
25	128	26	3	750025	105,50	209,80	2
26	128	26	3	750026	119,30	229,30	2
28	128	26	3	750028	123,10	232,40	2
30	128	26	3	750030	137,50	253,10	2
32	134	32	3	750032	155,20	295,10	2
35	157	32	4	750035	203,90	354,80	2
36	157	32	4	750036	217,90	368,90	2
38	163	38	4	750038	241,10	400,10	2
40	163	38	4	750040	268,20	426,40	2



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

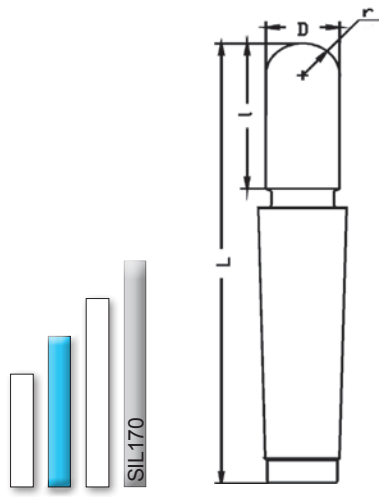
Pag.164 - 165

Lavorazioni, Machining Process

FIN

175 Frese semisferiche a finire serie normale

Ball nose end mills for finishing, short series



ISO 1641/II
DIN 1889/2

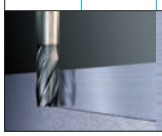
HSS M42Co8

NS

λ 30°
γ 12°

Uncoated

D	L	l	Mk	r	175	SIL	NIG	Z
k10						€	€	
16	117	32	2	8,0	175016	90,90	122,60	4
20	123	38	2	10,0	175020	122,70	165,10	6
25	147	45	3	12,5	175025	148,90	253,10	6
30	147	45	3	15,0	175030	185,00	300,10	6
32	155	53	3	16,0	175032	215,90	355,50	6
36	178	53	4	18,0	175036	292,70	443,40	6
40	188	63	4	20,0	175040	335,70	493,50	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.164 - 165

Lavorazioni, Machining Process

158 Frese a finire serie normale
Finishing end mills, standard series

HSS M42Co8

W

λ 35°
γ 17°

90°

ALU

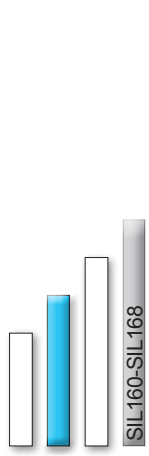
152 Frese a finire serie normale
Finishing end mills, standard series

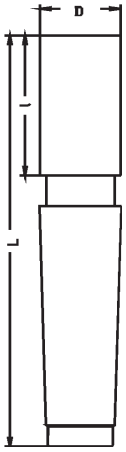
HSS M42Co8

NS

λ 30°
γ 12°

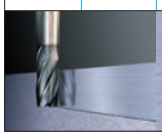
90°





ISO 1641/II
DIN 845K

D	L	l	Mk			158	SIL	NIG	Z	152	SIL	NIG	Z
k10							Uncoated €	Uncoated €			Uncoated €	Uncoated €	
16	117	32	2			158016	65,70	97,40	3	152016	63,90	95,60	4
18	117	32	2			158018	75,80	107,50	3	152018	71,40	103,70	4
20	123	38	2			158020	87,80	130,00	3	152020	79,60	122,00	4
22	140	38	3			158022	114,90	219,20	3	152022	106,00	210,40	4
25	147	45	3			158025	140,20	244,30	3	152025	124,40	228,60	4
28	147	45	3			158028	153,90	263,80	3	152028	143,30	252,50	6
30	147	45	3			158030	172,20	287,60	3	152030	163,50	278,80	6
32	155	53	3			158032	190,60	330,30	3	152032	179,20	318,50	6
36	178	53	4							152036	246,70	396,90	6
40	188	63	4							152040	291,60	450,20	6
45	188	63	4							152045	349,60	513,10	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
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Lavorazioni, Machining Process

Lavorazioni, Machining Process

SILMAX

160 Frese a finire serie lunga
Finishing end mills, standard series

HSS M42Co8

NS

λ 30°
γ 12°

90°

Uncoated

168 Frese a finire serie lunga
Finishing end mills, standard series

HSS M42Co8

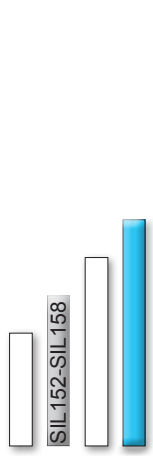
W

λ 35°
γ 17°

90°

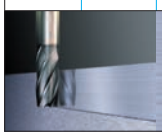
Uncoated

ALU



ISO 1641/II
DIN 845L

D	L	l	Mk			160	SIL	NIG	Z	168	SIL	NIG	Z
k10							€	€			€	€	
16	148	63	2			160016	83,00	121,00	4	168016	89,70	128,10	3
18	148	63	2			160018	89,10	126,90	5	168018	103,60	141,30	3
20	177	75	3			160020	128,40	229,60	5	168020	135,30	243,40	3
22	177	75	3			160022	132,70	240,40	5	168022	152,90	261,20	3
25	192	90	3			160025	150,90	258,80	6	168025	177,40	285,10	3
28	192	90	3			160028	189,40	300,10	6	168028	209,60	320,80	3
30	192	90	3			160030	221,50	346,70	6	168030	251,20	376,80	3
32	231	106	4			160032	237,90	386,10	6	168032	277,20	420,70	3
36	231	106	4			160036	302,90	457,70	6				
40	250	125	4			160040	355,20	515,40	6				
50	308	150	5			160050	606,50	847,00	8				
Mk - DIN2207						**Mk - DIN2207**							
40	273	125	4			160140	425,20	577,10	6				
50	336	150	5			160150	811,30	1063,00	8				



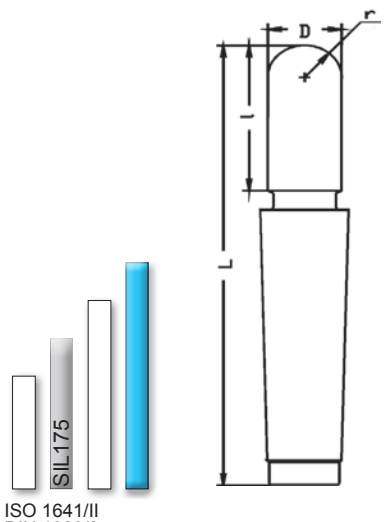
PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.164 - 165

Lavorazioni, Machining Process

Lavorazioni, Machining Process

170 Frese semisferiche a finire serie lunga

Ball nose end mills for finishing, long series



ISO 1641/II
DIN 1889/2

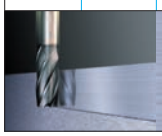
HSS M42Co8

NS

λ 30°
γ 12°

Uncoated

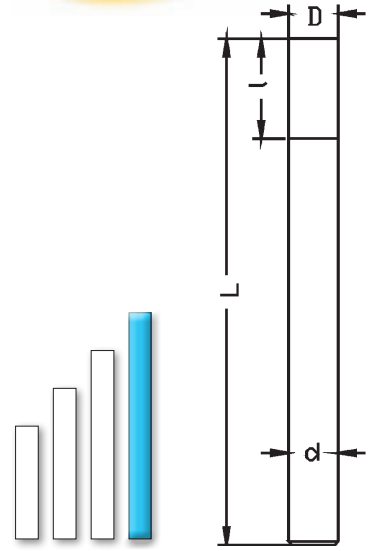
D	L	l	Mk	r	170	SIL	NIG	Z
k10						€	€	
16	148	63	2	8,0	170016	100,80	138,80	4
20	177	75	3	10,0	170020	146,50	255,00	6
25	192	90	3	12,5	170025	171,10	278,80	6
32	231	106	4	16,0	170032	295,50	442,50	6
40	250	125	4	20,0	170040	436,10	595,90	6
50	308	150	5	25,0	170050	648,60	900,80	8



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.164 - 165

Lavorazioni, Machining Process



Silmax Norm

145 Frese a finire serie extra lunga
Finishing end mills, extra long series

HSS M42Co8

NS

λ 30°
γ 10°

146 Frese a finire serie extra lunga
Finishing end mills, extra long series

HSS M42Co8

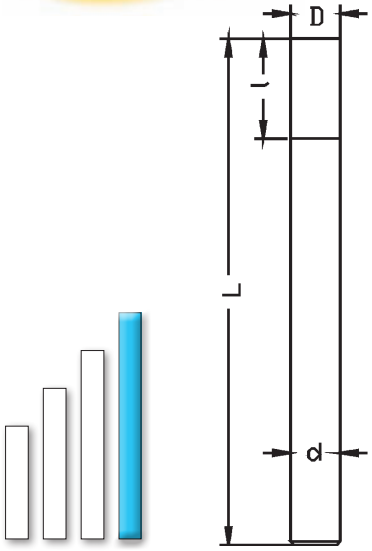
NS

λ 30°
γ 10°

D	d	L	l			145	SIL		z	146	SIL		z
k10							€				€		
6	6	180	25			145006	42,30		4	146006	42,30		2
8	8	180	25			145008	45,50		4	146008	45,50		2
10	10	200	30			145010	55,50		4	146010	55,50		2
12	12	200	30			145012	61,90		4	146012	61,90		2
14	14	200	35			145014	75,80		4	146014	75,80		2
16	16	200	35			145016	96,60		4	146016	96,60		2
20	20	200	35			145020	117,40		4	146020	117,40		2
25	25	200	40			145025	148,90		4				

Uncoated

Uncoated



Silmax Norm

147 Frese a finire serie extra lunga
Finishing end mills, extra long series

HSS M42Co8

NS

λ 30°
γ 10°

Uncoated

148 Frese a finire serie extra lunga
Finishing end mills, extra long series

HSS M42Co8

NS

λ 30°
γ 10°

Uncoated

D	d	L	l	r	147	SIL		z	148	SIL		z
k10						€				€		
6	6	180	25	3,0	147006	57,00		4	148006	57,00		2
8	8	180	25	4,0	147008	59,30		4	148008	59,30		2
10	10	200	30	5,0	147010	69,50		4	148010	69,50		2
12	12	200	30	6,0	147012	72,00		4	148012	72,00		2
14	14	200	35	7,0	147014	85,40		4	148014	85,40		2
16	16	200	35	8,0	147016	110,50		4	148016	110,50		2
20	20	200	35	10,0	147020	126,30		4	148020	126,30		2
25	25	200	40	12,5	147025	163,50		4				

Lavorazione di Acciai

Steels, Stähle, Stale

Gruppo		Nr	DIN	Gruppo	Nr	DIN
Steel < 800 N/mm²	Non legati < 800 N/mm²	1.1231	Ck67	Legati < 800 N/mm²	1.5026	55Si7
		1.1248	Ck75		1.7176	55Cr3
		1.1274	Ck101		1.8159	50CrV4
		1.0402	C22		1.3505	100Cr6
		1.0406	C25		1.6546	40NiCrMo2 2
		1.0501	C35		1.7218	25CrMo4
		1.0503	C45		1.7220	34CrMo4
		1.1133	20Mn5		1.7223	41CrMo4
	Legati < 800 N/mm²	1.7015	15Cr3			
		1.5752	14NiCr14			
		1.5919	15CrNi6			
		1.6523	21NiCrMo2			
		1.6587	17CrNiMo6			
		1.7131	16MnCr5			
Steel < 1000 N/mm²	Non legati < 1000 N/mm²	1.0535	C55	Legati < 1000 N/mm²	1.7225	42CrMo4
		1.0601	C60		1.8159	50CrV4
		1.1203	Ck55		1.7045	42Cr4
		1.1206	Ck50		1.8507	34CrAlMo5
		1.1221	Ck60		1.8509	41CrAlMo7
		1.1157	40Mn4		1.8515	31CrMo12
		1.1165	30Mn5			
		1.1167	36Mn5	Acciai legati per utensili	1.2067	100Cr6
		1.1170	28Mn6		1.2330	35CrMo4
	Legati < 1000 N/mm²	1.5710	36NiCr6		1.2332	47CrMo4
		1.5755	31NiCr14		1.2510	100MnCrW4
		1.6511	36CrNiMo4		1.2516	120WV4
		1.7033	34Cr4		1.2542	45WCrV7
		1.7034	37Cr4		1.2833	100V1
		1.7035	41Cr4		1.2842	90MnCrV8
		1.7218	25CrMo4	Ghisa	0.6015	GG-15
		1.7220	34CrMo4		0.6010	GG-10
		1.7223	41CrMo4		0.6020	GG-20
Steel < 1300 N/mm²	Legati < 1300 N/mm²	1.5710	36NiCr6	Acciai legati per utensili	1.2311	40CrMnMo7
		1.6511	36CrNiMo4		1.2344	X40CrMoV5 1
		1.6580	30CrNiMo8		1.2365	X32CrMoV3 3
		1.6582	34CrNiMo6		1.2581	X30WCrV9 3
		1.7220	34CrMo4		1.2343	X38 CrMoV5 1
		1.7223	41CrMo4		1.2344	X40CrMoV5 1
		1.7225	42CrMo4		1.2714	56NiCrMoV7
		1.7361	32CrMo12			
		1.8159	50CrV4	Ghisa	0.6030	GG-30
					0.6040	GG-40
12% Cr	Acciai legati per utensili	1.2080	X210Cr12	Acciai resistenti al calore	1.4914	-
		1.2436	X210CrW12		1.4920	X15CrMo12 1
		1.2601	X165CrMoV12		1.4924	-
		1.2706	X3NiCrMo18 8 5		1.4718	X45CrSi9 3
		1.2709	X2NiCoMoTi18 9 5		1.4845	X12CrNi25 21
		1.2201	X165CrV12		1.4878	X12CrNiTi18 9
		1.2376	X96CrMoV12		1.4742	X10CrAl18
		1.2379	X155CrMo12 1		1.4923	X22CrMoV12 1
		1.2609	X165CrVMo12 1			
		1.2631	X50CrMoW9 1 1			
		1.2880	X165CrCoMo12			

ALU & ALLOYS , COPPER & ALLOYS, THERMO PLASTICS pag. 70

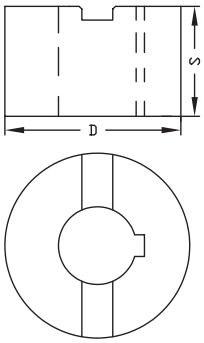
FRESE FRONTALI

SHELL END MILLS

STIRNFRÄSER

FREZY NASADZANE

SHELL



ISO 2586
DIN 1880
DIN 841

080 Frese frontali a sgrossare semifinire
Shell end mills for roughing and semifinishing

Semifinire
Semifinishing
Schrupp-Schlicht
Półwykończeniowa

HSS M42Co8

NF2 Sil F2

λ 30° γ 10°

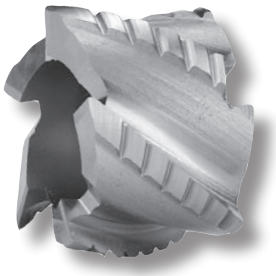
085 Frese frontali a sgrossare
Shell end mills for roughing

HSS M42Co8

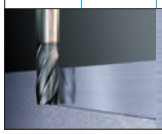
ALU

WF Alu Form

λ 38° γ 17°



D	S	Foro	Din			080	*Uncoated* SIL	NIG	Z	085	*Uncoated* SIL	NIG	Z
k12							€	€			€	€	
40	32	16	1880			080040	137,90	158,10	6	085040	163,50	183,30	5
50	36	22	1880			080050	172,90	199,40	6	085050	206,90	234,80	5
50	50	22	841			080505	216,40	253,70	6				
63	40	27	1880			080063	237,90	280,80	8	085063	282,70	325,30	5
80	45	27	1880			080080	383,70	462,70	10	085080	410,00	489,10	5
100	50	32	1880			080100	610,10	771,10	10	085100	577,30	738,40	6



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.146

Lavorazioni, Machining Process

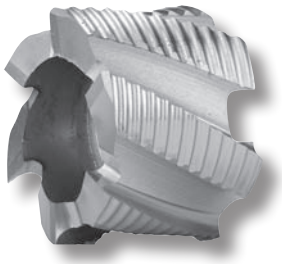
Lavorazioni, Machining Process

080A Frese frontali a sgrossare in PM
Shell end mills for roughing in PM

HSS PMCoF

NRF F Form

λ 30° γ 8°



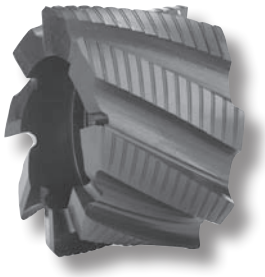
080S Frese frontali a sgrossare
SIL F2000

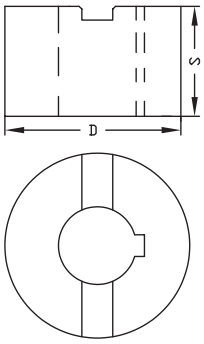
Shell end mill for roughing

HSS PMCoF

HPC SILF2000

λ 30° γ 10°

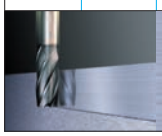




ISO 2586
DIN 1880

Uncoated

D	S	Foro	Din			080A	SIL	NIG	Z	080S		NIG	Z
k12							€	€				€	
40	32	16	1880			08A040	178,00	198,50	6	08S040		209,20	6
50	36	22	1880			08A050	244,90	272,60	8	08S050		288,40	6
63	40	27	1880			08A063	359,00	401,80	8	08S063		425,00	8
80	45	27	1880			08A080	502,30	580,20	10	08S080		612,60	10
100	50	32	1880			08A100	770,30	895,40	10	08S100		951,20	10



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania

Pag.146

Lavorazioni, Machining Process

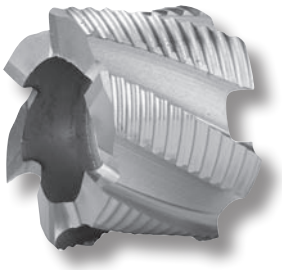
Lavorazioni, Machining Process

080B Frese frontali a sgrossare
Shell end mills for roughing

HSS M42Co8

NRB B Form

λ 30° γ 12°

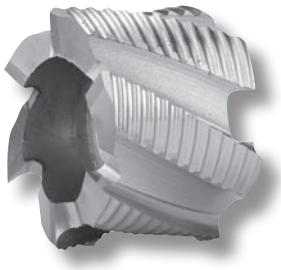


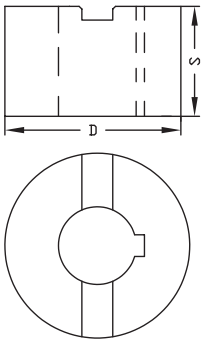
080F Frese frontali a sgrossare
Shell end mills for roughing

HSS M42Co8

NRF F Form

λ 30° γ 12°

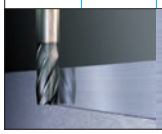




ISO 2586
DIN 1880
DIN 841

Uncoated

D k12	S	Foro	Din	080B	SIL €	NIG €	Z	080F	SIL €	NIG €	Z
40	32	16	1880	08B040	127,60	147,60	6	08F040	127,60	147,60	6
40	40	16	841					08F404	185,00	222,30	6
50	36	22	1880	08B050	173,10	201,30	6	08F050	173,10	201,30	6
50	50	22	841	08B505	216,40	253,70	6	08F505	216,40	253,70	6
60	60	27	841	08B606	304,90	364,10	8	08F606	304,90	364,10	8
63	40	27	1880	08B063	237,90	280,80	8	08F063	237,90	280,80	8
75	75	27	841	08B757	502,30	662,40	10	08F757	502,30	662,40	10
80	45	27	1880	08B080	383,70	462,20	10	08F080	383,70	462,20	10
100	50	32	1880	08B100	610,10	771,10	10	08F100	610,10	771,10	10
125	56	40	1880	08B125	823,90	1041,00	12	08F125	823,90	1041,00	12
160	63	50	1880	08B160	1495,00	1813,80	14				



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.146

Lavorazioni, Machining Process

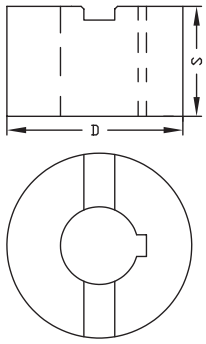
Lavorazioni, Machining Process

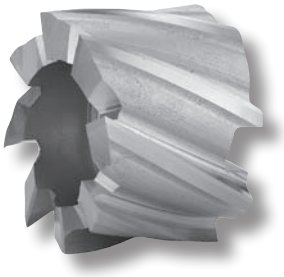
180A Frese frontali a finire in PM
Shell end mills for finishing in Powder Metal

HSS PMCoF

HS

λ 30°
γ 10°





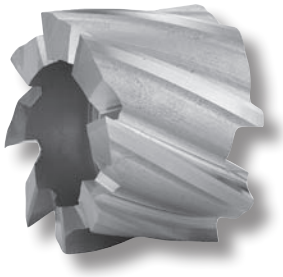
ISO 2586
DIN 1880
DIN 841

180 Frese frontali a finire
Shell end mills for finishing

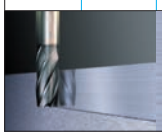
HSS M42Co8

NS

λ 30°
γ 12°



D	S	Foro	Din			180A	SIL (Uncoated)	NIG (Uncoated)	Z	180	SIL (Uncoated)	NIG (Uncoated)	Z
k10							€	€			€	€	
40	32	16	1880			18A040	183,60	202,50	8	180040	120,00	140,80	6
40	40	16	841							180404	153,90	191,60	6
50	36	22	1880			18A050	241,10	268,70	8	180050	156,70	184,70	8
50	50	22	841							180505	205,80	243,10	8
60	60	27	841							180606	277,10	336,60	8
63	40	27	1880			18A063	375,40	418,30	10	180063	226,00	269,40	8
75	75	27	841							180757	429,70	589,60	8
80	45	27	1880			18A080	555,90	633,60	10	180080	343,90	422,60	10
100	50	32	1880			18A100	852,40	1012,10	10	180100	543,20	704,40	10
125	56	40	1880							180125	697,80	915,40	12
160	63	50	1880							180160	1499,30	1819,20	14

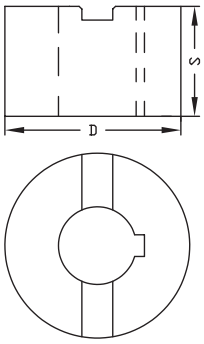


PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.146

Lavorazioni, Machining Process

Lavorazioni, Machining Process

185 Frese frontali a finire
Shell end mills for finishing



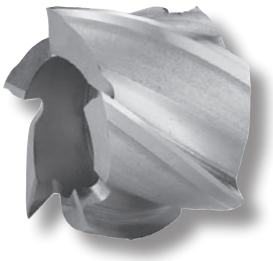
ISO 2586
DIN 1880

HSS M42Co8

W

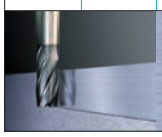
λ 38°
γ 17°

ALU



Uncoated

D	S	Foro	Din			185	SIL	NIG	Z				
k10							€	€					
40	32	16	1880			185040	148,90	168,90	5				
50	36	22	1880			185050	186,20	214,10	5				
63	40	27	1880			185063	248,10	291,40	5				
80	45	27	1880			185080	371,60	450,80	5				
100	50	32	1880			185100	538,30	699,50	6				



PARAMETRI DI TAGLIO
Cutting data, Schneideparameter, Parametry skrawania
Pag.146

Lavorazioni, Machining Process

FRESE CON FORO

SHELL END MILLS

WALZENSTIRNFRÄSER

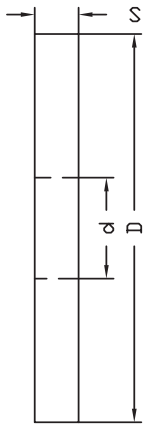
FREZY TARCZOWE

DISCO

102 Frese a disco
Side milling cutters

HSSCo

λ 0°
γ 10°



ISO 2587

DIN 885B

Uncoated

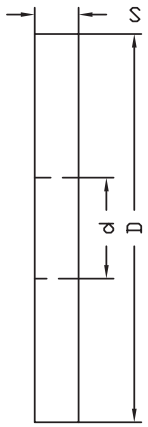
D	S	d	Z	102	SIL
js16	k11				€
63	4	22	22	102204	104,20
63	5	22	22	102205	107,40
63	6	22	22	102206	107,40
63	8	22	22	102208	118,10
63	10	22	22	102210	131,40
63	12	22	20	102212	137,50
63	14	22	20	102214	144,50
80	6	27	24	102306	144,50
80	8	27	24	102308	148,90
80	10	27	24	102310	161,50
80	12	27	24	102312	173,70
80	14	27	20	102314	185,60
80	16	27	20	102316	195,70
100	6	27	26	102406	185,60
100	8	27	26	102408	202,60
100	10	27	26	102410	219,00
100	12	27	26	102412	237,90
100	14	27	22	102414	253,70
100	16	27	22	102416	268,20
125	10	32	30	102510	292,70
125	12	32	24	102512	315,60
125	14	32	24	102514	338,80
125	16	32	24	102516	369,20
125	18	32	24	102518	412,60
125	20	32	24	102520	443,60

SILMAX

101 Frese a disco
Side milling cutters

HSSCo

λ 12°
γ 10°

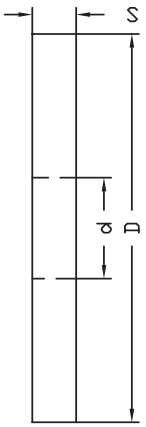


ISO 2587

DIN 885A

Uncoated

D	S	d	Z	101	SIL
js16	k11				€
50	3	16	14	101103	101,00
50	4	16	14	101104	89,10
50	5	16	14	101105	89,10
50	6	16	14	101106	94,80
50	7	16	14	101107	99,20
50	8	16	14	101108	99,20
50	9	16	14	101109	111,80
50	10	16	14	101110	111,80
63	3	22	16	101203	127,60
63	4	22	16	101204	104,20
63	5	22	16	101205	107,40
63	6	22	16	101206	107,40
63	7	22	14	101207	113,00
63	8	22	14	101208	118,10
63	9	22	14	101209	124,90
63	10	22	14	101210	131,40
63	12	22	14	101212	137,50
63	14	22	16	101214	144,50
80	3	27	18	101303	154,70
80	4	27	18	101304	127,60
80	5	27	18	101305	136,40
80	6	27	18	101306	144,50
80	7	27	16	101307	148,30
80	8	27	16	101308	148,30
80	9	27	16	101309	154,70
80	10	27	16	101310	161,50
80	12	27	16	101312	173,70
80	14	27	16	101314	185,60
80	16	27	16	101316	195,70



101 Frese a disco
Side milling cutters

HSSCo

λ 12°
γ 10°

ISO 2587

DIN 885A

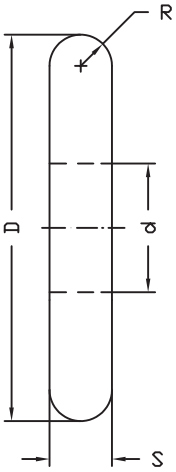
Uncoated

D	S	d	Z	101	SIL
js16	k11				€
100	3	32	22	101403	212,70
100	4	32	22	101404	172,90
100	5	32	22	101405	177,40
100	6	32	22	101406	185,60
100	7	32	18	101407	194,40
100	8	32	18	101408	202,60
100	9	32	18	101409	210,20
100	10	32	18	101410	219,00
100	12	32	18	101412	237,90
100	14	32	18	101414	253,70
100	16	32	18	101416	268,20
125	4	32	24	101504	261,90
125	5	32	24	101505	258,00
125	6	32	24	101506	258,00
125	7	32	20	101507	268,20
125	8	32	20	101508	274,50
125	10	32	20	101510	292,70
125	12	32	20	101512	315,60
125	14	32	20	101514	338,80
125	16	32	20	101516	369,20
125	18	32	20	101518	412,60
125	20	32	20	101520	443,60
160	5	40	26	101605	423,40
160	6	40	26	101606	382,40
160	7	40	26	101607	431,00
160	8	40	26	101608	402,50
160	10	40	22	101610	435,40
160	12	40	22	101612	468,90
160	14	40	22	101614	505,40
160	16	40	24	101616	536,90
160	18	40	24	101618	581,60
160	20	40	22	101620	613,40

10E Frese semicircolari
Half circle cutters

HSSCo

λ 0°
γ 8°



ISO 3860

DIN 856

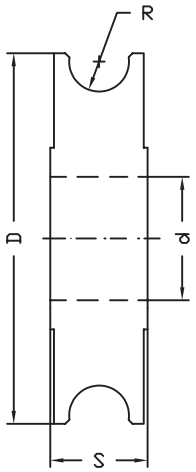
Uncoated

r	D	d	S	Z	10E	SIL
h11	js16					€
2	50	16	4	14	10E502	109,90
2,5	63	22	5	12	10E625	124,70
3	63	22	6	12	10E603	124,70
3,5	63	22	7	12	10E635	149,50
4	63	22	8	12	10E604	149,50
4,5	63	22	9	12	10E645	163,50
5	63	22	10	12	10E605	163,50
5,5	80	27	11	12	10E855	191,90
6	80	27	12	12	10E806	191,90
6,5	80	27	13	12	10E865	206,40
7	80	27	14	12	10E807	214,50
7,5	80	27	15	12	10E875	233,60
8	80	27	16	12	10E808	233,60
8,5	100	32	17	12	10E185	291,60
9	100	32	18	12	10E109	291,60
9,5	100	32	19	12	10E195	342,00
10	100	32	20	12	10E110	342,00

10F Frese semicircolari
Half circle cutters

HSSCo

λ 0°
γ 8°

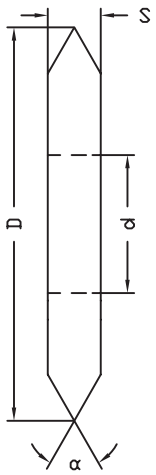


ISO 3860

DIN 855A

Uncoated

r	D	d	S	Z	10F	SIL
H11	js16					€
2	50	16	9	14	10F502	131,90
2,5	63	22	10	12	10F625	138,30
3	63	22	12	12	10F603	158,50
3,5	63	22	14	12	10F635	173,90
4	63	22	16	12	10F604	190,70
4,5	63	22	18	12	10F645	205,40
5	63	22	20	12	10F605	215,90
5,5	80	27	22	12	10F855	234,10
6	80	27	24	12	10F806	267,50
6,5	80	27	26	12	10F865	299,70
7	80	27	28	12	10F807	318,70
7,5	80	27	30	12	10F875	382,40
8	80	27	32	12	10F808	400,70
8,5	100	32	34	12	10F185	423,40
9	100	32	34	12	10F109	478,30
9,5	100	32	36	12	10F195	520,60
10	100	32	36	12	10F110	535,70



10A Frese ad angolo
Double angle cutters

HSSCo

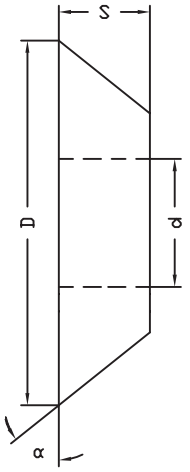
λ 0°
γ 0°

ISO 6108

DIN 847

Uncoated

α	D	S	d	Z	10A	SIL
± 30'	js16					€
45°	50	8	16	16	10A504	130,60
45°	63	10	22	18	10A634	171,70
45°	80	12	27	18	10A804	256,20
45°	100	18	32	20	10A104	367,90
60°	50	10	16	16	10A506	134,60
60°	63	14	22	18	10A636	177,40
60°	80	18	27	18	10A806	256,20
60°	100	25	32	20	10A106	392,40
90°	50	14	16	16	10A509	140,80
90°	63	20	22	18	10A639	195,70
90°	80	22	27	18	10A809	285,80
90°	100	32	32	20	10A109	422,70



10B Frese ad angolo
Double angle cutters

HSSCo

λ 0°
γ 3°

DIN 842A

Uncoated

α	D	S	d	Z	10B	SIL
± 25'	js16					€
45°	40	10	10	14	10B404	120,00
45°	50	13	13	16	10B504	146,50
45°	63	18	16	16	10B634	200,00
45°	80	22	22	18	10B804	311,10
45°	100	28	28	20	10B104	526,70
50°	40	13	10	14	10B405	120,00
50°	50	16	13	16	10B505	146,50
50°	63	20	16	16	10B635	200,00
50°	80	25	22	18	10B805	311,10
50°	100	32	27	20	10B105	526,70
60°	40	13	10	14	10B406	120,00
60°	50	16	13	16	10B506	146,50
60°	63	20	16	16	10B636	200,00
60°	80	25	22	18	10B806	311,10
60°	100	32	27	20	10B106	526,70

DISCO

Altri Prodotti

Other cutters
Andere Produkte
Pozostałe produkty

ALTRE FRESE

Other Cutters
Andere Fräser
Pozostałe frezy

ALTRE

FRESE SEDI VITI

Counterborers
Flachsenker
Pogłębiacze

FSB

SVASATORI

Countersinking
Kegelsenker
Fazowniki

PSV

MULTIFUNZIONALI

V-Plus

V Plus

ALESATORI

Reamer
Reibahlen
Rozwiertaki

ALR

PUNTE A CENTRARE
PUNTE A GRADINO

Center Drills - Subland drills
Zentrierbohrer - Mehrfasen/Stufenbohrer
Nawiertaki - Wiertła stopniowe

PCC / UTP

LIME ROTATIVE

Rotary burrs
Frässtifte
Frezy pilnikowe

LIME

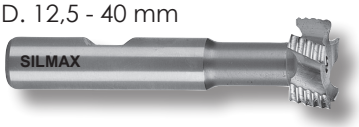
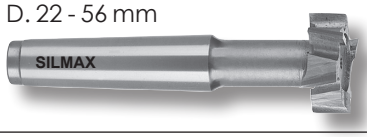
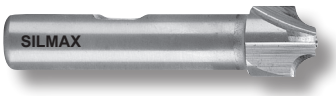
BARRETTE E
BULINI

Tool-bits, Burins
Stäbe und Gravierstichel
Półwyroby z HM

BAR

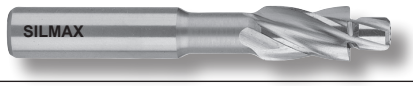
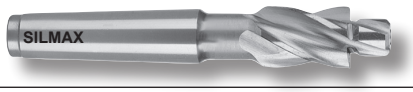
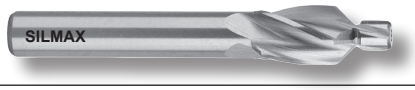
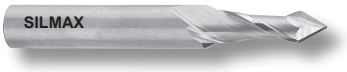
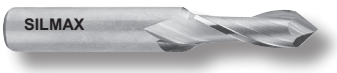
ALTRE FRESE

Other Cutters
Andere Fräser
Pozostałe frezy

Cod.				Pag.
005F	D. 12,5 - 40 mm 	**Frese a "T"** T-slot cutters "T" Nutenfräser Frezy T-owe	HSS M42Co8 3337 851AB Z=4/8 λ 25°	211
008F	D. 18 - 60 mm 	**Frese a "T"** T-slot cutters "T" Nutenfräser Frezy T-owe	HSS M42Co8 3337 851B Z=5/10 λ 25°	211
105T	D. 12,5 - 32 mm 	**Frese a "T"** T-slot cutters "T" Nutenfräser Frezy T-owe	HSSE 3337 851AA Z=6/8 λ 15°	210
108T	D. 22 - 56 mm 	**Frese a "T"** T-slot cutters "T" Nutenfräser Frezy T-owe	HSSE 3337 851B Z=6/10 λ 15°	210
1W5	D. 10,5 -25,5 mm 	**Frese Woodruff** Woodruff cutters Woodruff Schlichtfräser Frezy typu Woodruff	HSSE DIN 850B Z=6/8 λ 10°	212
10C	D.16-25 mm  **Convergente**	**Frese ad angolo** Dovetail cutters Winkelfräser Frezy kątowe	HSSE 3859 1833B Z=8/10 λ 0°	213
10D	D.16-25 mm  **Divergente**	**Frese ad angolo** Dovetail cutters Winkelfräser Frezy kątowe	HSSE 3859 1833A Z=8/10 λ 0°	213
10G	R. 1,0 - 20 mm 	**Frese a quarto di cerchio** Quarter circle cutters Viertelkreisfräser Fazowniki promieniowe	HSSE DIN 6518B Z=4/6 λ 6°	214
10G	R.0,5 - 2,5 mm 	**Frese a quarto di cerchio** Quarter circle cutters Viertelkreisfräser Fazowniki promieniowe	MG Co Silmax Norm Z=2 λ 0°	214

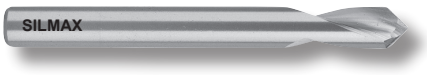
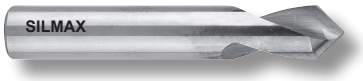
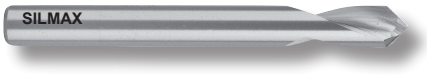
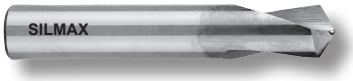
SEDI VITI
SVASATORI
ALESATORI

Counterborers, Countersinking cutters, Reamers
Flachsenker, Kegelsenker, Reibahlen
Pogłębiacze, Fazowniki, Rozwiertaki

Cod.				Pag.
401	M3 - M12 	**Sedi viti 180°** Counterborers Flachsenker Pog□□biacze	HSSE · 4205 373 · 180°	215
402	M10 - M20 	**Sedi viti 180°** Counterborers Flachsenker Pogłębiacze	HSSE · 4205 373 · 180°	215
403	M3 - M10 	**Sedi viti 90°** Counterborers Flachsenker Pogłębiacze	HSSE · 4206 1866 · 90°	215
361	D. 6,3 - 25 mm 	**Svasatori 60°** Countersinking Kegelsenker Fazowniki	HSSE · DIN 333C · 60° · Z=3	216
362	D. 4,3 - 31 mm 	**Svasatori 90°** Countersinking Kegelsenker Fazowniki	HSSE · DIN 333C · 90° · Z=3	216
367	D. 12,4 - 31 mm 	**Svasatori 90°** Countersinking Kegelsenker Fazowniki	HSSE · DIN 335C · 90° · Z=3	217
363	D. 8 - 25 mm 	**Svasatori 120°** Countersinking Kegelsenker Fazowniki	HSSE · DIN 333C · 120° · Z=3	217
320	D. 1 - 10 mm 	**V Plus 60°**	MG Co10 · Silmax Norm · 60° · λ 30°	219
330	D. 1 - 10 mm 	**V Plus 90°**	MG Co10 · Silmax Norm · 90° · λ 30°	219
503	D. 0,95 - 12,47 mm 	**Alesatori** Reamer Reibahlen Rozwiertaki	MG Co · 212B · Z=4/6	221

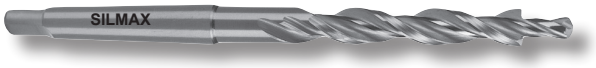
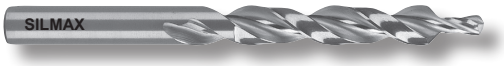
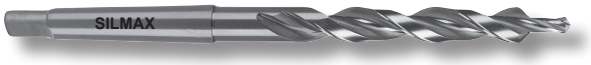
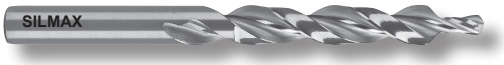
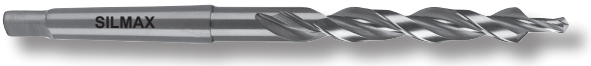
PUNTE A CENTRARE

Center Drills
Zentrierbohrer
Nawiertaki

Cod.			Pag.
357	D. 3 - 20 mm 	HSSE · ISO 10898 · 90° · λ 20°	225
357	D. 3 - 16 mm 	MG Co10 · Silmax Norm · 90° · λ 20°	225
358	D. 3 - 20 mm 	HSSE · ISO 10898 · 120° · λ 20°	225
358	D. 3 - 12 mm 	MG Co10 · Silmax Norm · 120° · λ 20°	225
351	d 1 - 5 mm 	MGCo · 60° · λ 0°	222
351	D. 1 - 6,3 mm 	HSSE · DIN 333A · 60°	222
350	D. 1 - 4 mm 	HSSE · Silmax Norm · 60°	222
355	D. 1,6 - 6,3 mm 	HSSE · DIN 333A · 60°	222
352	D. 1 - 6,3 mm 	HSSE · DIN 333R	223
356	D. 1,6 - 6,3 mm 	HSSE · DIN 333R	223
353	D. 1,5 - 6 mm 	HSSE · DIN 333B	224

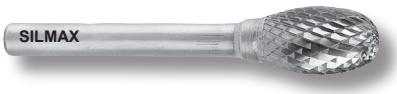
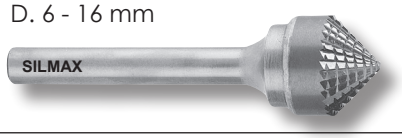
PUNTE A GRADINO

Subland drills
Mehrfasen/Stufenbohrer
Wiertła stopniowe

Cod.			Pag.
301	M3 - M10 	HSS DIN 8376 180°	226
302	M5 - M20 	HSS DIN 8377 180°	227
311	M3 - M8 	HSS DIN 8374 90°	228
312	M5 - M14 	HSS DIN 8375 90°	228
321	M3 - M12 	HSS DIN 8378 90°	229
322	M8 - M20 	HSS DIN 8379 90°	229

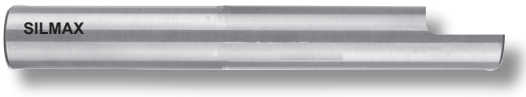
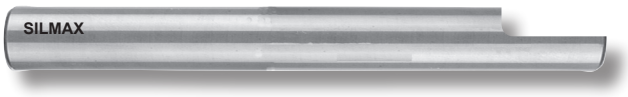
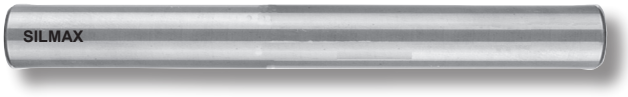
LIME ROTATIVE

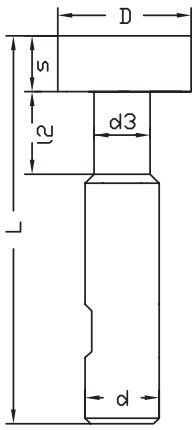
Rotary burrs
Frässtifte
Frezy pilnikowe

Cod.					Pag.
401 405	D. 6 - 16 mm 	 401	 405	MG Co10 · ZYA	231
410	D. 6 - 16 mm 			MG Co10 · WRC	232
420	D. 6 - 16 mm 			MG Co10 · KEL	232
430	D. 6 - 16 mm 			MG Co10 · RBF	233
440	D. 6 - 16 mm 			MG Co10 · SPG	233
450	D. 6 - 16 mm 			MG Co10 · SKM · α	234
460	D. 6 - 16 mm 			MG Co10 · TRE	234
470	D. 6 - 16 mm 			MG Co10 · KSK · 90°	235
475	D. 6 - 16 mm 			MG Co10 · KSJ · 60°	235
480	D. 6 - 16 mm 			MG Co10 · KUD	236
490 495	D. 6 - 12 mm 	 490	 495	MG Co10 · WKN · 15°	237

BARRETTE
BULINI

Tool-bits, Burins
Stäbe und Gravierstichel
Półwyroby z HM

Cod.			Pag.
210	D. 3 - 16 mm 	MG Co10	239
220	D. 3 - 16 mm 	MG Co10	239
HMM	D. 3 - 20 mm 	MG Co10	238



105T Frese a "T" a finire
Finishing T-slot cutters

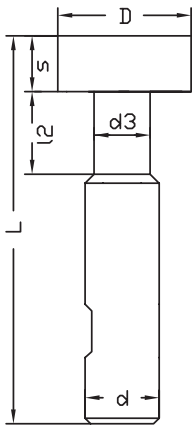
HSSE
ISO 3337
DIN 851AA
λ 15° γ 12°
N

108T Frese a "T" a finire
Finishing T-slot cutters

HSSE
ISO 3337
DIN 851B
λ 15° γ 12°
N

D	S	L	d	d3	l2	105T	SIL	NIG	Z
						Uncoated			
d11	d11		h6				€	€	
12,5	6	57	10	5	7	105T12	71,40	80,20	6
16	8	62	10	7	10	105T16	85,40	97,10	6
18	8	70	12	8	13	105T18	99,80	114,70	6
19	9	70	12	8	13	105T19	105,50	120,40	6
21	9	74	12	10	16	105T21	114,30	134,90	6
22	10	74	12	10	16	105T22	120,00	140,50	6
25	11	82	16	12	17	105T25	138,30	164,50	6
28	12	85	16	13	20	105T28	156,70	184,80	6
32	14	90	16	15	22	105T32	176,70	209,00	8

D	S	L	MK	d3	l2	108T	SIL	NIG	Z
							Uncoated		
							€	€	
22	10	98	2	10	16	108T22	131,40	155,30	6
25	11	103	2	12	17	108T25	142,70	168,80	6
28	12	106	2	13	20	108T28	171,70	199,80	6
32	14	111	2	15	22	108T32	205,10	237,30	8
36	16	131	3	17	27	108T36	228,50	272,40	8
40	18	138	3	19	27	108T40	282,00	369,60	8
45	20	143	3	21	30	108T45	332,00	439,00	8
50	22	173	4	25	34	108T50	414,60	521,30	10
56	24	182	4	28	40	108T56	544,50	718,20	10



005F Frese a "T" a sgrossare
Roughing T-slot cutters

HSS M42Co8

NRF F Form

λ 25° γ 10°

ISO 3337

DIN 851AB

008F Frese a "T" a sgrossare
Roughing T-slot cutters

HSS M42Co8

NRF F Form

λ 25° γ 10°

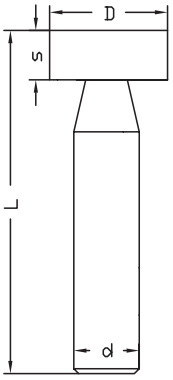
ISO 3337

DIN 851B

D	S	L	d	d3	l2	005F	SIL *Uncoated* €	NIG €	Z
k12			h6						
12,5	6	57	10	5	7	005F12	55,00	64,80	4
16	8	62	10	7	10	005F16	60,70	74,20	5
18	8	70	12	8	13	005F18	69,50	85,50	5
21	9	74	12	10	16	005F21	77,60	100,00	5
22	10	82	16	10	16	005F22	85,90	108,00	5
25	11	82	16	12	17	005F25	98,00	125,10	5
30	12	90	16	14	22	005F30	133,80	162,60	6
32	14	90	16	15	22	005F32	141,30	174,10	6
36	16	108	25	17	27	005F36	193,80	234,40	6
40	18	108	25	19	27	005F40	199,40	248,70	8

D	S	L	MK	d3	l2	008F	SIL *Uncoated* €	NIG €	Z
18	8	82	1	8	13	008F18	84,20	113,30	5
21	9	98	2	10	16	008F21	95,40	137,00	5
25	11	103	2	12	17	008F25	107,40	211,70	5
30	12	111	2	14	22	008F30	138,30	253,70	6
32	14	111	2	15	22	008F32	144,50	284,50	6
36	16	138	3	17	27	008F36	186,20	337,30	6
40	18	138	3	19	27	008F40	220,30	378,70	8
45	20	141	3	21	30	008F45	251,20	415,70	8
50	22	173	4	25	34	008F50	308,10	487,80	8
56	24	179	4	28	40	008F56	388,70	622,90	10
60	28	188	4	30	43	008F60	453,60	687,50	10

1W5 Frese Woodruff
Woodruff cutters



HSSE

λ 10°
γ 10°

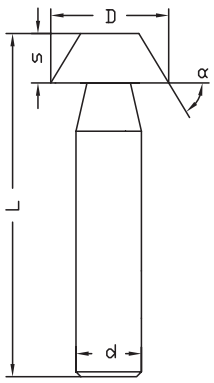
DIN 850B

Uncoated

D	S	L	d	1W5	SIL	Z
h12	e8		h8		€	
10,5	2	50	6	1W5102	52,40	6
10,5	2,5	50	6	1W5125	52,40	6
10,5	3	50	6	1W5103	52,40	6
13,5	2	56	10	1W5132	60,70	8
13,5	3	56	10	1W5133	60,70	8
13,5	4	56	10	1W5134	60,70	8
16,5	3	56	10	1W5163	69,50	8
16,5	4	56	10	1W5164	69,50	8
16,5	5	56	10	1W5165	69,50	8
16,5	6	56	10	1W5166	69,50	8
19,5	3	56	10	1W5193	81,60	8
19,5	4	56	10	1W5194	81,60	8
19,5	5	56	10	1W5195	81,60	8
19,5	6	56	10	1W5196	81,60	8
22,5	4	56	10	1W5224	93,40	8
22,5	5	56	10	1W5225	93,40	8
22,5	6	56	10	1W5226	93,40	8
22,5	8	56	10	1W5228	93,40	8
25,5	5	56	10	1W5255	108,60	8
25,5	6	56	10	1W5256	108,60	8
25,5	7	56	10	1W5257	108,60	8
25,5	8	56	10	1W5258	108,60	8

SILMAX

10C Frese ad angolo convergente
Dovetails cutters



HSSE

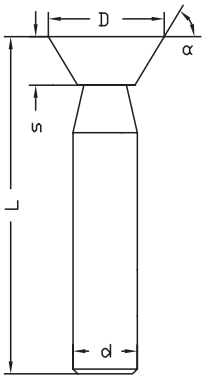
λ 0°
γ 0°

ISO 3859

Uncoated

α	D	S	L	d	10C	SIL	Z
+/-30'	js16			h8		€	
45°	16	4,0	60	12	10C164	63,90	8
45°	20	5,0	63	12	10C204	83,40	8
45°	25	6,3	67	16	10C254	102,30	10
60°	16	6,3	60	12	10C166	63,90	8
60°	20	8,0	63	12	10C206	83,40	8
60°	25	10,0	67	16	10C256	102,30	10
70°	16	7,0	60	12	10C167	63,90	8
70°	20	9,0	63	12	10C207	83,40	8
70°	25	11,0	67	16	10C257	102,30	10

10D Frese ad angolo divergente
Dovetails cutters



HSSE

λ 0°
γ 0°

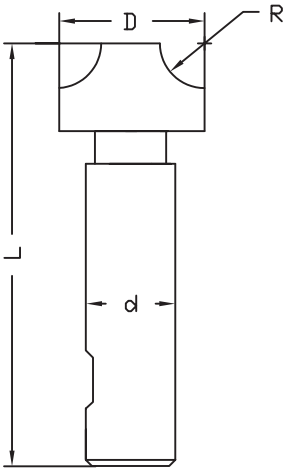
ISO 3859

Uncoated

α	D	S	L	d	10D	SIL	Z
+/-30'	js16			h8		€	
45°	16	4,0	60	12	10D164	63,90	8
45°	20	5,0	63	12	10D204	83,40	8
45°	25	6,3	67	16	10D254	102,30	10
60°	16	6,3	60	12	10D166	63,90	8
60°	20	8,0	63	12	10D206	83,40	8
60°	25	10,0	67	16	10D256	102,30	10
70°	16	7,0	60	12	10D167	63,90	8
70°	20	9,0	63	12	10D207	83,40	8
70°	25	11,0	67	16	10D257	102,30	10

SILMAX

10G Frese a quarto di cerchio
Quarter circle cutters



HSSE

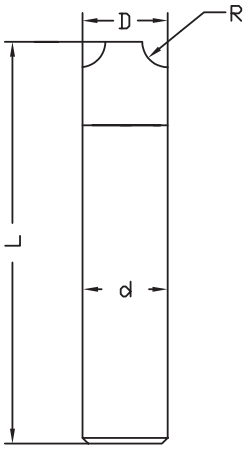
Z4/6

λ 6°
γ 6°

DIN 6518B

Uncoated

r	D	L	d	10G	SIL	NIG
H11			h6		€	€
1	8	60	10	10G101	67,70	74,10
1,5	9	60	10	10G115	67,70	74,10
2	10	60	10	10G102	67,70	74,10
2,5	11	60	10	10G125	67,70	74,10
3	12	60	12	10G103	67,70	75,60
3,5	14	60	12	10G135	71,40	79,40
4	14	60	12	10G104	71,40	79,40
4,5	16	60	12	10G145	85,90	96,80
5	16	60	16	10G205	85,90	96,80
5,5	20	67	16	10G255	94,00	104,90
6	20	67	16	10G206	94,00	104,90
6,5	24	71	16	10G265	113,00	124,00
7	24	71	16	10G207	113,00	124,00
7,5	24	71	16	10G275	113,00	124,00
8	24	71	16	10G208	113,00	124,00
8,5	28	85	20	10G385	140,80	154,10
9	28	85	20	10G309	140,80	154,10
9,5	28	85	20	10G395	140,80	154,10
10	28	85	20	10G310	140,80	154,10
10,5	32	90	20	10G315	175,50	192,10
11	32	90	20	10G311	175,50	192,10
12	34	90	20	10G312	175,50	192,10
14	44	100	20	10G414	256,90	273,40
15	46	100	20	10G415	359,70	376,30
16	48	100	20	10G516	359,70	376,30
18	52	112	20	10G618	513,70	535,00
20	58	112	20	10G620	599,40	619,90



10G Frese a quarto di cerchio
Quarter circle cutters

CARBIDE

MGCo

Z2

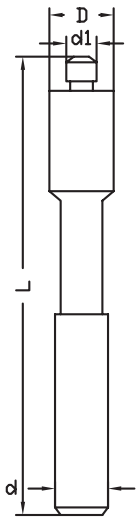
NS

λ 0°

Silmax Norm

Uncoated

r	D	L	d	10G	HM0	HMG
±0,02	±0,1		h6		€	€
0,5	4	50	4	10G005	51,10	57,70
0,6	4	50	4	10G006	51,10	57,70
0,8	4	50	4	10G008	51,10	57,70
1,0	4	50	4	10G101	51,10	57,70
1,25	6	50	6	10G112	63,10	70,10
1,5	6	50	6	10G115	63,10	70,10
2,0	8	50	8	10G102	77,30	86,50
2,5	8	50	8	10G125	77,30	86,50



401 Sedi viti
Counterborers

HSSE
180°
ISO 4205
DIN 373

Uncoated

402 Sedi viti
Counterborers

HSSE
180°
ISO 4205
DIN 373

Uncoated

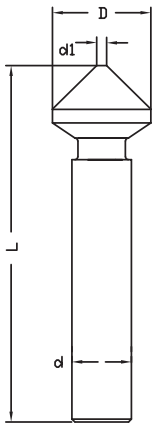
403 Sedi viti
Counterborers

HSSE
90°
ISO 4206
DIN 1866

Uncoated

dv	d1	D	L	d	z	401	FSB	402	FSB	403	FSB
	e8	z9		h8			€		€		€
M3	3,2	6	71	6	4	401003	17,10				
M4	4,3	7.4	71	8	4	401004	17,10				
M5	5,3	9.4	80	10	4	401005	19,70				
M6	6,4	10.4	80	10	4	401006	23,50				
M8	8,4	13.5	100	12	4	401008	28,90				
M10	10,5	16.5	100	12	4	401010	36,20				
M12	13	20	100	12	4	401012	43,10				
dv	d1	D	L	Mk	z						
M10	10,5	16.5	145	2	4			402010	49,20		
M12	13	20	150	2	4			402012	61,80		
M14	15	23	160	2	4			402014	72,10		
M16	17	25	165	2	4			402016	80,40		
M18	19	28	175	2	4			402018	104,80		
M20	21	31	200	3	4			402020	140,10		
dv	d1	D	L	d	z						
M3	3,2	6.5	71	6	4					403003	18,80
M4	4,3	8.6	71	8	4					403004	18,80
M5	5,3	10.6	80	10	4					403005	26,10
M6	6,4	12.6	80	10	4					403006	27,80
M8	8,4	16.7	100	12	4					403008	40,30
M10	10,5	20.7	100	12	4					403010	43,10

361 Svasatori
Countersinking



HSSE

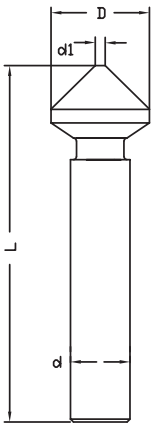
Z 3

60°

DIN 333 C

D	d1	d	L	361	PSV	NIG
±0,05		h8			€	€
6,3	1,5	5	47	361063	16,60	20,90
8,3	2	6	52	361083	18,00	23,70
10,4	2,5	6	53	361104	17,80	25,90
12,4	3	8	60	361124	22,00	29,00
16,5	4	10	65	361165	24,40	36,70
20,5	4	10	69	361205	36,10	47,50
25,0	5	10	75	361250	48,90	70,00

Uncoated



D	d1	d	L
4,3	1,3	4	40
5,3	1,5	4	40
6,3	2,0	5	45
7,3	2,0	6	50
8,3	2,5	6	50
9,4	3,0	6	50
10,4	3,0	6	50
12,4	3,0	8	56
16,5	4,0	10	60
20,5	4,0	10	63
25,0	4,0	10	67
31,0	4,0	12	71

362 Svasatori
Countersinking

HSSE

Z 3

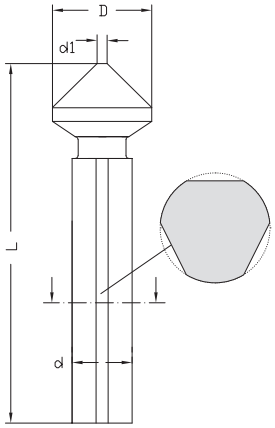
90°

DIN 333 C

362	PSV	NIG
	€	€
362043	17,80	22,20
362053	17,80	22,20
362063	14,00	19,60
362073	13,30	20,80
362083	13,30	20,80
362094	13,80	21,90
362104	14,00	22,00
362124	16,70	24,50
362165	26,30	32,80
362205	31,30	40,30
362250	44,40	58,60
362310	69,50	99,40

Uncoated

367 Svasatori per l'impiego a mano
Countersinking with flatted shanks

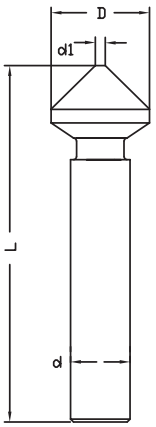


HSSE
Z 3
90°
DIN 335 C

Uncoated

D ±0,05	d1	d h9	L	367	PSV €	NIG €
12,4	3,0	8	56	367124	19,30	28,20
16,5	4,0	10	60	367165	30,30	37,70
20,5	4,0	10	63	367205	36,10	46,40
25,0	4,0	10	67	367250	51,10	67,50
31,0	4,0	12	71	367310	80,00	114,20

363 Svasatori
Countersinking

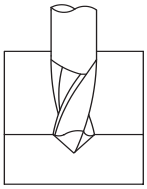


HSSE
Z 3
120°
DIN 333 C

Uncoated

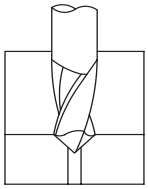
D ±0,05	d1	d h8	L	363	PSV €	NIG €
8,0	2,0	6	49	363080	20,40	25,20
12,5	2,8	8	54	363125	25,40	32,20
16,0	3,2	10	57	363160	33,60	42,80
20,0	3,5	10	59	363200	47,50	61,70
25,0	3,8	10	63	363250	62,60	79,90

330



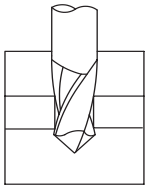
Centratura
Centering
Zentrierung
Nawiercanie

320
330



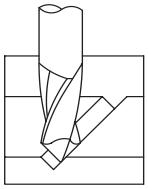
Smusso
Chamfering
Abkantung
Fazowani

330



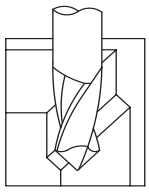
Foratura
Drilling
Bohrung
Wiercenie

330



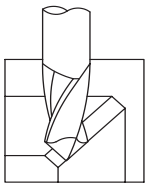
Cava a V
V-Grooving
V-Nut
Rowki w formie V

320
330



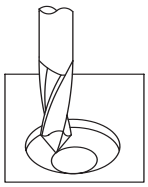
Smusso longitudinale
Chamfer longitudinal
Längsabkantung
Fazowanie krawędzi

320
330



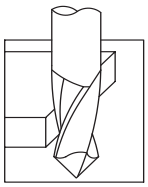
Smusso longitudinale
Chamfer longitudinal
Längsabkantung
Fazowanie krawędzi

330



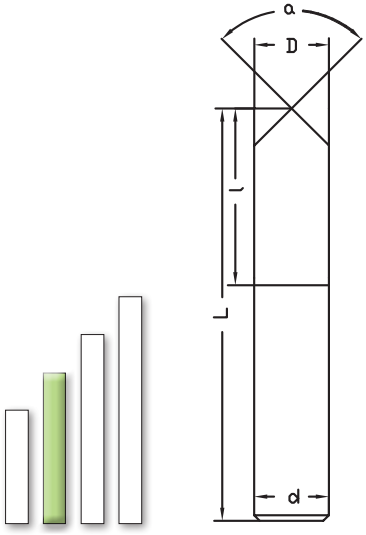
Foratura interpolata
Interpolation drilling
Interpolierte Bohrung
Wiercenie interpolowane

320
330



Contornatura
Contouring
Umfangsfräsen
Frezowanie walcowe

Vc 55-100 m/min	D	fz	D	fz	D	fz
Steel ≤ 500 N/mm² / Steel 500-800 N/mm²	3-4 mm	0,050	3-4 mm	0,050	3-4 mm	0,008
	5-6 mm	0,080	5-6 mm	0,080	5-6 mm	0,014
	8-10 mm	0,140	8-10 mm	0,140	8-10 mm	0,025
	12 mm	0,200	12 mm	0,190	12 mm	0,040
Vc 40-60 m/min	**D**	**fz**	**D**	**fz**	**D**	**fz**
Steel 780-980 N/mm² / Steel 1020-1270 N/mm²	3-4 mm	0,045	3-4 mm	0,004	3-4 mm	0,008
	5-6 mm	0,070	5-6 mm	0,006	5-6 mm	0,013
	8-10 mm	0,120	8-10 mm	0,012	8-10 mm	0,025
	12 mm	0,180	12 mm	0,016	12 mm	0,040
Vc 30-40 m/min	**D**	**fz**	**D**	**fz**	**D**	**fz**
Inox 12% Cr / Inconel	3-4 mm	0,040	3-4 mm	0,003	3-4 mm	0,008
	5-6 mm	0,060	5-6 mm	0,005	5-6 mm	0,013
	8-10 mm	0,110	8-10 mm	0,010	8-10 mm	0,025
	12 mm	0,160	12 mm	0,013	12 mm	0,035
Vc 70-160 m/min	**D**	**fz**	**D**	**fz**	**D**	**fz**
Copper & alloys	3-4 mm	0,100	3-4 mm	0,008	3-4 mm	0,010
	5-6 mm	0,150	5-6 mm	0,010	5-6 mm	0,015
	8-10 mm	0,250	8-10 mm	0,017	8-10 mm	0,030
	12 mm	0,300	12 mm	0,020	12 mm	0,045
Vc 210 m/min	**D**	**fz**	**D**	**fz**	**D**	**fz**
Alu & alloys / Plastics	3-4 mm	0,050	3-4 mm	0,008	3-4 mm	0,008
	5-6 mm	0,090	5-6 mm	0,013	5-6 mm	0,013
	8-10 mm	0,160	8-10 mm	0,023	8-10 mm	0,030
	12 mm	0,200	12 mm	0,030	12 mm	0,045



320 VPlus 60°

MG Co10

V Plus

Silmax Norm

λ 30°

60°

330 VPlus 90°

MG Co10

V Plus

Silmax Norm

λ 30°

90°

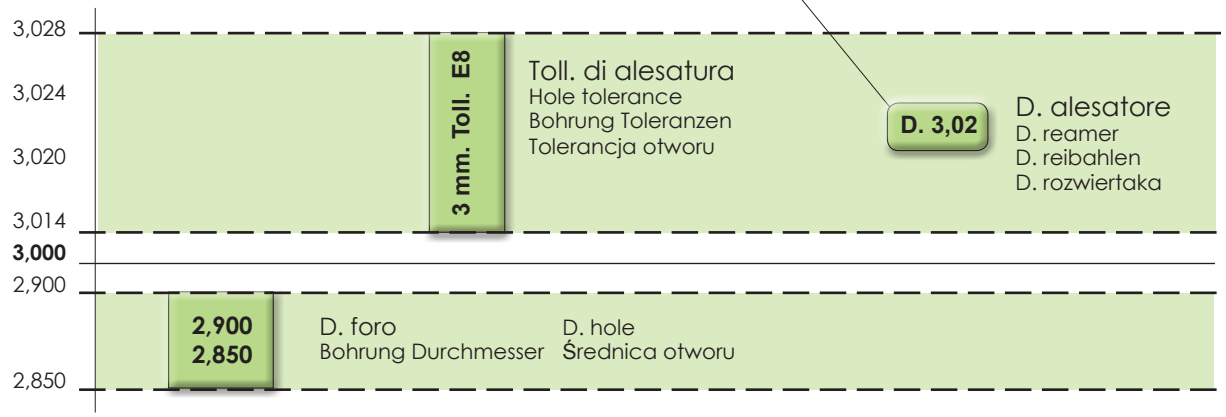
D	d	L	l		Z	320 Uncoated	HM0 €	HMG €	α ±1°	330 Uncoated	HM0 €	HMG €	α ±1°
h9	h6												
1	3	39	2		2	320010	63,60	68,50	60	330010	43,80	48,50	90
2	3	39	4		2	320020	54,40	59,30	60	330020	43,80	48,50	90
3	4	50	6		2	320030	73,80	79,20	60	330030	58,80	64,20	90
4	5	50	8		2	320040	76,50	82,30	60	330040	61,30	67,00	90
5	6	50	10		2	320050	87,30	93,20	60	330050	70,00	75,90	90
6	8	60	12		2	320060	98,90	106,30	60	330060	79,40	86,90	90
8	10	70	16		2	320080	143,10	152,10	60	330080	117,20	126,30	90
10	12	70	18		2	320100	166,60	176,20	60	330100	147,40	157,00	90

VPlus

SCELTA DELL'ALESATORE Reamer choice, Reibahlen Auswahl, Wybór rozwiertaka

Toll.	D. 2 mm	D. 3 mm	D. 4 mm	D. 5 mm	D. 6 mm	D. 8 mm	D. 10 mm	D. 12 mm
D10	2,04	3,04	4,05	5,06	6,06	8,07	10,08	12,10
E8	2,02	**3,02**	4,03	5,03	6,03	8,03	10,03	12,04
E9	2,03	3,03	4,04	5,04	6,04	8,05	10,05	12,06
F7	2,01	3,01	4,01	5,01	6,01	8,02	10,02	12,02
F8	2,01	3,01	4,02	5,02	6,02	8,02	10,02	12,03
G7	-	-	-	-	-	8,01	10,01	12,01
H6	2,00	3,00	4,00	5,00	6,00	8,00	10,00	12,00
H7	-	-	-	-	-	-	-	-
H8	-	-	4,01	5,01	6,01	8,01	10,01	12,01
H9	2,01	3,01	4,02	5,02	6,02	8,02	10,02	12,03
M7	1,99	2,99	3,99	4,99	5,99	7,99	9,99	11,99
N7	1,99	2,99	3,99	4,99	5,99	7,98	9,98	11,98
P7	1,99	2,99	3,98	4,98	5,98	7,98	9,98	11,97
R7	1,98	2,98	3,98	4,98	5,98	7,98	9,98	11,97

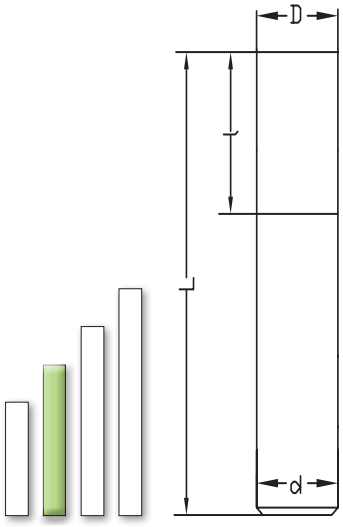
Example



Suggerimenti per lavorare,
Suggested for machining, Empfehlungen für die Bearbeitung, Zalecenia do obróbki

	Vc m/min	25-40	20-25	12-18	10-15	7-12	6-10	25-30	40-60	35-40
		Steel ≤500 N/mm²	Steel 500-800 N/mm²	Steel 780-980 N/mm²	Steel 1020-1270 N/mm²	Inox 12% Cr	Inconel	Copper & alloys	Alu & alloys	Brass
f/giro	**D. 2 mm**	0,15	0,10	0,08	0,08	0,07	0,07	0,12	0,15	0,20
	D. 6 mm	0,15	0,12	0,10	0,09	0,08	0,10	0,18	0,18	0,22
	D.10 mm	0,25	0,18	0,15	0,14	0,12	0,12	0,20	0,25	0,30
	D.16 mm	0,25	0,18	0,20	0,18	0,15	0,15	0,25	0,30	0,35

503 Alesatori
Reamers



MGCo

212-B

Uncoated

D	d	l	L	503	HM0	HMG	Z
	h9				€	€	
0,95-1,05	D	7	33	503...	70,80	76,20	4
1,06-1,55	D	10	40	503...	68,60	73,50	4
1,56-2,36	D	11	50	503...	66,20	70,80	4
2,37-3,44	D	15	57	503...	64,10	68,60	4
3,45-3,75	3,5	18	70	503...	64,10	68,60	6
3,76-4,02	4	19	75	503...	68,60	73,50	6
4,03-4,25	4	19	80	503...	68,60	73,50	6
4,26-4,52	4,5	21	80	503...	68,60	73,50	6
4,53-4,75	5	21	86	503...	68,60	73,50	6
4,76-5,02	5	23	86	503...	75,30	81,40	6
5,03-5,52	5,5	26	93	503...	81,40	90,80	6
5,53-6,00	6	26	93	503...	81,40	90,80	6
6,01-6,52	6	28	100	503...	81,40	90,80	6
6,53-6,70	6	28	100	503...	81,40	90,80	6
6,71-7,02	7	31	109	503...	116,10	126,00	6
7,03-7,50	7	31	109	503...	116,10	126,00	6
7,51-8,02	8	33	117	503...	116,10	126,00	6
8,03-8,50	8	33	117	503...	116,10	126,00	6
8,51-9,02	9	36	125	503...	142,00	154,10	6
9,03-9,50	9	36	125	503...	142,00	154,10	6
9,51-10,02	10	38	133	503...	181,90	195,30	6
10,03-10,60	10	38	133	503...	181,90	195,30	6
10,61-11,47	10	41	142	503...	181,90	195,30	6
11,48-12,02	12	44	150	503...	192,00	206,20	6
12,03-12,47	12	44	151	503...	192,00	206,20	6

D. > 0,95 ≤ 3,00 Toll. D 0 + 0,003
D. > 3,01 ≤ 6,00 Toll. D 0 + 0,004
D. > 6,01 ≤ 12,47 Toll. D 0 + 0,005

ALR

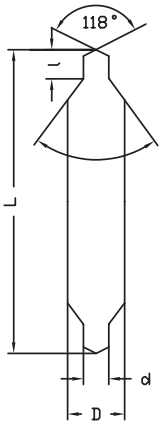
351 Punte a centrare
Center Drills

HSSE

Form A

60°

DIN 333A



D	d	L	l	351	PCC	NIG
h8	k12				€	€
3,15	1	31	1,3-1,6	351100	6,30	10,60
3,15	1,25	31	1,6-1,9	351125	6,30	10,60
4	1,6	35	2,0-2,4	351160	6,30	10,60
5	2	40	2,5-2,9	351200	7,10	12,10
6,3	2,5	45	3,1-3,6	351250	7,80	13,40
8	3,15	50	3,9-4,4	351315	8,90	16,40
10	4	55	5,0-5,6	351400	11,50	19,00
12,5	5	63	6,3-6,9	351500	19,10	28,30
16	6,3	71	8,0-8,6	351630	27,60	45,40

Con piatto sul gambo, with flatted shanks

D	d	L	l	P	355	PCC	NIG
h8	k12					€	€
4	1,6	35	2,0-2,4	3,25	355160	10,20	14,00
5	2	40	2,5-2,9	4,20	355200	11,20	15,80
6,3	2,5	45	3,1-3,6	5,35	355250	12,30	17,70
8	3,15	50	3,9-4,4	6,95	355315	14,80	20,50
10	4	55	5,0-5,6	8,40	355400	23,00	29,70
12,5	5	63	6,3-6,9	10,95	355500	31,10	39,70
16	6,3	71	8,0-8,6	14,00	355630	49,90	65,50

Serie Lunga, Long Series

D	d	L	l	350	PCC	NIG
h8	k12				€	€
4	1	100	1,3-1,6	350100	22,00	30,80
5	1,5	100	2,0-2,4	350150	21,70	30,80
6	2	100	2,5-2,9	350200	21,70	31,40
8	2,5	100	3,1-3,6	350250	21,70	34,00
8	3	100	3,9-4,4	350300	21,70	34,00
10	4	100	5,0-5,6	350400	21,70	37,10

351 Punte a centrare
Center Drills

CARBIDE

MGCo

Form A

λ 0°

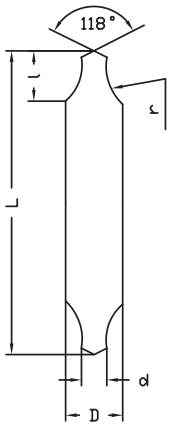
60°

DIN 333A

351	HM0	HMG
	€	€
351100	46,50	52,60
351125	46,50	52,60
351160	46,50	52,60
351200	57,90	64,00
351250	68,70	77,50
351315	83,00	90,20
351400	111,10	120,00
351500	187,40	199,10

PCC

352 Punte a centrare
Center Drills



HSSE

Form R

DIN 333R

D	d	L	l	r	352	Uncoated PCC €	NIG €
h8	k12						
3,15	1	31	3,0-3,3	2,9	352100	6,30	10,60
3,15	1,25	31	3,3-3,6	3,15	352125	6,30	10,60
4	1,6	35	4,2-4,7	4	352160	6,30	10,60
5	2	40	5,0-5,4	5	352200	7,10	12,10
6,3	2,5	45	6,3-6,8	6,3	352250	7,80	13,40
8	3,15	50	8,0-8,5	8	352315	8,90	16,40
10	4	55	10,0-10,6	10	352400	11,30	19,00
12,5	5	63	12,5-13,1	12,5	352500	19,10	28,30
16	6,3	71	16,0-16,6	16	352630	27,90	45,90

356 Punte a centrare con piatto sul gambo
Center Drills with flatted shanks

HSSE

Form R

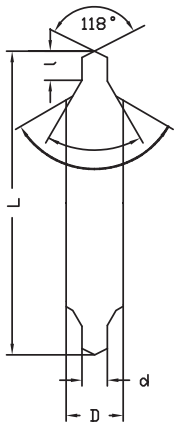
DIN 333R

D	d	L	l	r	356	Uncoated PCC €	NIG €	P
4	1,6	35	4,2-4,7	4	356160	10,20	14,00	3,25
5	2	40	5,0-5,4	5	356200	11,20	15,80	4,20
6,3	2,5	45	6,3-6,8	6,3	356250	12,30	17,70	5,35
8	3,15	50	8,0-8,5	8	356315	14,80	20,50	6,95
10	4	55	10,0-10,6	10	356400	23,00	29,70	8,40
12,5	5	63	12,5-13,1	12,5	356500	31,10	39,70	10,95
16	6,3	71	16,0-16,6	16	356630	49,90	65,50	14,00

PCC

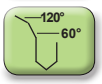
353 Punte a centrare con paracentro

Center Drills with saved angle



HSSE

Form B



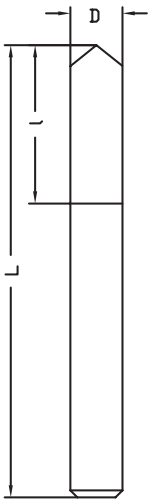
DIN 333B

Uncoated

D	d	L	l	k	353	PCC	NIG
h8	k12					€	€
5	1,50	40	2,0-2,4	3,00	353150	12,10	16,40
6	2,00	45	2,5-2,9	4,00	353200	13,50	17,90
8	2,50	50	3,1-3,6	5,50	353250	15,70	21,50
10	3,00	55	3,9-4,4	7,00	353300	18,80	26,20
10	4,00	55	5,0-5,6	8,00	353400	18,80	26,60
12	5,00	63	6,3-6,9	9,00	353500	26,50	35,30
18	6,00	77	8,0-8,6	12,00	353600	49,70	63,40

357 Punte a centrare
Center Drills

358 Punte a centrare
Center Drills



HSSE
NC
ISO 10898
λ 20°
90°

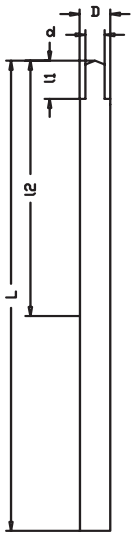
HSSE
NC
ISO 10898
λ 20°
120°

D	L	l	357	Uncoated PCC	NIG	358	Uncoated PCC	Alcrona NIG
h7				€	€		€	€
3	50	10	357003	13,80	16,40	358003	13,80	16,40
4	52	12	357004	13,80	17,60	358004	13,80	17,60
5	60	15	357005	16,00	19,60	358005	16,00	19,60
6	66	20	357006	16,00	20,20	358006	16,00	20,20
8	79	25	357008	20,80	27,10	358008	20,80	27,10
10	89	25	357010	22,90	32,90	358010	22,90	32,90
12	102	30	357012	26,60	36,60	358012	26,60	36,60
14	115	35	357014	37,80	50,30			
16	114	35				358016	39,70	51,00
16	115	35	357016	39,70	51,00			
20	130	40				358020	70,00	88,70
20	131	40	357020	70,00	88,70			

D	L	l	CARBIDE 357	Uncoated HM0	HMG	CARBIDE 358	Uncoated HM0	Alcrona HMG
h6				€	€		€	€
3	45	10	357003	35,40	39,20	358003	35,40	39,20
4	50	12	357004	37,50	41,90	358004	37,50	41,90
5	50	15	357005	40,40	44,80	358005	40,40	44,80
6	50	18	357006	43,00	47,60	358006	43,00	47,60
8	64	23	357008	56,20	62,70	358008	56,20	62,70
10	67	24	357010	79,80	90,20	358010	79,80	90,20
12	74	24	357012	115,60	124,80	358012	115,60	124,80
16	92	32	357016	195,80	210,70			

PCC

301 Punte a gradino
Subland drills



HSS

DIN 8376

180°

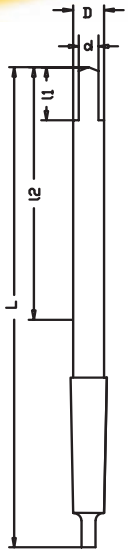
Uncoated

Fil	d	D	l1	l2	L	301	UTP
D	h9	h8					€
M3	3,4	6,0	9	57	93	301003	20,30
M3	3,2	5,9	6	52	88	301031	20,30
M3	3,2	5,9	11	57	93	301032	20,30
M4	4,5	8,0	11	75	117	301004	26,00
M4	4,3	7,4	6	56	98	301041	26,00
M4	4,3	7,4	13	63	105	301042	26,00
M5	5,5	10,0	13	87	133	301005	27,20
M5	5,3	9,4	6	65	110	301051	27,20
M5	5,3	9,4	16	75	120	301052	27,20
M6	6,6	11,0	15	94	142	301006	29,80
M6	6,4	10,4	10	83	133	301061	29,80
M6	6,4	10,4	20	83	133	301062	29,80
*M8	9,0	15,0	19	114	169	301008	48,70
M8	8,4	13,5	13	100	160	301081	48,70
M8	8,4	13,5	23	100	160	301082	48,70
*M10	11,0	18,0	23	130	191	301010	77,60
*M10	10,5	16,5	15	105	176	301101	77,60
*M10	10,5	16,5	25	115	186	301102	77,60

* gambo D. 13,5

UTP

302 Punte a gradino
Subland drills



HSS

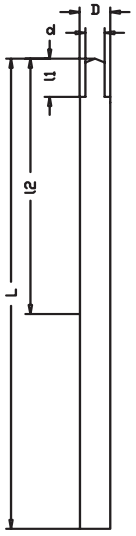
DIN 8377

180°

Uncoated

Fil	d	D	l1	l2	L	Mk	302	UTP
D	h9	h8						€
M5	5,5	10	13	87	168	1	302005	44,10
M5	5,3	9,4	6	77	158	1	302051	44,10
M5	5,3	9,4	16	87	168	1	302052	44,10
M6	6,6	11	15	94	175	1	302006	45,30
M6	6,4	10,4	10	84	165	1	302061	45,30
M6	6,4	10,4	20	94	175	1	302062	45,30
M8	9,0	15	19	114	212	2	302008	77,50
M8	9,0	15	10	105	203	2	302080	77,50
M8	8,4	13,5	13	104	189	1	302081	77,50
M8	8,4	13,5	23	114	199	1	302082	77,50
M10	11,0	18	23	130	228	2	302010	80,60
M10	11,0	18	13	120	218	2	302100	80,60
M10	10,5	16,5	15	120	218	2	302101	80,60
M10	10,5	16,5	25	130	228	2	302102	80,60
M12	14,0	20	27	140	238	2	302012	93,40
M12	14,0	20	17	130	228	2	302120	93,40
M12	13,0	19	17	130	228	2	302121	93,40
M12	13,0	19	27	140	238	2	302122	93,40
M14	16,0	24	31	160	281	3	302014	120,20
M14	16,0	24	21	150	271	3	302140	120,20
M14	15,0	23	21	150	271	3	302141	120,20
M14	15,0	23	31	160	281	3	302142	120,20
M16	18,0	26	35	165	286	3	302016	146,10
M16	18,0	26	25	155	276	3	302160	155,80
M16	17,0	25	25	155	276	3	302161	140,00
M16	17,0	25	35	165	286	3	302162	140,00
M18	20,0	30	39	175	296	3	302018	189,20
M18	20,0	30	29	165	286	3	302180	202,50
M18	19,0	28	29	165	286	3	302181	189,20
M18	19,0	28	39	175	296	3	302182	189,20
M20	22,0	33	43	185	334	4	302020	245,70
M20	22,0	33	33	175	324	4	302200	245,70
M20	21,0	31	33	175	300	3	302201	217,70
M20	21,0	31	43	185	310	3	302202	217,70

UTP



311 Punte a gradino
Subland drills

HSS

DIN 8374

90°

312 Punte a gradino
Subland drills

HSS

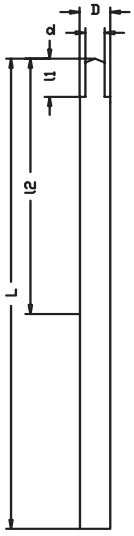
DIN 8375

90°

Fil	d	D	l1	l2	L		311	*Uncoated* UTP	
D	h9	h8						€	
M3	3,4	6,6	9	63	101		311003	21,40	
M3	3,2	6,3	11	52	90		311032	20,20	
M4	4,5	9	11	81	125		311004	27,20	
M4	4,3	8,3	13	63	105		311042	26,00	
M5	5,5	11	13	94	142		311005	32,00	
M5	5,3	10,4	16	83	133		311052	30,80	
M6	6,6	13	15	101	151		311006	48,50	
M6	6,4	12,4	20	90	142		311062	46,50	
*M8	9	17,2	19	130	191		311008	77,60	
*M8	8,4	16,5	23	115	186		311082	75,60	

* gambo D. 13,5

Fil	d	D	l1	l2	L	Mk		312	*Uncoated* UTP
D	h9	h8							€
M5	5,5	11	13	94	175	1		312005	58,50
M5	5,3	10,4	16	84	168	1		312052	58,50
M6	6,6	13	15	101	182	1		312006	63,90
M6	6,4	12,4	20	95	182	1		312062	63,90
M8	9	17,2	19	130	228	2		312008	87,40
M8	8,4	16,5	23	120	223	2		312082	87,40
M10	11	21,5	23	150	248	2		312010	110,40
M10	10,5	20,5	25	135	240	2		312102	110,40
M12	13	25	28	155	281	3		312122	129,50
M14	15	28	31	165	291	3		312142	175,10



321 Punte a gradino per fori da filettare

Subland drills for tapered holes

HSS

DIN 8378

90°

Uncoated

322 Punte a gradino per fori da filettare

Subland drills for tapered holes

HSS

DIN 8379

90°

Uncoated

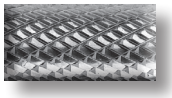
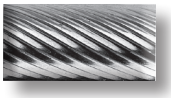
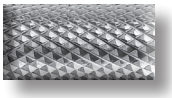
Fil	d	D	l1	l2	L	Mk	321	UTP		322	UTP	
D	h9	h8						€			€	
M3	2,5	3,4	9,0	39	70		321003	18,40				
M4	3,3	4,5	11,0	47	80		321004	18,40				
M5	4,2	5,5	14,0	57	93		321005	19,00				
M6	5	6,6	16,0	63	101		321006	20,30				
M8	6,8	9	21,0	81	125		321008	26,10				
M8	6,8	9	21,0	81	162	1				322008	44,10	
M10	8,5	11	25,0	94	142		321010	31,00				
M10	8,5	11	25,0	94	175	1				322010	55,50	
M12	10,2	14	30,0	108	189	1				322012	77,50	
*M12	10,2	14	30,0	108	160		321012	50,90				
M14	12	16	34,0	120	218	2				322014	80,60	
M16	14	18	38,0	130	228	2				322016	83,00	
M18	15,5	20	43,0	140	238	2				322018	107,20	
M20	17,5	22	47,0	150	248	2				322020	117,30	

* gambo D. 13,5

UTP

SCELTA DELL'UTENSILE,

Tool choice, Werkzeugwahl, Wybór narzędzia

CUTS	DOUBLE CUT (0)	ALU CUT (A)	SINGLE CUT (S)	DIAMOND CUT (D)
				
Aluminium, Soft Alloys		●		
Bronze, Brass, Copper	●			
Carbon	●		●	●
Cast Iron	●		●	
Malleable Iron	●		●	
Magnesium Alloys	●	●	●	
Masonite				●
Plastics	●	●		
Hard Rubber		●		
Steel Carbon	●		●	
Steel Alloy ⩽ 52 HRC	●		●	
Steel Alloy ⩽ 58 HRC	●			●
Steel,12% Cr	●		●	
Steel Stainless	●		●	●
Steel Weldments	●		●	
Titanium Alloys	●		●	●
Zinc Alloys			●	

Suggerimenti per lavorare,

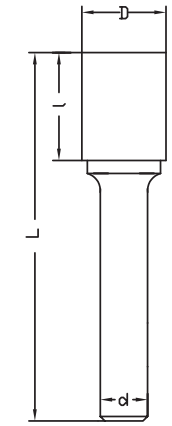
Suggested for machining, Empfelungen für die Bearbeitung, Zalecenia do obróbki

	D	n min	n max
Steel ≤ 980 N/mm²	6 mm	45.000	60.000
	8 mm	35.000	50.000
	10 mm	30.000	40.000
	12 mm	22.000	30.000
	16 mm	18.000	24.000

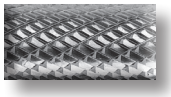
	D	n min	n max
Steel 1020-1270 N/mm² / Copper & alloys	6 mm	30.000	60.000
	8 mm	24.000	50.000
	10 mm	19.000	40.000
	12 mm	15.000	30.000
	16 mm	12.000	24.000

	D	n min	n max
Inox 12% Cr / Hardened ≤ 52 HRC / Hardened ≤ 58 HRC / Ceramics	6 mm	15.000	45.000
	8 mm	12.000	35.000
	10 mm	10.000	30.000
	12 mm	7.000	22.000
	16 mm	6.000	18.000

	D	n min	n max
Alu & alloys / Plastics / Zn Zink / Glass Fibre	6 mm	22.000	70.000
	8 mm	18.000	60.000
	10 mm	15.000	50.000
	12 mm	11.000	38.000
	16 mm	9.000	30.000

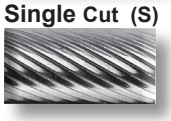


Double Cut (0)

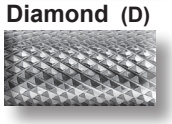


Alu Cut (A)

Single Cut (S)



Diamond (D)



401 Lime cilindriche
Cylindrical shape rotary burs

MG Co10 | ZYA | DIN 8033

405 Lime cilindriche testa affilata
Cylindrical shape rotary burs, sharpened end

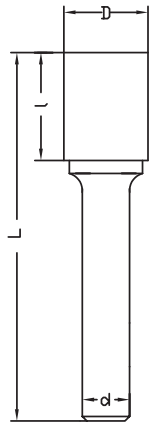
MG Co10 | ZYA (S) | DIN 8033

D	d	L	l	401	HM0 *Uncoated*	HMG	405	HM0 *Uncoated*	HMG
± 0,1	h7				€	€		€	€
Double Cut (0)									
6	6	50	18	4016060	21,30	25,70	4056060	22,80	27,80
8	6	63	18	4016080	25,50	31,90	4056080	28,10	34,50
10	6	65	20	4016100	28,80	36,60	4056100	31,90	39,70
12	6	70	25	4016120	37,30	46,60	4056120	41,00	50,20
16	8	70	25	4018160	54,40	67,10	4058160	60,10	72,60
Alu Cut (A)									
6				401606A	21,30	25,70	405606A	22,80	27,80
8				401608A	25,50	31,90	405608A	28,10	34,50
10				401610A	28,80	36,60	405610A	31,90	39,70
12				401612A	37,30	46,60	405612A	41,00	50,20
16				401816A	54,40	67,10	405816A	60,10	72,60
Single Cut (S)									
6				401606S	19,20	23,90	405606S	21,30	25,70
8				401608S	23,10	29,30	405608S	25,50	31,90
10				401610S	26,20	34,30	405610S	28,80	36,60
12				401612S	33,80	43,20	405612S	37,30	46,60
16				401816S	49,50	61,90	405816S	54,40	67,10
Diamond Cut (D)									
6				401606D	24,80	29,50	405606D	26,60	31,40
8				401608D	28,00	34,40	405608D	30,60	36,90
10				401610D	31,30	39,20	405610D	34,50	42,40
12				401612D	40,80	50,00	405612D	44,80	54,10
16				401816D	59,60	72,00	405816D	65,10	77,80

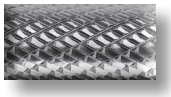
LIME

410 Lime cilindriche testa sferica
Cylindrical shape rotary burs, radius end

420 Lime coniche 14° testa sferica
Taper 14° radius end shape rotary burs

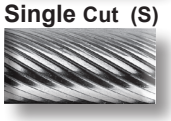


Double Cut (0)

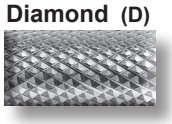


Alu Cut (A)

Single Cut (S)



Diamond (D)

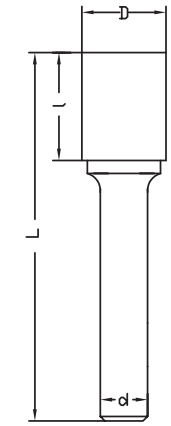


MG Co10 | WRC | DIN 8033

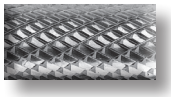
MG Co10 | KEL | DIN 8033 | 14° K

D	d	L	l	K	410	HM0	HMG	420	HM0	HMG
						Uncoated			*Uncoated*	
± 0,1	h7					€	€		€	€
Double Cut (0)										
6	6	50	18		4106060	23,60	28,30			
8	6	63	18		4106080	28,80	35,30			
10	6	65	20		4106100	33,10	41,00			
12	6	70	25		4106120	44,80	54,10			
16	8	70	25		4108160	62,00	74,70			
6	6	50	20	1,0				4206060	23,60	28,30
8	6	69	24	1,3				4206080	31,90	38,30
10	6	73	28	2,0				4206100	39,20	47,20
12	6	75	30	2,6				4206120	46,80	56,30
16	8	83	38	4,0				4208160	74,20	86,60
Alu Cut (A)										
6					410606A	23,60	28,30	420606A	23,60	28,30
8					410608A	28,80	35,30	420608A	31,90	38,30
10					410610A	33,10	41,00	420610A	39,20	47,20
12					410612A	44,80	54,10	420612A	46,80	56,30
16					410816A	62,00	74,70	420816A	74,20	86,60
Single Cut (S)										
6					410606S	21,50	26,40	420606S	21,50	26,40
8					410608S	26,10	32,40	420608S	28,90	35,40
10					410610S	30,10	38,00	420610S	35,70	43,60
12					410612S	40,90	50,10	420612S	42,70	52,10
16					410816S	56,40	68,70	420816S	67,20	79,60
Diamond Cut (D)										
6					410606D	25,40	30,20	420606D	28,00	32,70
8					410608D	31,30	37,80	420608D	34,80	41,30
10					410610D	36,20	44,00	420610D	42,80	50,80
12					410612D	48,90	58,10	420612D	51,20	60,60
16					410816D	67,70	80,20	420816D	80,40	92,90

LIME

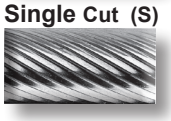


Double Cut (0)

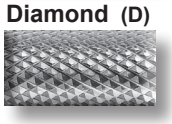


Alu Cut (A)

Single Cut (S)



Diamond (D)



430 Lime a ogiva testa sferica
Tree shape rotary burs, radius end

MG Co10 | RBF | DIN 8033

440 Lime a ogiva
Tree shape rotary burs

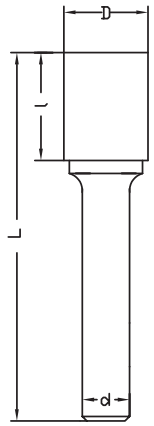
MG Co10 | SPG | DIN 8033

D	d	L	l	430	Uncoated HM0	Uncoated HMG	440	Uncoated HM0	Uncoated HMG
± 0,1	h7				€	€		€	€
Double Cut (0)									
6	6	50	18	4306060	27,20	32,10	4406060	26,00	30,90
8	6	61	16	4306080	28,00	34,40	4406080	25,60	32,00
10	6	65	20	4306100	32,30	40,10	4406100	31,90	39,70
12	6	70	25	4306120	39,00	48,50	4406120	37,60	46,80
16	8	73	28	4308160	58,20	70,80	4408160	57,10	69,40
Alu Cut (A)									
6				430606A	27,20	32,10	440606A	26,00	30,90
8				430608A	28,00	34,40	440608A	25,60	32,00
10				430610A	32,30	40,10	440610A	31,90	39,70
12				430612A	39,00	48,50	440612A	37,60	46,80
16				430816A	58,20	70,80	440816A	57,10	69,40
Single Cut (S)									
6				430606S	24,80	29,50	440606S	24,20	28,90
8				430608S	25,40	31,70	440608S	23,30	29,70
10				430610S	29,30	37,30	440610S	28,90	36,70
12				430612S	35,50	45,00	440612S	34,20	43,40
16				430816S	52,60	65,00	440816S	52,00	64,40
Diamond Cut (D)									
6				430606D	29,80	34,60	440606D	28,60	33,40
8				430608D	30,50	36,70	440608D	28,00	34,40
10				430610D	35,30	43,20	440610D	34,60	42,50
12				430612D	42,50	52,00	440612D	40,90	50,10
16				430816D	63,30	75,80	440816D	62,00	74,70

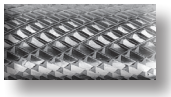
SILMAX

450 Lime coniche
Cone shape rotary burs

460 Lime ovali
Oval shape rotary burs

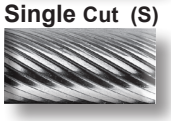


Double Cut (0)

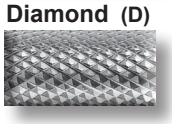


Alu Cut (A)

Single Cut (S)



Diamond (D)



MG Co10

SKM

DIN 8033

α

MG Co10

TRE

DIN 8033

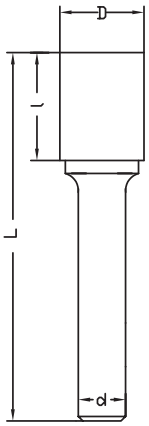
Uncoated

D	d	L	l	α	450	HM0	HMG	460	HM0	HMG
± 0,1	h7					€	€		€	€
Double Cut (0)										
6	6	50	18	16	4506060	22,30	27,00			
8	6	60	15	26	4506080	20,10	26,40			
10	6	63	18	28	4506100	23,70	31,50			
12	6	65	20	30	4506120	32,20	41,60			
16	8	67	22	38	4508160	48,00	60,60			
6	6	50	9					4606060	24,80	29,50
8	6	59	14					4606080	26,50	32,90
10	6	61	16					4606100	30,30	38,30
12	6	66	21					4606120	38,00	47,20
16	8	70	25					4608160	57,10	69,40
Alu Cut (A)										
6					450606A	22,30	27,00	460606A	24,80	29,50
8					450608A	20,10	26,40	460608A	26,50	32,90
10					450610A	23,70	31,50	460610A	30,30	38,30
12					450612A	32,20	41,60	460612A	38,00	47,20
16					450816A	48,00	60,60	460816A	57,10	69,40
Single Cut (S)										
6					450606S	20,40	25,10	460606S	22,80	27,80
8					450608S	18,00	24,40	460608S	24,20	30,60
10					450610S	21,50	29,30	460610S	27,70	35,50
12					450612S	29,20	38,70	460612S	34,50	43,80
16					450816S	43,60	56,30	460816S	52,00	64,40
Diamond Cut (D)										
6					450606D	24,20	28,90	460606D	27,20	32,10
8					450608D	21,50	28,00	460608D	28,90	35,40
10					450610D	25,70	33,60	460610D	33,10	41,00
12					450612D	35,20	44,50	460612D	41,40	50,60
16					450816D	52,00	64,40	460816D	62,80	75,20

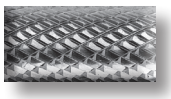
LIME

470 Lime coniche 90°
90° Cone shape rotary burs

475 Lime coniche 60°
60° Cone shape rotary burs

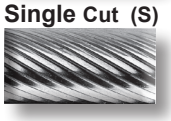


Double Cut (0)

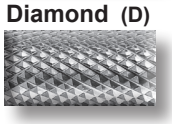


Alu Cut (A)

Single Cut (S)



Diamond (D)



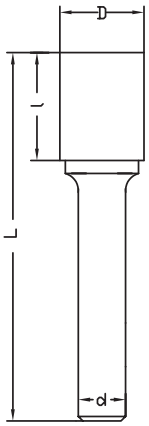
MG Co10 | KSK | DIN 8033 | 90°

MG Co10 | KSJ | DIN 8033 | 60°

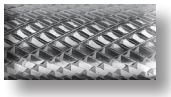
D	d	L	l	470	HM0 Uncoated	HMG	475	HM0 Uncoated	HMG
± 0,1	h7				€	€		€	€
Double Cut (0)									
6	6	52	3	4706060	20,30	25,00			
10	6	54	5	4706100	21,40	29,20			
16	6	59	8	4706160	30,00	42,40			
6	6	52	5				4756060	21,20	26,00
10	6	57	8,5				4756100	23,70	31,50
16	6	64	13,8				4756160	34,40	46,80
Alu Cut (A)									
6				470606A	20,30	25,00	475606A	21,20	26,00
10				470610A	21,40	29,20	475610A	23,70	31,50
16				470616A	30,00	42,40	475616A	34,40	46,80
Single Cut (S)									
6				470606S	18,80	23,10	475606S	19,20	24,10
10				470610S	19,80	27,70	475610S	21,40	29,20
16				470616S	27,20	39,70	475616S	31,30	43,80
Diamond Cut (D)									
6				470606D	21,10	25,90	475606D	22,30	27,00
10				470610D	22,60	30,60	475610D	24,90	32,70
16				470616D	31,30	43,80	475616D	36,20	48,80

LIME

480 Lime sferiche
Ball shape rotary burs

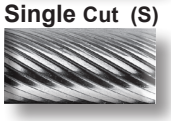


Double Cut (0)

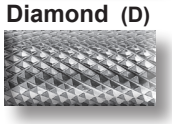


Alu Cut (A)

Single Cut (S)



Diamond (D)



MG Co10

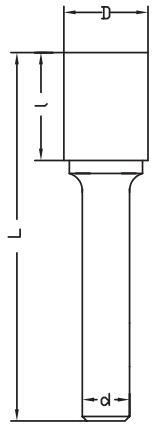
KUD

DIN 8033

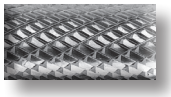
Uncoated

D	d	L	l	480	HM0	HMG
± 0,1	h7				€	€
Double Cut (0)						
6	6	50	5	4806060	24,20	28,90
8	6	52	7	4806080	21,70	28,20
10	6	54	9	4806100	25,60	33,50
12	6	56	11	4806120	31,00	40,20
16	8	60	15	4808160	45,60	58,00
Alu Cut (A)						
6				480606A	24,20	28,90
8				480608A	21,70	28,20
10				480610A	25,60	33,50
12				480612A	31,00	40,20
16				480816A	45,60	58,00
Single Cut (S)						
6				480606S	22,30	27,00
8				480608S	20,10	26,40
10				480610S	23,50	31,30
12				480612S	28,20	37,60
16				480816S	41,40	53,90
Diamond Cut (D)						
6				480606D	26,60	31,40
8				480608D	23,80	30,20
10				480610D	28,10	35,90
12				480612D	33,70	43,10
16				480816D	47,60	60,30

SILMAX

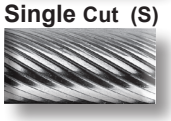


Double Cut (0)

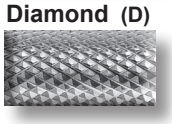


Alu Cut (A)

Single Cut (S)



Diamond (D)



490 Lime coniche
Inverted cone shape rotary burs

MG Co10 | WKN | DIN 8033 | 15°

495 Lime coniche testa affilata
Inverted cone shape rotary burs, sharpened end

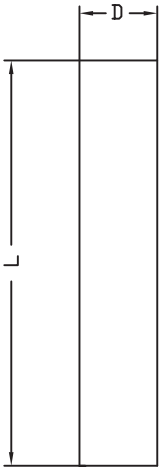
MG Co10 | WKN (S) | DIN 8033 | 15°

D	d	L	l	α	490	HM0 Uncoated	HMG	495	HM0 Uncoated	HMG
± 0,1	h7					€	€		€	€
Double Cut (0)										
6	6	50	6	15	4906060	22,70	27,70	4956060	25,00	29,80
8	6	53	8	15	4906080	21,10	27,60	4956080	23,10	29,30
10	6	55	10	15	4906100	26,00	34,10	4956100	28,60	36,40
12	6	57	12	15	4906120	30,50	39,70	4956120	33,50	42,80
Alu Cut (A)										
6					490606A	22,70	27,70	495606A	25,00	29,80
8					490608A	21,10	27,60	495608A	23,10	29,30
10					490610A	26,00	34,10	495610A	28,60	37,60
12					490612A	30,50	39,70	495612A	33,50	42,80
Single Cut (S)										
6					490606S	21,30	25,50	495606S	22,70	27,70
8					490608S	19,20	25,50	495608S	21,10	27,60
10					490610S	23,80	31,60	495610S	26,00	34,10
12					490612S	27,80	37,00	495612S	30,50	39,70
Diamond Cut (D)										
6					490606D	23,90	28,70	495606D	26,20	31,10
8					490608D	22,30	28,60	495608D	24,30	30,70
10					490610D	27,20	35,30	495610D	30,10	38,00
12					490612D	32,00	41,40	495612D	35,20	44,50

LIME

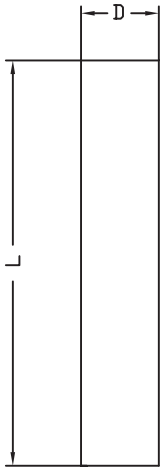
SILMAX

HMM Barrette Tool-bits



D h7	L		HMM €
3	50	050030	3,00
3	100	100030	6,00
3	160	160030	11,50
4	50	050040	3,70
4	100	100040	7,40
4	160	160040	13,70
5	50	050050	4,90
5	100	100050	9,90
5	160	160050	17,00
6	57	057060	6,60
6	100	100060	13,00
6	160	160060	21,60
7	60	060070	7,80
7	100	100070	15,70
7	160	160070	25,50
8	63	063080	10,20
8	100	100080	20,20
8	160	160080	32,10
9	67	067090	12,10
9	100	100090	24,10
9	160	160090	38,80
10	72	072100	14,40
10	100	100100	28,70
10	160	160100	45,90

HMM Barrette Tool-bits

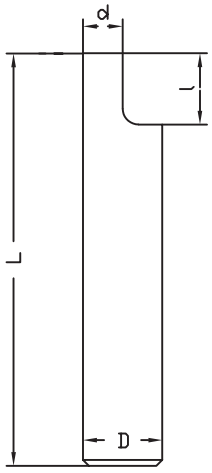


D h7	L		HMM €
12	75	075120	30,70
12	100	100120	41,00
12	150	150120	61,40
14	85	085140	46,40
14	100	100140	54,70
14	150	150140	81,90
16	92	092160	62,70
16	110	110160	75,00
16	150	150160	102,30
18	92	092180	76,50
18	110	110180	91,50
18	150	150180	124,50
20	110	110200	115,00
20	150	150200	156,70

BAR

SILMAX

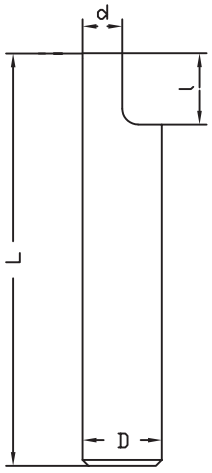
210 Bulini
Burins



MG Co10

Uncoated

D h7	d	L	l	210	HM0 €
3	1,5	100	4	210030	12,70
4	2	100	5	210040	15,20
5	2,5	100	7	210050	18,10
6	3	100	8	210060	22,70
7	3,5	100	8	210070	26,40
8	4	100	10	210080	32,90
9	4,5	100	10	210090	38,20
10	5	100	13	210100	45,70
12	6	100	16	210120	63,70
14	7	100	18	210140	82,00
16	8	110	20	210160	121,50



220 Bulini
Burins

MG Co10

Uncoated

D h7	d	L	l	220	HM0 €
3	1,5	150	4	220030	21,30
4	2	150	5	220040	26,30
5	2,5	150	7	220050	30,60
6	3	150	8	220060	37,20
7	3,5	150	8	220070	42,10
8	4	150	10	220080	51,80
9	4,5	150	10	220090	59,50
10	5	150	13	220100	70,10
12	6	150	16	220120	87,26
14	7	150	18	220140	115,30
16	8	150	20	220160	153,00

SilService

Listino prezzi del servizio di **Riaffilatura e Re-Coating**

*Pricelist for the **Resharpening** and **Recoating-service***

Indice ***Pag.***
Contents

LE CONDIZIONI DI VENDITA
SALES CONDITIONS

- **ORDINI**
  ORDERS

Gli ordini si intendono accettati sulla base delle nostre Condizioni generali di Vendita.
Orders are accepted on the basis of our general sales conditions.

- **PREZZI**
  PRICES

I prezzi sono indicati in Euro.
L'ordine minimo è di Euro 100,00.
Il presente listino è soggetto a variazioni ad insindacabile giudizio della ns. società.
Per dimensioni non previste nel presente listino chiedere offerta specifica.
The currency of the prices is EURO.
The minimum order value is net € 100.00.
This list is subject to change. Changes are at the discretion of our company.
For dimensions outside the list we ask you to send an inquiry.

- **IMBALLAGGIO**
  PACKAGE

Al fine di evitare danneggiamenti durante i trasporti, i pezzi ci devono pervenire correttamente protetti, in imballaggi riutilizzabili per la restituzione; in caso non lo fossero, l'imballaggio da noi fornito verrà fatturato al costo.
To avoid damages to the tools during the shipment, they must be adequately protected in a reusable packaging (also for the return). If this is not the case the packaging for the return will be charged by us.

- **TRASPORTO**
  SHIPPING

I prezzi si intendono franco nostro stabilimento.
I prodotti viaggiano a rischio e pericolo del committente.
Prices are ex works SILMAX.
Shipping is at risk of the customer.

- **CONSEGNA**
  DELIVERY TIME

La consegna prevista è di 10 giorni lavorativi dal ricevimento del materiale presso il nostro stabilimento.
The estimated delivery time is 10 working days of receipt of the goods at our house.

- **URGENZE**
  EMERGENCIES

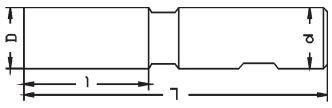
E' possibile concordare per un ordine una consegna nei 5 giorni lavorativi. Per tali ordini i prezzi saranno maggiorati del 20%.
There is the possibility of ordering with a delivery time of only 5 working days.
The surcharge for this shortening of the delivery time is 20% on the netprice.

- **PAGAMENTO**
  PAYMENT

In uso con Voi.
In accordance with agreement.

SilService

Frese Cilindriche in HSS
con codolo clindrico
Cylindrical Cutter in HSS
with cyl. shank

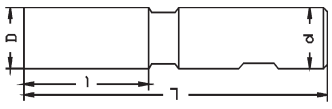


Serie Corta — DIN 327
Series Short — *DIN 327*
Serie Normale — DIN 844K
Series Normal — *DIN 844K*

D.	RIAFFILATURA			*Resharpening*		RE-COATING	
					Oltre Others		**AlCrN**
	€	€	€	€			€
10	10,70	10,70	10,70	==	==		7,80
12	10,70	10,70	10,70	==	==		8,20
14	10,70	10,70	10,70	==	==		9,30
16	10,70	10,70	10,70	==	==		12,80
18	10,70	10,70	12,80	==	==		16,90
20	10,70	15,00	17,10	20,50	==		16,90
22	15,00	18,10	21,40	25,50	==		22,00
25	17,90	21,80	25,50	30,60	==		24,60
28	21,00	25,50	29,80	35,70	==		29,40
30	22,40	27,10	31,80	38,20	==		29,40
32	26,90	32,60	38,20	46,00	==		29,40
36	29,80	36,10	42,50	50,90	==		40,00
40	37,20	45,10	53,10	63,60	==		78,60
50	44,50	54,20	63,60	76,30	==		113,40

nb: per la riaffilatura + recoating, sommare i costi delle rispettive colonne. *PS: For resharpening and recoating add up the cost of columns*

Frese Cilindriche in HSS
con codolo clindrico
Cylindrical Cutter in HSS
with cyl. shank



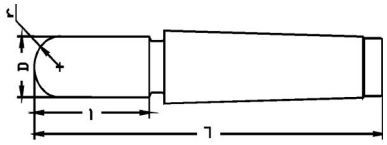
Serie Media — Norma Silmax
Series Medium — *Norm SILMAX*
Serie Lunga — DIN 844L
Serie Long — *DIN 844L*

D.	RIAFFILATURA			*Resharpening*		RE-COATING	
					Oltre Others		**AlCrN**
	€	€	€	€			€
10	13,40	13,40	13,40	==	==		11,10
12	13,40	13,40	13,40	==	==		11,90
14	13,40	13,40	13,40	==	==		12,80
16	13,40	13,40	13,40	==	==		14,80
18	13,40	13,40	16,00	==	==		21,80
20	13,40	18,70	21,40	25,50	==		21,80
22	18,70	22,80	26,70	31,80	==		52,30
25	22,40	27,10	31,80	38,20	==		52,30
28	26,10	31,80	37,20	44,50	==		65,20
30	27,90	33,90	39,80	47,80	==		65,20
32	33,50	40,60	47,80	57,20	==		74,90
36	37,20	45,10	53,10	63,60	==		78,40
40	46,60	56,40	66,30	79,60	==		83,10
50	55,80	67,70	79,60	95,40	==		118,70

nb: per la riaffilatura + recoating, sommare i costi delle rispettive colonne. *PS: For resharpening and recoating add up the cost of columns*

SilService

Frese Cilindriche in HSS
con codolo conico Morse
Cylindrical Cutters in HSS with conical shank

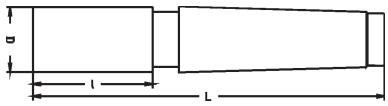


Serie Corta — DIN 326
Series Short — *DIN 326*
Serie Normale — DIN 845K
Series Normal — *DIN 845K*

D.	MK	RIAFFILATURA / Resharpening					RE-COATING	
						Oltre / Others		AlCrN
		€	€	€	€	€		€
10	**1**	10,70	10,70	10,70	==	==		16,20
12	**1**	10,70	10,70	10,70	==	==		16,20
14	**1**	10,70	10,70	10,70	==	==		22,00
16	**2**	10,70	10,70	10,70	==	==		24,50
18	**2**	10,70	10,70	12,80	==	==		27,10
20	**2**	10,70	15,00	17,10	20,50	==		35,10
22	**2**	15,00	==	==	==	==		40,40
22	**3**	==	18,10	21,40	25,50	==		50,90
25	**3**	17,90	21,80	25,50	30,60	==		58,70
28	**3**	21,00	25,50	29,80	35,70	==		65,60
30	**3**	22,40	27,10	31,80	38,20	==		73,40
32	**3**	26,90	32,60	38,20	46,00	==		83,90
36	**4**	29,80	36,10	42,50	54,90	==		118,70
40	**4**	37,20	45,10	53,10	63,60	==		124,10
50	**5**	44,50	54,20	63,60	76,30	89,00		180,00

nb: per la riaffilatura + recoating, sommare i costi delle rispettive colonne. *PS: For resharpening and recoating add up the cost of columns*

Frese Cilindriche in HSS
con codolo conico Morse
Cylindrical Cutters in HSS with conical shank



Serie Media — Norma Silmax
Series Medium — *Norm SILMAX*
Serie Lunga — DIN 845L
Series Long — *DIN 845L*

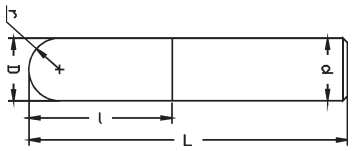
D.	MK	RIAFFILATURA / Resharpening					RE-COATING	
						Oltre / Others		AlCrN
			€	€	€	€		€
10		==	13,40	13,40	==	==		==
12		==	13,40	13,40	==	==		==
14		==	13,40	13,40	==	==		==
16	**2**	==	13,40	13,40	==	==		26,70
18	**2**	==	13,40	16,00	==	==		30,60
20	**3**	==	18,70	21,40	25,50	==		68,30
22	**3**	==	22,80	26,70	31,80	==		68,30
25	**3**	==	27,10	31,80	38,20	==		68,30
28	**3**	==	31,80	31,20	44,50	==		74,30
30	**3**	==	33,90	39,80	47,80	==		79,40
32	**4**	==	40,60	47,80	57,20	==		117,70
36	**4**	==	45,10	53,10	63,60	==		124,10
40	**4**	==	56,40	66,30	79,60	==		129,40
50	**5**	==	67,70	79,60	95,40	111,40		187,60

nb: per la riaffilatura + recoating, sommare i costi delle rispettive colonne. *PS: For resharpening and recoating add up the cost of columns*

SilService

Frese Raggiate in HSS
con codolo clindrico

Radial cutters in HSS with cyl. shank



Serie Normale — DIN 1889/1, DIN 1889/2

Series Normal — *DIN 1889/1, DIN 1889/2*

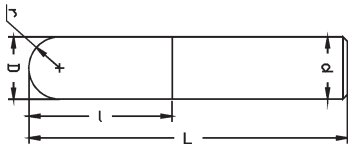
D.	r	RIAFFILATURA			*Resharpening*		RE-COATING	
						**Oltre** Others		**AlCrN**
		€	€	€	€			€
10	**5**	16,00	18,70	21,40	==	==		7,8
12	**6**	16,00	18,70	21,40	==	==		8,2
14	**7**	16,00	18,70	21,40	==	==		9,30
16	**8**	16,00	18,70	21,40	==	==		12,80
18	**9**	16,00	18,70	23,40	==	==		16,90
20	**10**	16,00	23,00	27,70	36,30	==		16,90
22	**11**	20,30	26,10	31,80	41,50	==		22,00
25	**12,5**	23,20	29,80	36,10	46,60	==		24,60
28	**14**	27,30	35,10	42,50	54,80	==		29,40
30	**15**	28,70	36,70	44,50	57,20	==		29,40
32	**16**	33,30	42,10	50,90	65,00	==		29,40
36	**18**	36,10	45,80	55,20	70,00	==		40,00
40	**20**	43,50	54,60	65,90	82,70	==		78,60

nb: per la riaffilatura + recoating, sommare i costi delle rispettive colonne.

PS: For resharpening and recoating add up the cost of columns

Frese Raggiate in HSS
con codolo clindrico

Radial cutters in HSS with cyl. shank



Serie Lunga — DIN 1889/1, DIN 1889/2

Series Long — *DIN 1889/1* DIN 1889/2

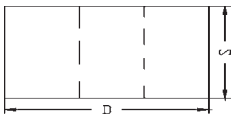
D.	r	RIAFFILATURA			*Resharpening*		RE-COATING	
						**Oltre** Others		**AlCrN**
		€	€	€	€			€
10	**5**	18,70	21,40	24,00	==	==		11,10
12	**6**	18,70	21,40	24,00	==	==		11,90
14	**7**	18,70	21,40	24,00	==	==		12,80
16	**8**	18,70	21,40	24,00	==	==		14,80
18	**9**	18,70	21,40	26,70	==	==		21,80
20	**10**	18,70	26,70	31,80	41,50	==		21,80
22	**11**	24,00	30,60	37,20	47,80	==		52,30
25	**12,5**	27,70	35,10	42,50	54,20	==		52,30
28	**14**	32,40	41,50	49,90	63,60	==		65,20
30	**15**	34,30	43,50	52,50	66,90	==		74,90
32	**16**	39,80	50,30	60,50	76,30	==		74,90
36	**18**	43,50	54,60	65,90	82,70	==		78,40
40	**20**	52,90	66,10	79,00	98,70	==		83,10

nb: per la riaffilatura + recoating, sommare i costi delle rispettive colonne.

PS: For resharpening and recoating add up the cost of columns

SilService

Frese Frontali in HSS
End mills in HSS

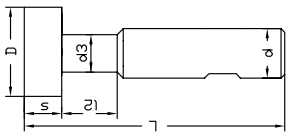


Serie Normale DIN 1880 DIN 841
Series Normal DIN 1880 DIN 841

D.	S	RIAFFILATURA Z5	Z6	Z8	*Resharpening* Z10	Z12	RE-COATING	AlCrN
		€	€	€	€			€
40	**32**	16,00	19,10	25,50	==	==		17,30
40	**40**	==	24,00	32,80	==	==		31,80
50	**36**	24,90	29,80	39,80	==	==		23,80
50	**50**	==	37,20	49,70	==	==		31,80
60	**60**	==	==	53,10	==	==		50,50
63	**40**	26,70	==	42,50	53,10	==		36,70
75	**75**	==	==	66,30	82,90	==		133,50
80	**45**	33,3	==	53,10	66,30	==		66,90
100	**50**	==	40,80	==	67,90	==		134,50
125	**56**	==	==	==	83,10	99,70		183,30

nb: per la riaffilatura + recoating, sommare i costi delle rispettive colonne.
PS: For resharpening and recoating add up the cost of columns

Frese a "T" in HSS
T-slot-cutters in HSS



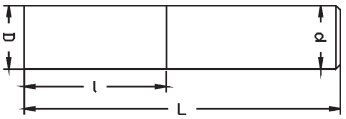
Serie Normale DIN 851
Series Normal DIN 851

D.	S	RIAFFILATURA Z4	Z5	Z6	*Resharpening* Z8	Oltre Others	RE-COATING	AlCrN
		€	€	€	€			€
12,5	**6**	10,70	==	==	==	==		8,20
16	**8**	==	11,70	==	==	==		11,10
18	**9**	==	12,80	==	==	==		13,60
22	**10**	==	15,40	==	==	==		18,90
25	**11**	==	18,10	==	==	==		23,00
30	**12**	==	==	21,80	==	==		24,60
32	**14**	==	==	24,40	==	==		27,90
36	**16**	==	==	29,80	==	==		36,70
40	**18**	==	==	==	40,40	==		41,70

nb: per la riaffilatura + recoating, sommare i costi delle rispettive colonne.
PS: For resharpening and recoating add up the cost of columns

SilService

Frese Cilindriche in Metallo Duro Integrale
con codolo clindrico
Cylindrical cutters in solid carbide with cyl. shank



Serie Normale

Series Normal

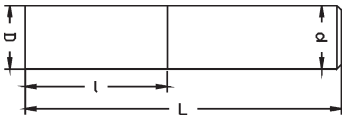
D.	RIAFFILATURA			*Resharpening*		RE-COATING	
					**Oltre** Others	**AlCrN**	**AlTiN**
	€	€	€	€		€	€
6	9,70	10,70	11,70	14,00	==	5,40	10,90
6 Cr	11,50	12,80	14,20	16,70	==	5,40	10,90
7	11,70	12,80	14,00	==	==	6,70	14,00
8	14,00	15,00	16,00	19,10	==	6,70	14,00
8 Cr	16,70	17,90	19,10	23,00	==	6,70	14,00
9	17,10	18,10	19,10	==	==	7,40	15,60
10	18,10	19,10	20,30	23,40	==	8,00	17,30
10 Cr	20,80	22,00	23,20	26,90	==	8,00	17,30
11	20,30	21,40	22,40	==	==	11,90	18,30
12	24,40	25,50	26,70	29,80	==	11,90	18,30
12 Cr	28,10	29,40	30,60	34,30	==	11,90	18,30
13	26,70	27,70	28,70	==	==	13,40	20,30
14	27,70	28,70	29,80	33,10	==	13,40	20,30
14 Cr	30,40	31,60	32,80	36,30	==	13,40	20,30
15	30,80	31,80	33,10	==	==	15,00	31,80
16	33,10	35,10	37,20	41,50	==	15,00	31,80
16 Cr	36,30	38,60	40,80	45,60	==	15,00	31,80
20	36,10	38,20	40,40	45,80	==	19,10	40,80
20 Cr	39,80	42,10	44,30	50,30	==	19,10	40,80

nb: per la riaffilatura + recoating, sommare i costi delle rispettive colonne.

PS: For resharpening and recoating add up the cost of columns

SilService

Frese Cilindriche in Metallo Duro Integrale
con codolo clindrico
Cylindrical cutters in solid carbide
with cyl. shank



Serie Lunga
Serie Extra Lunga
Series Long
Extralong

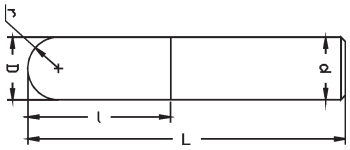
D.	RIAFFILATURA *Resharpening*		RE-COATING Serie Lunga *Recoating Series Long*		RE-COATING Serie Extra Lunga *Recoating Series Extralong*	
			AlCrN	AlTiN	AlCrN	AlTiN
	€	€	€	€		€
6	14,00	16,00	7,00	14,60	9,50	20,30
6 Cr	16,70	19,10	7,00	14,60	9,50	20,30
7	16,00	18,10	7,20	15,40	==	==
8	16,00	21,40	7,20	15,40	10,10	21,20
8 Cr	21,80	25,50	7,20	15,40	10,10	21,20
9	21,40	24,40	8,00	17,30	==	==
10	22,40	26,70	14,20	29,80	14,20	29,80
10 Cr	25,70	30,60	14,20	29,80	14,20	29,80
11	24,50	28,70	14,20	29,80	==	==
12	30,80	34,10	14,20	29,80	20,50	43,70
12 Cr	35,50	39,20	14,20	29,80	20,50	43,70
13	33,10	36,10	15,60	33,50	==	==
14	37,20	40,40	15,60	33,50	23,00	49,00
14 Cr	40,80	44,30	15,60	33,50	23,00	49,00
15	40,40	44,50	18,50	39,60	==	==
16	45,80	49,90	18,50	39,60	26,10	55,40
16 Cr	50,30	55,00	18,50	39,60	26,10	55,40

nb: per la riaffilatura + recoating, sommare i costi delle rispettive colonne.

PS: For resharpening and recoating add up the cost of columns

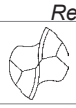
SilService

Frese Cilindriche in Metallo Duro Integrale
con codolo clindrico
Radial cutters in solid carbide
with cyl. shank



Serie Normale

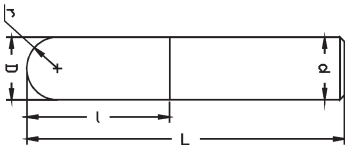
Series Normal

D.	r	RIAFFILATURA *Resharpening*		RE-COATING *Recoating*	
				AlCrN	AlTiN
		€	€	€	€
6	**3**	15,00	18,10	5,40	10,90
7	**3,5**	17,10	20,30	6,70	14,00
8	**4**	19,10	23,40	6,70	14,00
9	**4,5**	21,40	25,50	8,00	15,60
10	**5**	24,40	30,80	8,00	15,60
11	**5,5**	27,70	34,10	11,90	18,30
12	**6**	30,80	38,20	11,90	18,30
13	**6,5**	34,10	41,50	13,40	20,30
14	**7**	36,10	44,50	13,40	20,30
15	**7,5**	41,50	49,90	15,00	31,80
16	**8**	45,80	56,20	15,00	31,80
20	**10**	==	==	19,10	40,80

nb: per la riaffilatura + recoating, sommare i costi delle rispettive colonne.

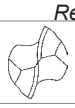
PS: For resharpening and recoating add up the cost of columns

Frese Cilindriche in Metallo Duro Integrale
con codolo clindrico
Radial cutters in solid carbidel
with cyl. shank



Serie Lunga

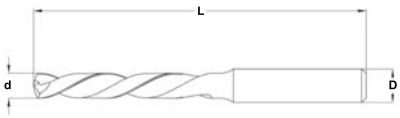
Series Long

D.	r	RIAFFILATURA *Resharpening*		RE-COATING *Recoating*	
				AlCrN	AlTiN
		€	€	€	€
6	**3**	18,10	21,40	9,50	17,30
8	**4**	23,40	27,70	9,90	21,20
10	**5**	29,80	36,10	13,40	28,10
12	**6**	37,20	44,50	20,50	43,70
14	**7**	43,50	52,10	23,00	49,00
16	**8**	55,20	65,90	26,10	55,40

nb: per la riaffilatura + recoating, sommare i costi delle rispettive colonne.

PS: For resharpening and recoating add up the cost of columns

Punte Cilindriche in Metallo Duro Integrale
High performances carbide drills



Gambo *Shank*	RIAFFILATURA + RE-COATING AlCrN *Resharpening + Re-coating AlCrN*	
	Resharpening + Re-Coating *(Normal Wear)*	*Resharpening + Re-Coating* *(Severe Wear)*
	€	€
8	19,20	26,00
10	24,20	34,40
12	27,80	35,00
14	30,00	37,40
16	34,20	42,00

La qualità come scelta.

Servizi

Services, Leistung, Serwis

Info Tecniche

Informations, Informationen, Informacje techniczne

PROGETTAZIONE e RICERCA

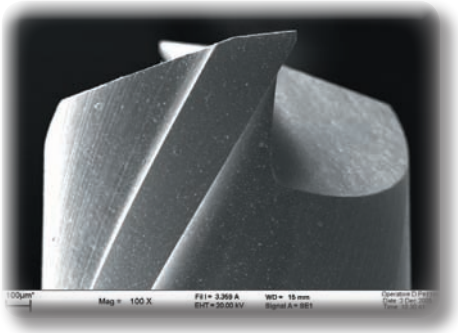
La progettazione dei prodotti viene realizzata utilizzando software specifici e simulatori grafici 3D altamente sofisticati.
Ogni parametro del processo è studiato e controllato per trasformare una idea in un prodotto.

CENTRO RICERCHE SILMAX
L'attività del centro ruota attorno alla nuova fresatrice C.B. Ferrari dotata di elettromandrino da 24 KW e 20 000 giri al minuto, dotata di strumenti sensori, in grado di mantenere sotto

controllo sia l'efficienza energetica del processo di taglio sia il progredire dell'usura dell'utensile durante il taglio. Il risultato più evidente dell'attività di ricerca e sviluppo è rappresentato dall'elevato numero di nuovi prodotti lanciati sul mercato da Silmax nel corso dell'ultimo periodo.

DESIGN & DEVELOPMENT

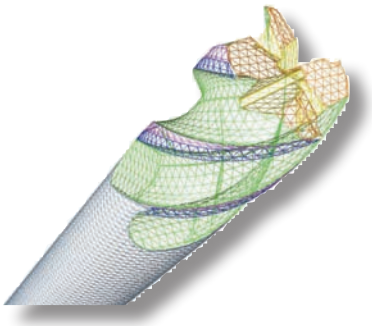
For the design of our products and the technical process, we use specific software and highly sophisticated 3D graphic simulators.
Each parameter is studied in order to transform an idea in a product, in a short time and with extreme precision.



R&D SILMAX DEPARTMENT
All the activities in R&D are focused on the new C.B. Ferrari milling machine fitted with a 24 kW, 20.000 rpm electronic spindle.
The machine is fitted with sensor tools for controlling the cutting process energy efficiency and the tools' wear during the cutting.
The most important result of the R&D activity is represented by the high number of new products presented by Silmax during the last year.

PLANUNG

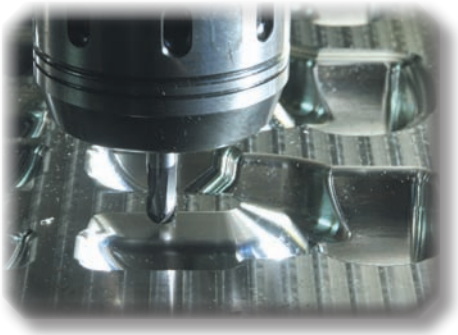
Spezifische Software und grafisch hochwertige CAD/CAM 3D Simulatoren werden für die Entwicklung von neuen Produkten sowie auch für die Produktion eingesetzt. Jeder Parameter der Entwicklung ist genau geplant um eine Idee schnellst möglich und hoch präzise umzusetzen.
DIE FORSCHUNGSARBEIT
Mittelpunkt der Entwicklungsabteilung ist die neue Fräsmachine C.B.Ferrari mit 24 kw Spindelmotor sowie einer Leistung von 20.000U/min. Die Maschine ist mit einem Überwachungssystem ausgestattet, das



nicht nur den Wirkungsgrad des Schneideprozesses aufzeichnet, sondern auch den fortschreitenden Verschleiß des Werkzeuges während der Bearbeitung ermittelt. Die Ergebnisse des letzten Jahres unserer Forschungs,-und Entwicklungsabteilung kann man am besten an der Vielzahl an neuen Produkten erkennen.

PROJEKTOWANIE I ROZWÓJ

Wszystkie produkty firmy SILMAX projektowane są z wykorzystaniem odpowiednich programów i specjalizowanych symulatorów 3D
Każdy parametr procesu jest studiowany i kontrolowany w taki sposób, aby przetworzyć pomysł w gotowy produkt.



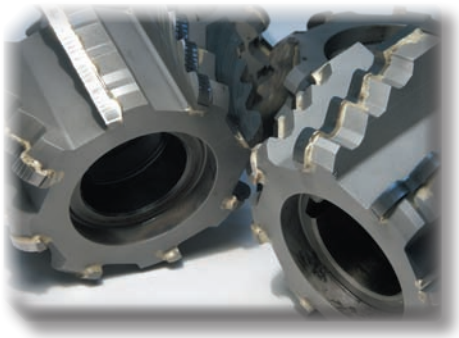
CENTRUM BADAWCZO ROZWOJOWE SILMAX
"Działalnośc centrum badawczo rozwojowego skupia się wokół nowej frezarki firmy C.B. Ferrari. Jest to 5-cio osiowa obrabiarka posiadająca elektrowrzeciono o mocy 24kW i 20 000 obr./min. Obrabiarka wyposażona jest we wszelkie niezbędne czujniki kontrolujące zapotrzebowanie na moc podczas skrawania, jak i sam proces zużywania się narzędzia podczas pracy. Rezultatem działalności centrum jest duża ilość nowych produktów przedstawiona na rynku w ostatnim czasie."

UTENSILI SPECIALI

SILMAX produce un'ampia gamma di utensili speciali in metallo duro integrale e in acciaio superrapido, progettati e costruiti su richiesta del cliente o su suo specifico disegno.

FRESE IN SAGOMA

La produzione delle frese di forma in Hss e HM integrale o saldobrasato ha assunto una posizione di grande rilievo.
In particolare per il settore dell'energia, Silmax ha sviluppato una tecnologia molto avanzata per la produzione delle frese a profilo



utilizzate per la realizzazione degli ancoraggi del piede delle palette.

SPECIAL TOOLS

Silmax projects and produces special tools in HSS Co and Solid Carbide on request or upon Client's drawing.

FORM CUTTERS

Form cutters have gained a great importance inside Silmax production.
Particularly in the energy's field, where Silmax has developed a high technology for the production of profile cutters used to realize the anchorages of the vane's bottom.

SONDERWERKZEUGE

Silmax produziert eine große Anzahl an Sonderwerkzeugen aus VHM sowie HSS-E und PM, die nach Kundenwunsch und/oder spezifischer Zeichnung entworfen werden. Unsere Techniker stehen Ihnen jederzeit zur Verfügung, um Ihren Wünschen gerecht zu werden.

FORMFRÄSER

Die Formfräser spielen mittlerweile eine große Rolle innerhalb der Silmax Produktion. Deren Anwendung findet sich speziell im

Energiebereich wieder.
Silmax hat eine Spitzentechnologie in der Entwicklung für Formfräser insbesondere für Turbinenschaufeln entworfen.

NARZĘDZIA SPECJALNE

Silmax projektuje i wykonuje szeroką gamę narzędzi specjalnych zarówno ze stali HSSE, jak i pełnowęglikowych. Narzędzia te projektowane i wykonywane są na zamówienie Klienta lub na podstawie dostarczonych rysunków.

FREZY KSZTAŁTOWE

Produkcja frezów kształtowych z HSSE, HM i lutowanych stała się w ostatnim czasie bardzo ważna ze względu na znaczne zapotrzebowanie rynku na produkty tego typu. Przykładem może być sektor energetyczny, na potrzeby którego SILMAX stworzył nowoczesną technologię produkcji frezów kształtowych używanych do wykonania połączenia stopy łopatki turbiny.

OPZIONI A RICHIESTA

SILMAX produce un'ampia gamma di utensili speciali in metallo duro integrale e in acciaio superrapido, progettati e costruiti su richiesta del cliente o su suo specifico disegno.

ATTACCO WELDON

Sui diam. indicati in tabella, è possibile richiedere la realizzazione del piatto wld.

RIBASSAMENTO DOPO IL TAGLIENTE

Realizziamo ribassamenti tra la parte tagliente e il codolo, come da tabella sotto indicata.

RAGGI DI RACCORDO

Si eseguono su richiesta anche raggi diversi dallo standard presentati a catalogo

OPTIONS UPON REQUEST

Silmax projects and produces special tools in HSS Co and Hard Metal on request or according Client's drawing.

WELDON SHANK

On request, we can realize the Weldon flat on the diameters indicated in the list.

RECESSED DIAMETER

We can also realize reduction in diameter between the cutting part and the shank, as per list below.

CORNER RADIUS

We can also realize, on request, corner radius different from the standard ones indicated in the catalogue.

OPTIONEN AUF ANFRAGE

Silmax produziert ein umfangreiches Sortiment von VHM- und HSS-Sonderwerkzeugen, die nach Kundenwunsch oder nach Zeichnung konstruiert und gefertigt werden.

WELDON SCHAFTAUSFÜHRUNG

Für die Durchmesser in der Tabelle ist das Werkzeug auf Wunsch mit Weldon-Fläche lieferbar.**ABGESETZTER SCHAFT**

Auf Wunsch sind Absätze zwischen Schneiden und Schaft gemäß folgender Tabelle möglich.

CORNER RADIEN

Auf Wunsch sind andere Radien als die im Katalog angegebenen Standardradien möglich.

OPCJE NA SPECJALNE ZAMÓWIENIE

Silmax projektuje i wykonuje szeroką gamę narzędzi specjalnych zarówno ze stali HSSE, jak i pełnowęglikowych. Narzędzia te projektowane i wykonywane są na zamówienie Klienta lub na podstawie dostarczonych rysunków.

CHWYT TYPU WELDON

Na zamówienie możemy wykonać na narzędziu chwyt typu WELDON. Średnice przedstawiono w tabeli.

OBNIŻENIE ZA CZĘŚCIĄ SKRAWAJĄCĄ

Wykonujemy obniżenie pomiędzy częścią skrawającą i chwytową narzędzia tak, jak przedstawione zostało to w tabeli

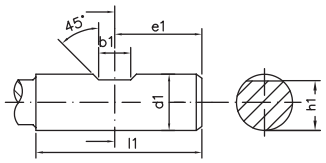
PROMIEŃ NAROŻA

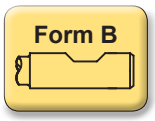
Na specjalne zamówienie wykonujemy także promienie naroży inne niż te, podane w katalogu.

RAGGI DI RACCORDO

R.	Z2	Z3	Z4	Z6	R.	Z2	Z3	Z4	Z6
	€	€	€	€		€	€	€	€
0,5	2,10	2,60	3,10	4,20	3,0	2,60	3,10	3,70	4,70
1,0	2,10	2,60	3,10	4,20	3,5	2,60	3,10	3,70	4,70
1,5	2,10	2,60	3,10	4,20	4,0	3,10	3,70	4,20	5,20
2,0	2,10	2,60	3,10	4,20	4,5	3,10	3,70	4,20	5,20
2,5	2,60	3,10	3,70	4,70	5,0	4,20	4,70	5,20	6,20

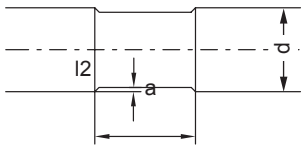
Form B - WELDON - DIN





d1 h6 0	b1 +0,05 -1	e1 0	h1 h11	€
6	4,2	18	5,1	**1,90**
8	5,5	18	6,9	**2,00**
10	7	20	8,5	**2,30**
12	8	22,5	10,4	**2,90**
14	8	22,5	12,7	**2,90**
16	10	24	14,2	**5,00**
18	10	24	16,2	**5,00**
20	11	25	18,2	**5,10**

RIBASSAMENTO, Neck, Schaft, Obniżenie



Ribassamenti su richiesta
Neck diameter on request
Auf Wunsch abgesetzer Schaft
Obniżenie na zamówienie

d1 h6	a	l2 +1 0	€
6	0,05	10	**1,20**
8	0,05	10	**1,40**
10	0,05	10	**1,70**
12	0,05	10	**1,90**
14	0,05	10	**2,10**
16	0,05	10	**2,40**
18	0,05	10	**2,60**
20	0,05	10	**2,90**
25	0,05	10	**3,30**

SILSERVICE

UN SERVIZIO DI RIAFFILATURA

Per la propria Clientela SILMAX ha organizzato un servizio di Riaffilatura e Re-Coating di elevata qualità. Utilizzando macchine a CNC dell'ultima generazione è possibile, in tempi rapidi, ripristinare un utensile alle condizioni originali. Per gli utensili ricoperti, con un nuovo trattamento, garantiamo le stesse prestazioni dell'utensile nuovo.

TRATTAMENTO TERMICO

Da alcuni anni SILMAX ha installato presso lo

stabilimento di produzione di Lanzo Torinese un centro di trattamento termico sotto vuoto, dotato delle più moderne tecnologie del settore. In questo centro si eseguono su vostra richiesta trattamenti termici di Acciai Superrapidi, mettendoVi a disposizione la nostra decennale esperienza.

SILSERVICE

RESHARPENING SERVICE

SILMAX offers to customers an high tech resharpening and recoating service, named Sil Service. Using last generation CNC machines is possible to restore tools. For coated tools, with

the recoating service we guarantee a new tool same performances.

HEATING TREATMENT

For the production of HSS tools, the heat treatment is the most delicate phase, wich can emphasize, if correctly done, the features of a good steel. Since 1995 a High Vacuum Heat treatment centre, equipped with the most updated technologies is operative in Lanzo Torinese.

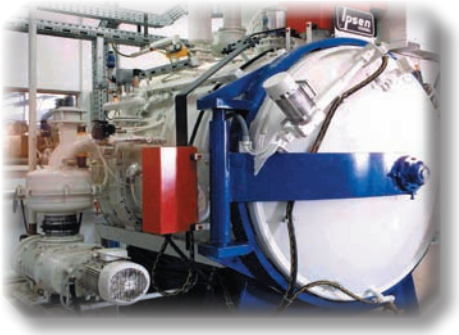
SILSERVICE

NACHSCHLEIF-SERVICE

SILMAX bietet einen Kundenservice für hochwertiges Nachschleifen und Nachbeschichten. Unter Verwendung von CNC-Maschinen der neuesten Generation kann in kürzester Zeit ein Werkstück in seinem Originalzustand zurückversetzt werden. Für die beschichteten Werkzeuge garantieren wir, nach einer neuen Behandlung, dieselbe Leistungen.

WÄRMEBEHANDLUNG

Die Wärmebehandlung ist das Herz eines Hochgeschwindigkeitswerkzeuges. Seit



einigen Jahren hat SILMAX überfeinerte Behandlungstechniken entwickelt, besonders die Vakuum-Härtung. In diesem Zentrum führt man Wärmebehandlungen auf Hochgeschwindigkeitsstählen nach spezifischen Kundenwünschen durch.

SILSERVICE

EL REAFILADO

SILMAX oferuje swoim Klientom wysokiej jakości usługę ostrzenia i powlekania narzędzi nazwaną SILSERVICE. Używając szlifierek CNC ostatniej generacji możliwe jest przywrócenie narzędzia do stanu oryginalnego w krótkim czasie. Narzędzia

powlekane poddawane są procesowi ponownego powlekania. Gwarantuje to uzyskanie wydajności takiej, jak dla narzędzia nowego.

OBRÓBKA TERMICZNA

Od kilku lat w siedzibie firmy SILMAX w Lanzo Torinese funkcjonuje próżniowe centrum obróbki termicznej wyposażone w najnowocześniejszy sprzęt z tej dziedziny.

ASSISTENZA TECNICA

Il reparto di Assistenza Tecnica SILMAX è a disposizione della propria clientela per analizzare i Vostri problemi di lavorazione e per aiutarVi ad ottimizzare le condizioni di utilizzo degli utensili Silmax.

MODULO DI RICHIESTA INFORMAZIONI
Per una migliore trasmissione delle vostre richieste abbiamo predisposto un modulo tecnico di richiesta informazioni.

EMAIL : Una prima versione, compilabile direttamente con Word utilizzando i campi predisposti, può essere inviata direttamente tramite email a: **assistenza@silmax.it**

FAX : Una seconda versione può essere scaricata in formato pdf ed inviata via fax al numero **+39 0123 940339**

TECHNICAL ASSISTANCE

Our technical assistance department is available for all the customers needs to analyse and solve working problems and to optimize the use of our tools.

INFORMATION APPLICATION FORM
For a better transmission of your requests we have arranged a technical information application form.

EMAIL : a first version, that you can fill in directly in Word completing our form, can be sent by e-mail **assistenza@silmax.it**

FAX : A second version, can be downloaded in pdf form and than be sended by fax **+39 0123 940339**

TECHNISCHER SERVICE

Der technische Service von Silmax steht zur Ihrer Verfügung, um Ihre Bearbeitungsprobleme zu analysieren. Und Sie bei der Optimierung ihres Arbeitsprozesses zu unterstützen.

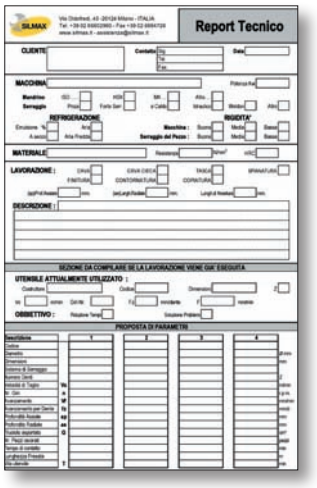
INFO-FORMULAR
Zur schnellen Erledigung Ihrer technischen Anfragen haben wir ein Formular auf unserer Homepage hinterlegt.
EMAIL : Eine Version, die mit Word geöffnet und ausgefüllt wird, können sie dann per E-Mail an: **assistenza@silmax.it** senden

FAX : Eine andere Version können Sie im PDF-Format herunterladen und per Fax an die Nummer **+39 0123 940339** senden.

POMOC TECHNICZNA

Dział pomocy technicznej firmy SILMAX jest do pełnej Państwa dyspozycji. Oferujemy pomoc przy analizowaniu problemów związanych z obróbką i optymalizacji warunków stosowania narzędzi SILMAX.

FORMULARZ INFORMACYJNY
Aby udoskonalić przepływ informacji pomiędzy Państwem i SILMAX przygotowaliśmy formularz informacji technicznych.



EMAIL: wersja pierwsza. Można wypełnić przygotowane pola bezpośrednio w programie Word i wysłać tak wypełniony formularz na adres **assistenza@silmax.it**

FAX: wersja druga. Może być pobrana w formacie pdf, wypełniona i wysłana faksem na numer: **+39 0123 940339**

SERVIZI WEB

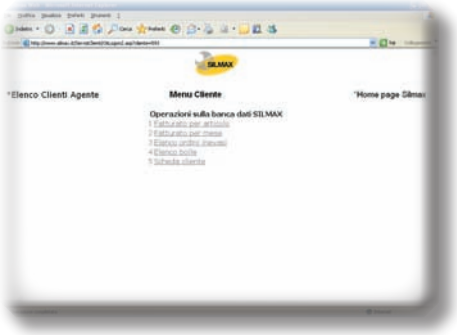
Il nuovo sito web di Silmax **www.silmax.it** presenta numerose novità rispetto al passato. La nuova logica di navigazione permette di raggiungere ogni argomento desiderato in modo rapido.

SERVIZIO CLIENTI E' disponibile un'area riservata ai clienti dove potete verificare la posizione dei vostri ordini, la merce in consegna e molte altre informazioni.
ULTIME NOVITA' PRESENTATE Grande rilievo viene dato alla presentazione dei prodotti e alla ricerca della documentazione tecnica e commerciale.

FILMATI E INFORMAZIONI TECNICHE
All'interno del sito è poi possibile scaricarsi numerosi filmati dimostrativi delle ultime novità al lavoro, e ottenere tutte le informazioni tecniche necessarie.

WEB SERVICES

The new Silmax web site **www.silmax.it** presents a lot of news compared with the past. The new logic of consultation allows you to find quickly any desired topic.

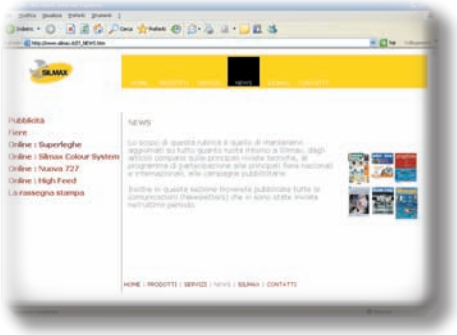


CUSTOMER SERVICE A reserved area for customers is available, where you can test the position of your orders, the items that will be delivered and a lot of other information.
THE LATEST NEWS A big importance is given to the presentation of our products, and our R&D news. You can easily find the technical and business documentation.
FILMS AND TECHNICAL INFORMATION
Inside out web site it is also possible to download several exemplary films about the various applications, and to obtain all the technical information you might need.

SERVICE WEB

Die neue Homepage **www.silmax.it** hat zahlreiche Änderungen erfahren. Die neue Navigationstechnik erlaubt einen schnellen Zugriff auf den jeweils gewünschten Themenbereich.

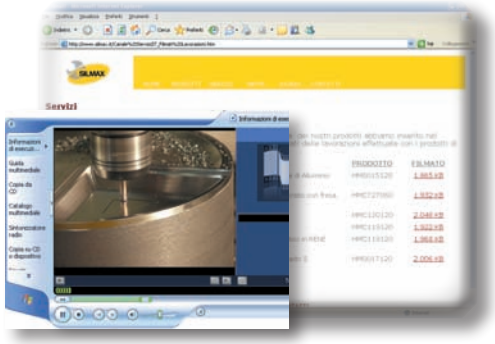
KUNDENSERVICE. Im reservierten Kundenbereich können Sie den Status Ihrer Bestellungen, das zu liefernde Material und zahlreiche weitere Daten überprüfen.
Neuigkeiten. Ein besonderes Augenmerk gilt der Produktepräsentation, sowie der F&E. Hier finden Sie die entsprechenden technischen und



kommerziellen Unterlagen.
FILME UND TECHNISCHE INFORMATIONEN
Über unsere Homepage können Sie zahlreiche Demonstrationsfilme herunterladen und alle notwendigen technischen Informationen abrufen.

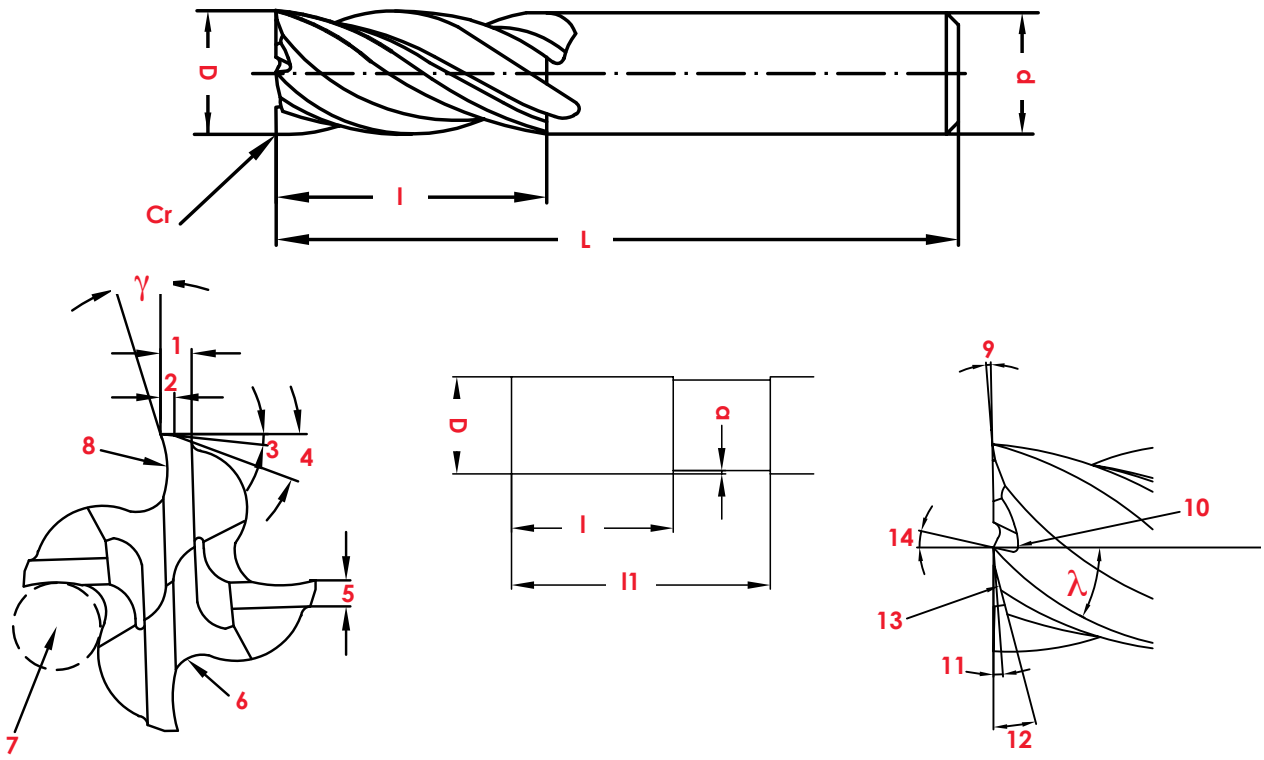
POMOC PRZEZ INTERNET

Nowa strona internetowa **www.silmax.it** zawiera wiele nowości w stosunku do tego co było dawniej. Nowa logika obsługi pozwala szybciej dotrzeć do poszukiwanej informacji.



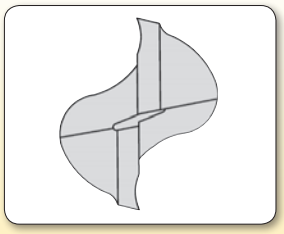
STREFA KLIENTA
Klienci mają do dyspozycji zarezerwowaną strefę w której mogą uzyskać informacje dotyczące swoich zamówień, towaru w fazie dostawy i wiele innych.
NOWOŚCI Dużo uwagi zostaje poświęcone nowym produktom w ofercie. Możecie Państwo szybko odszukać informację techniczną i handlową dotyczącą tych produktów.
FILMY I INFORMACJE TECHNICZNE Z naszej strony można pobrać liczne filmy prezentujące nowości, a także wiele inych przydatnych informacji technicznych.

NOZIONI DI BASE, General informations, Informationen, Informacje



VOCABOLARIO, Vocabulary, Bezeichnungen Und Begriffe, Vocabulario

l	Lunghezza di taglio	Lenght of cut	Schnittlänge	Długość części skrawającej
D	Diametro della Fresa	Mill diameter	Fräser-Durchmesser	Średnica narzędzia
L	Lunghezza totale	Overall lenght	Gesamtlänge	Długość całkowita
d	Diametro del Gambo	Shank diameter	Schaft-Durchmesser	Średnica chwytu
a	Ribassamento del codolo	Neck	Abgesetzter Schaft	Obniżenie
l1	Lunghezza ribassata	Neck Length	Abgesetzte Länge	Obniżenie
Cr	Raggio di raccordo	Corner radius	Übergangsradius	Promień naroża
r	Raggio	Radius	Radius	Promień narzędzia
γ	Angolo di spoglia radiale superiore (Mordente)	Radial rake angle	Radialer Spanwinkel	Promieniowy kąt natarcia
1	Larghezza spoglia radiale primaria	Radial primary relief width	Breite der Hauptschneidenfase	Szerokość pierwszej płaszczyzny przyłożenia
2	Larghezza del dente	Land width	Fasenbreite	Szerokość ostrza
3	Angolo prima spoglia radiale	Radial primary relief angle	Radialer Freiwinkel der Hauptschneide	Pierszy kąt natarcia
4	Seconda spoglia radiale	Radial secondary clearance angle	Radialer zusätlicher Fr eiwinkel der Hauptschneide	Drugi kąt przyłożenia
5	Larghezza spoglia assiale primaria	Axial primary relief width	Breite der Axialfase	Szerokość pierwszej płaszczyzny przyłożenia
6	Gola	Flute	Spannut	Średnica rdzenia
7	Vano truciolo	Chip room	Grosser Spanraum	Rowek wiórowy
8	Piano di Mordente	Cutting face	Spanfläche	Powierzchnia natarcia
9	Angolo di rastremazione frontale	End cutting edge concavity angle	Nebenschneidenwinkel	Wyluzowanie na czole
λ	Angolo d' elica	Helix angle	Drallwinkel	kąt pochylenia linii śrubowej
10	Gola frontale	End gash	Lücke	Podcięcie pod ostrzem
11	Prima spoglia frontale	Axial primary relief angle	Axialer Hauptschneidenwinkel	Pierwszy kąt przyłożenia
12	Angolo seconda spoglia frontale	Axial secondary clearance angle	Axialer zusätzlicher Freiwinkel	Drugi kąt przyłożenia
13	Denti frontali	End teeth	Nebenschneide	Ostrza centralne
14	Angolo di spoglia frontale superiore (Mordente)	Axial rake angle	Axialer Spanwinkel	Osiowy kąt natarcia

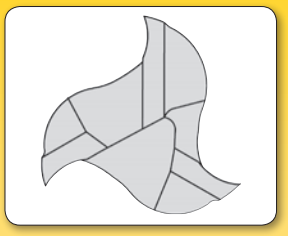


2 denti
Vano grande per il truciolo e piccolo diametro del nucleo. Buoni risultati nella sgrossatura e nella fresatura di cave. Usato anche per foratura assiale nelle leghe di alluminio e in materiali con trucioli lunghi.

2 teeth
Large chip room and small core diameter.
Good results in roughing and in slot milling.
Also used for plunging and drilling in aluminium alloys and materials with long chips.

2 Schneiden
Großer Spanraum und kleiner Steg-Durchmesser
Gute Tauglichkeit beim Schrupp- und Nutenfräsen.
Auch geeignet zum Tauchfräsen und Bohren in Alu-Legierungen und langspanenden Materialien.

2 ostrza
Szeroki rowek wiórowy i mała średnica rdzenia narzędzia
Dobre wyniki w obróbce zgrubnej i przy wykonywaniu rowków.
Używane także do wiercenia w stopach aluminium i materiałach dających długi wiór.

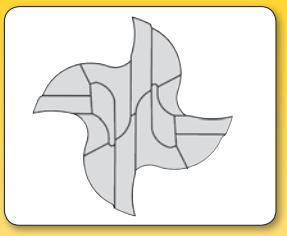


3 denti
La fresa universale. Ottima scelta per fresatura di cave.

3 teeth
The most universal milling tool.
Excellent choice for slot milling.

3 Schneiden
Das universellste Fräswerkzeug
Ausgezeichnet geeignet zum Nutenfräsen und Formfräsen in Eisenmetallen und hitzebeständigen Werkstoffen.

3 ostrza
Frez uniwersalny
Doskona□y wybór przy wykonywaniu rowków.

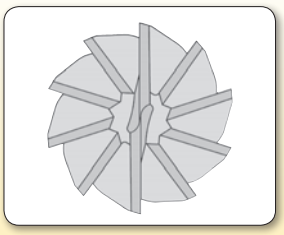


4 denti
Geometria universale, impiegata per fresatura laterale e frontale e fresatura periferica. Elevata rigidità dell'utensile dovuta al grande diametro del nucleo.

4 teeth
Universal geometry, used for side and face milling and peripheral milling.
High tool rigidity due to the large core diameter.

4 Schneiden
Universelle Geometrie für Scheibenfräser und Umfang-Fräsen.
Hohe Werkzeug-Stabilität durch den großen Stegdurchmesser.

4 ostrza
Geometria uniwersalna używana przy frezowaniu bocznym, czołowym i obwiedniowym.
Wysoka sztywność narzędzia uzyskana dzięki dużej średnicy rdzenia narzędzia.



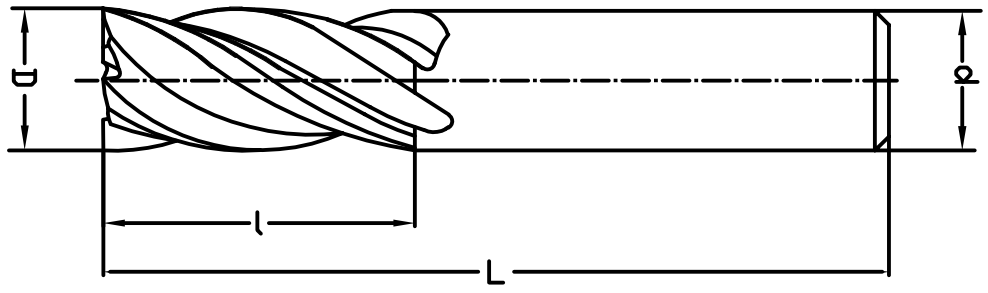
Multitagliente
Principalmente per finitura – buona finitura di superficie. Permette un'elevata velocità di avanzamento. Taglio morbido perché un dente è sempre impegnato nel materiale lavorato.

More teeth
Mainly for finishing - good surface finish.
Allow a high feed rate.
Soft cut because there is always a tooth in the workpiece material.

Mehrschneidenfräser
Hauptsächlich zum Schlichten, gute Oberflächengüten.
Hohe Vorschubraten möglich.
Weicher Schnitt, weil immer eine Schneide am bearbeitenden ist.

Frezy wieloostrzowe
Przeznaczone głównie do obróbek wykończeniowych - doskonała jakość powierzchni.
Umożliwiają pracę z wysokimi posuwami.
Proces skrawania jest "miękki" dzięki temu, że zawsze przynajmniej jedno ostrze ma kontakt z materiałem.

NORMA DIN, Din Norm



	CARBIDE								HSS											
Serie	Corta Short Kurz Krótki				Lunga Long Lang Długi				Corta Short Kurz Krótki			Normale Regular Normal Normalny			Media Medium Mittlere Wydłużony			Lunga Long Lang Długi		
DIN	6527K				6527L				327			844K			Silmax Norm			844L		
D.	d	L	l	l	d	L	l	l	d	L	l	d	L	l	d	L	l	d	L	l
			z=2/3	z=4			z=2/3	z=4												
1	3	38	3	3																
1,5	3	38	3	4																
2	3	38	3	4	3	38	6	7	6	48	4	6	51	7				6	54	10
2	6	50	3	4																
2,5	3	38	3	4	3	38	7	8	6	49	5	6	52	8				6	56	12
2,5	6	50	3	4																
3	3	38	4	5	3	38	7	8	6	49	5	6	52	8				6	56	12
3	6	50	4	5	6	57	7	8												
3,5	6	50	4	6	6	57	7	10												
4	6	54	5	8	6	57	8	11	6	51	7	6	55	11				6	63	19
5	6	54	6	9	6	57	10	13	6	52	8	6	57	13				6	68	24
6	6	54	7	10	6	57	10	13	6	52	8	6	57	13	6	62	18	6	68	24
7	8	58	8	11	8	63	13	16	10	60	10	10	66	16				10	80	30
8	8	58	9	12	8	63	16	19	10	61	11	10	69	19	10	75	25	10	88	38
9	10	66	10	13	10	72	16	19	10	61	11	10	69	19				10	88	38
10	10	66	11	14	10	72	19	22	10	63	13	10	72	22	10	83	33	10	95	45
11									12	70	13	12	79	22				12	102	45
12	12	73	12	16	12	83	22	26	12	73	16	12	83	26	12	96	39	12	110	53
13									12	73	16	12	83	26				12	110	53
14	14	75	14	18	14	83	22	26	12	73	16	12	83	26	12	96	39	12	110	53
15									12	73	16	12	83	26				12	110	53
16	16	82	16	22	16	92	26	32	16	79	19	16	92	32	16	105	45	16	123	63
17									16	79	19	16	92	32				16	123	63
18	18	84	18	24	18	92	26	32	16	79	19	16	92	32	16	105	45	16	123	63
19									16	79	19	16	92	32				16	123	63
20	20	92	20	26	20	104	32	38	20	88	22	20	104	38	20	121	55	20	141	75
22									20	88	22	20	104	38	20	121	55	20	141	75
24									25	102	26	25	121	45				25	166	90
25									25	102	26	25	121	45	25	141	65	25	166	90
26									25	102	26	25	121	45				25	166	90
28									25	102	26	25	121	45	25	141	65	25	166	90
30									25	102	26	25	121	45	25	141	65	25	166	90
32									32	112	32	32	133	53	32	158	78	32	186	106
40									40	130	38	40	155	63				40	217	125
45									40	130	38							40	217	125
50									50	147	45	50	177	75				50	252	150

TOLLERANZE, Tolerances, Toleranzen, Tolerancje (µm = 0,001 mm)

D mm.	≥1 ≤3	>3 ≤6	>6 ≤10	>10 ≤18	>18 ≤30	>30 ≤50	>50 ≤80	>80 ≤120
m7	+12 +2	+16 +4	+21 +6	+25 +7	+29 +8	+34 +9	+41 +11	+48 +13
d11	-20 -80	-30 -105	-40 -130	-50 -160	-65 -195	-80 -240	-100 -290	-120 -340
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89	60 -106	-72 -126
f8	-6 -20	-10 -28	-13 -35	-16 -43	-20 -53			
h5	0 -4	0 -5	0 -6	0 -8	0 -9	0 -11	0 -13	0 -15
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16	0 -19	0 -22
h7	0 -10	0 -12	0 -15	0 -18	0 -21	0 -25	0 -30	0 -35
h8	0 -14	0 -18	0 -22	0 -27	0 -33	0 -39	0 -46	0 -54
h9	0 -25	0 -30	0 -36	0 -43	0 -52	0 -62	0 -74	0 -87
h10	0 -40	0 -48	0 -58	0 -70	0 -84	0 -100	0 -120	0 -140
h11	0 -60	0 -75	0 -90	0 -110	0 -130	0 -160	0 -190	0 -220
h12	0 -100	0 -120	0 -150	0 -180	0 -210	0 -250	0 -300	0 -350
js16	+300 -300	+375 -375	+450 -450	+550 -550	+650 -650	+800 -800	+950 -950	+1100 -1100
k10	+40 0	+48 0	+58 0	+70 0	+84 0	+100 0	+120 0	+140 0
k11	+60 0	+75 0	+90 0	+110 0	+130 0	+160 0	+190 0	+220 0
k12	+100 0	+120 0	+150 0	+180 0	+210 0	+250 0	+300 0	+350 0
P9	-6 -31	-12 -42	-15 -51	-18 -61	-22 -74	-26 -88	-32 -106	-37 -124
H11	+60 0	+75 0	+90 0	+110 0	+130 0	+160 0	+190 0	+220 0

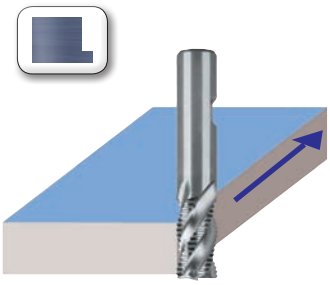
D mm.	≥1 ≤3	>3 ≤6	>6 ≤10	>10 ≤14	>14 ≤18	>18 ≤24	>24 ≤30	>30 ≤40
z9	+51 +26	+65 +35	+78 +42	+93 +50	+103 +60	+125 +73	+140 +88	+174 +112

TABELLA DUREZZE, Hardness table, Härtevergleichstabelle, Tabela Twardości

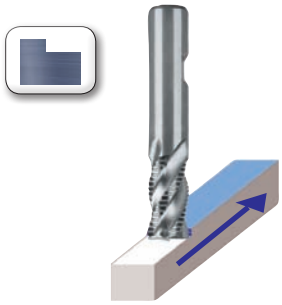
R_m (N/mm²)	HV 10 (Vickers)	HB (Brinnel)	HRC (Rockwell)	R_m (N/mm²)	HV 10 (Vickers)	HB (Brinnel)	HRC (Rockwell)
240	75	71		920	287	273	28
255	80	76		940	293	278	29
270	85	81		970	302	287	30
285	90	86		995	310	295	31
305	95	90		1020	317	301	32
320	100	95		1050	327	311	33
335	105	100		1080	336	319	34
350	110	105		1110	345	328	35
370	115	109		1140	355	337	36
385	120	114		1170	364	346	37
400	125	119		1200	373	354	38
415	130	124		1230	382	363	39
430	135	128		1260	392	372	40
450	140	133		1300	403	383	41
465	145	138		1330	413	393	42
480	150	143		1360	423	413	44
495	155	147		1400	434	413	44
510	160	152		1440	446	424	45
530	165	157		1480	458	435	46
545	170	162		1530	473	449	47
560	175	166		1570	484	460	48
575	180	171		1620	497	472	49
595	185	176		1680	514	488	50
610	190	181		1730	527	501	51
625	195	185		1790	544	517	52
640	200	190		1845	560	532	53
660	205	195		1910	578	549	54
675	210	199		1980	596	567	55
690	215	204		2050	615	584	56
705	220	209		2140	639	607	57
720	225	214			655	622	58
740	230	219			675		59
755	235	223			698		60
770	240	228			720		61
785	245	233			745		62
800	250	238	22		773		63
820	255	242	23		800		64
835	260	247	24		829		65
860	268	255	25		864		66
870	272	258	26		900		67
900	280	266	27		940		68

LAVORAZIONI, Machining end mills, Bearbeitungen der Fräser, Obróbki

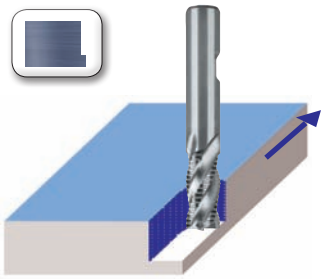
Fresatura laterale
Side milling
Flankenfräsen
Frezowanie walcowe



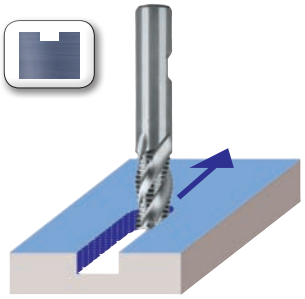
Fresatura frontale
Slot millin
Planfräsen
Frezowanie czołowe



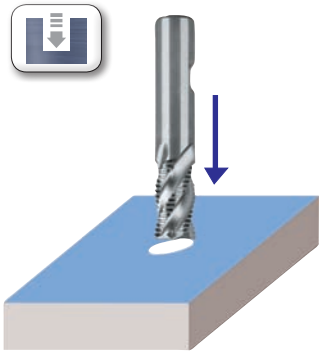
Fresatura laterale e frontale
Side and face milling
Schulterfräsen
Frezowanie walcowo czołowe



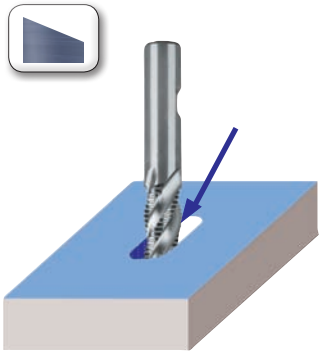
Fresatura di cava
Slot milling
Nutenfräsen
Frezowanie rowków



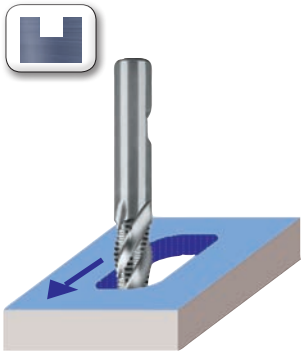
Penetrazione assiale
Plunging
Bohr-/Fräsen
Wiercenie



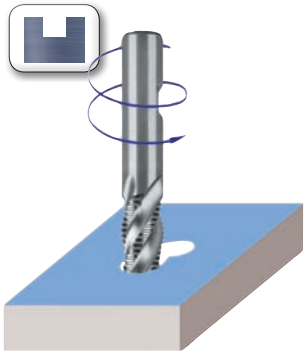
Fresatura in rampa
Diagonal plunging
Diagonales Bohr-/Fräsen
Zagłębianie po rampie



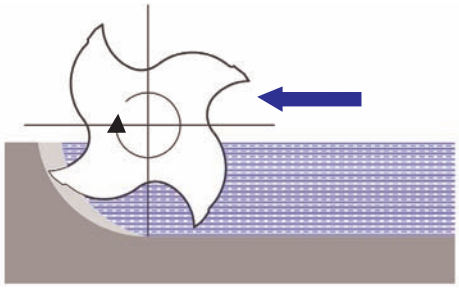
Fresatura di tasche
Pocketing
Auskoffern
Wybieranie kieszeni



Interpolazione elicoidale
Helical interpolation
Spiraliges Formfräsen
Interpolacja kołowa



Fresatura convenzionale (discorde).
Lo spessore del truciolo comincia da zero e raggiunge il massimo alla fine del taglio. Tendenza a respingere il pezzo. Il tagliente scivola invece di tagliare, provocando un forte attrito tra il fianco del dente dell'utensile e il materiale.



Conventional milling.
The width of the chip starts at zero and increases to a maximum at the end of the cut. Tendency to push workpiece away. Tool edge slides instead of cutting, causing high friction between tool flank face and material.

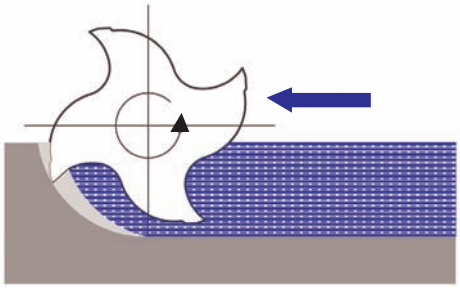
Konventionelles (Gegenlauf-) Fräsen
Die Breite des Spans fängt bei Null an und vergrößert sich zu einem Maximum am Ende des Schnittes.- Tendenz besteht, das Werkstück wegzudrücken. Die Schneiden gleiten, anstatt zu schneiden und erzeugen eine hohe Reibung zwischen Werkzeug-Freifläche und Werkstück.

Frezowanie konwencjonalne (przeciwbieżne)
Grubość warstwy skrawanej w początkowej fazie obróbki wynosi zero, aby osiągnąć grubość maksymalną na końcu skrawania. Pojawia się zjawisko odpychania elementu obrabianego. Zamiast skrawać, ostrze ślizga się po materiale powodując powstanie znacznych sił tarcia pomiędzy ostrzem i materiałem.

Fresatura concorde.
Lo spessore del truciolo comincia al massimo e scende verso lo zero alla fine del taglio. Taglio efficiente. Lunga e sicura vita dell'utensile. Miglior superficie di finitura.

Climb milling.
The tooth meets the work at the top of the cut, producing the thickest part of the chip first. Efficient cutting. Long and reliable tool life. Better surface finish.

Gleichlauffräsen
Die Schneide trifft zur Beginn des Schnittes auf das Werkstück und erzeugt zuerst den größten Querschnitt des Spans. Wirkungsvolle Zerspanung. Lange und zuverlässige Standzeiten. Bessere Oberflächengüten.



Frezowanie współbieżne
Grubość warstwy skrawanej jest maksymalna w początkowej fazie zagłębiania się ostrza w materiał, aby pod koniec procesu osiągnąć zero. Frezowanie bardzo wydajne. Doskonała jakość powierzchni. Długa żywotność narzędzia.

RIVESTIMENTI *COATING*

	HMF	HMG/NIG	HMC	HMH	HMY	HMD	HMW	HMX
Chemical composition	**TiAlN**	**AlCrN**	**AlTiN**	**TiSiN**	**AlTiN**	**Diamond**	**TiAlN+WC**	**AlCrN**
Hardness HV	3000	3200	3300	3600	3200	8000-10000	3000	3200
Thickness	1-4	2-4	1-4	2-4	2-4	6-12	2-4	2-4
Max Service Temp. °C	800	1200	900	1200	1200	600	800	1200
Application	STD	HPC/STD	HRC/COLOUR	HRC	COLOUR	DIAMOND	ALU	DRILLS
MATERIAL	**HMF**	**HMG/NIG**	**HMC**	**HMH**	**HMY**	**HMD**	**HMW**	**HMX**
STEEL	☺☺	☺☺☺	☺☺☺	☺☺	☺			☺☺☺
HARDENED STEEL		☺☺	☺☺☺	☺☺☺+				☺☺
STAINLESS STEEL	☺	☺	☺☺		☺☺☺			☺☺☺
SUPERALLOYS		☺	☺☺		☺☺☺			☺☺
ALUMINIUM		☺				☺☺	☺☺☺	☺☺
GRAPHITE						☺☺☺		
PLASTICS	☺	☺	☺			☺☺☺	☺☺	☺☺

recommended ☺☺☺
good ☺☺
suitable ☺

COME MONITORARE L'USURA, How to monitor wear, Beobachtung Von Verschleiss, Jak monitorować zużycie ostrza

SUGGERIMENTI:
- Nella fresatura un attento controllo dell'usura dello spigolo prolunga la vita dell'utensile.

Advice:
- In milling, careful monitoring of corner wear prolongs tool life

Hinweis des Werkzeugherstellers:
- Die sorgfältige Beobachtung des Schneidenverschleisses verlängert die Standzeiten beim Fräsen.

Zalecenia:
- Aby uzyskać maksymalną żywotność narzędzia należy w sposób ciągły kontrolować zużywanie się krawędzi skrawającej

USURA DEL FIANCO: Normale modalità di usura
- Se troppo elevata, diminuire prima la velocità di taglio (Vc) poi la larghezza di taglio (ae)

Flank wear: Normal wear pattern
- If too high, decrease first the cutting speed (Vc) then the width of cut (ae)

Flankenverschleiss: Normale Verschleißerscheinung
- Wenn zu hoch, zuerst Schnittgeschwindigkeit (Vc), dann Spanbreite (ae) verringern

Starcie na powierzchni przyłożenia. Normalny sposób zużycia.
- Jeżeli zaobserwujemy przyspieszone zużycie należy w pierwszej kolejności zredukować prędkość skrawania Vc, a w następnej kolejności naddatek promieniowy ae.

CRATERIZZAZIONE: da limitare
- Diminuire la velocità di taglio (Vc)

Crater wear: To be limited
- Decrease the cutting speed (Vc)

Verkraterung: Muss in Grenzen gehalten werden
- Schnittgeschwindigkeit (Vc) verringern

Krater - ograniczać
- Zmniejszyć prędkośc skrawania Vc

SCHEGGIATURA: da evitare
- Diminuire prima l'avanzamento (fz) poi la profondità di taglio (ap)

Chipping: to be avoided
- Decrease first the feed (fz)and second the depth of cut (ap)

Bröckelungen: Müssen vermieden werden.
- Zuerst Vorschub (fz), dann Spantiefe (ap) verringern

Wykruszenie - unikać.
- Zmniejszyć posuw na ostrze fz, a w następnej kolejności naddatek ap.

DEFORMAZIONE: da evitare
- Diminuire prima la velocità di taglio (Vc), poi l'avanzamento (fz) e infine ae

Deformation: to be avoided
- Decrease first the cutting speed (vc), then the feed (fz) and third ae

Verformungen: Müssen vermieden werden
- Zuerst Schnittgeschwindigkeit (Vc), dann Vorschub (fz) und dann Spanbreite ae verringern

Deformacja - unikać.
- Zmniejszyć w pierwszej kolejności prędkość skrawania Vc, następnie posuw fz, później naddatek promieniowy ae.

MATERIALE DI RIPORTO: da limitare
- Diminuire la velocità di taglio (Vc) e/o l'avanzamento (fz)
- Aumentare l'effettivo angolo di taglio
- Aumentare il flusso refrigerante

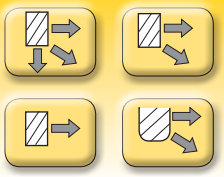
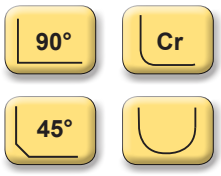
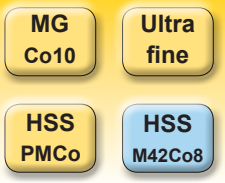
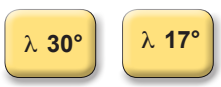
Built-up edge: to be limited
- Decrease the cutting speed (Vc) and/or the feed (fz)
- Increase the effective cutting angle
- Increase the coolant flow

Aufbauschneiden: Müssen in Grenzen gehalten werden
- Schnittgeschwindigkeit (Vc) und / oder Vorschub (fz) vergrößern
- Wirksamen Schnittwinkel vergrößern
- Kühlmittel-Zufuhr erhöhen

Narost - ograniczać
- Zwiększyć prędkość skrawania Vc i/lub posuw fz
- Zwiększyć efektywny kąt natarcia (zmiana geometrii narzędzia)
- Zwiększyć intensywność chłodzenia

FORMULE, Formulas, Formeln, Przydatne wzory

D (mm)	Diametro fresa	Diameter	Durchmesser	Średnica narzędzia
z	Numero dei denti	Number of teeth	Zähnezahl	Ilość ostrzy
ae (mm)	Profondità radiale di passata	Cutting width	Schnittbreite	Naddatek promieniowy
ap (mm)	Profondità assiale di passata	Cutting depth	Schnitttiefe	Naddatek poosiowy
$n = \frac{Vc \times 1000}{D \times \Pi}$	Velocità di rotazione numero giri al min.	Round per minute Rpm	Drehzahl	Obroty na minutę [obr/min]
$V_f = f_z \times z \times n$	Avanzamento in mm/min	Feed speed mm/min	Vorschub in mm/min	Posuw [mm/min]
$V_c = \frac{D \times \Pi \times n}{1000}$	Velocità di taglio m/min	Cutting speed m/min	Schnittgeschwindigkeit m/min	Prędkość skrawania [m/min]
$f = f_z \times z$ (mm)	Avanzamento per giro	Feed per revolution	Vorschub	Posuw na obrót
$f_z = \frac{Vf}{z \times n}$ (mm)	Avanzamento per dente	Feed per tooth	Vorschub pro Zahn	Posuw na ostrze
$Q = \frac{aexapxVf}{1000}$	Volume di truciolo cmm^3/min	Chip removal rate cmm^3/min	Zeitspanungvolumen in cmm^3/min	Wydajność procesu [cmm^3/min]

	**Direzioni di avanzamento:** le frecce indicano le possibili direzioni di avanzamento della fresa illustrata	**Feed direction:** the arrows show the allowed feed directions for the indicated end-mill	**Vorschubrichtungen:** Die Pfeile zeigen die möglichen Vorschubrichtungen des dargestellten Fräsers.	**Kierunek posuwu**: strzałki wskazują możliwe kierunki posuwów
	Geometria Frontale	Front design	Stirngeometrie	Kształt narzędzia
	Materiale utensile	Material tools	Werkzeugwerkstoff	Materiał narzędzia
	Angolo elica	Helix angle	Drallwinkel	Kąt skrętu rowka wiórowego
	Angolo spoglia radiale superiore	Radial rake angle	Radialer Spanwinkel	Kąt natarcia
	Lavorazione a secco con aria compressa	Dry cutting: Air	Trockenbearbeitung: Druckluft	Obróbka na sucho: Sprężone powietrze
	Lubrificazione minimale	Emulsion: Minimun quantity lubrication	Emulsion: Minimalschmierung	Chłodzenie minimalne
	Emulsione	Lubrication	Schmierung	Emulsja

SILMAX SPA

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Sede Legale e Stabilimento di produzione e Sede Commerciale e Amministrativa
Production factory & Technical assistance and Sales and Accounting office

Via Fucine, 9 - 10074 Lanzo Torinese (TO)
ITALIA
GPS N.45°16'50"
E. 7°28'20"

SILMAX

La qualità come scelta.

INFO TECNICHE

CONDIZIONI GENERALI DI VENDITA

1.Catalogo prodotti e offerte: Le nostre offerte sono vincolanti per entrambi le parti se seguite da accettazione scritta o da comportamento concludente. Silmax si riserva di modificare i prodotti e i dati tecnici inseriti nel proprio catalogo senza nessun obbligo di preavviso. Non saranno accettati ordini di valore inferiore ai 100,00 €, al netto dell'I.V.A. Le ordinazioni che ci pervengono si considerano accettate solo se seguite da una conferma per iscritto.

2.Prezzi: Le forniture di utensili normalizzati saranno fatturate ai prezzi indicati nel Listino Silmax in vigore e si intendono al netto dell'I.V.A. Silmax si riserva di modificare il listino senza obbligo di preavviso. Per i prodotti realizzati su richiesta del cliente, i prezzi indicati nelle nostre offerte sono applicati per il periodo di validità delle offerte medesime non potranno essere modificati. Per la merce, offerta o venduta, destinata all'estero i prezzi potranno essere soggetti a revisione qualora si verificassero variazioni di cambio di prezzo all'origine prima della spedizione o del pagamento del materiale, oppure variazioni delle tariffe e tasse doganali e d'importazione nel periodo intercorrente tra la data della nostra offerta e quella della consegna effettiva della merce al cliente.

3.Trasporti: Le spese di trasporto a destino e qualunque altra spesa o tassa che dovesse gravare sulle merci si intende ad esclusivo carico dell'acquirente, salvo diverso accordo, da pattuirsi per iscritto al momento dell'ordine. In nessun caso, poi, potremo essere chiamati a rispondere per mancata, ritardata o irregolare consegna da parte dei ferrovie, mezzi di trasporto aereo, di navigazione o su terra, restando inteso che la merce - anche se, per speciali accordi, venduta in porto franco – viaggia sempre a rischio e pericolo dell'acquirente ai sensi dell'art.1510 c.c. La mancata, ritardata o irregolare consegna dovuta alle suddette cause, quindi da noi indipendenti, non potrà costituire motivo di annullamento dell'ordine, né di mancato o ritardato pagamento, né, infine, di reclamo da parte dell'acquirente.

4.Consegne: i termini di consegna indicati ed accettati sono orientativi e valevoli solamente in condizioni normali di lavoro. Eventuali cause di forza maggiore, quali, a titolo esemplificativo, guerre, scioperi, epidemie, incidenti, il ritardo o l'interruzione dei qualsivoglia tipi di trasporto, la penuria di materiali ed ogni altro fatto che comporti il ritardo, la sospensione o l'interruzione totale o parziale del lavoro e/o del contratto, ci autorizzano a sospendere ovvero ad annullare la fornitura e/o il contratto, senza alcuna responsabilità o penalità da parte nostra.

5.Pagamenti: il prezzo d'acquisto della merce, comprese le spese per l'eventuale imballaggio e qualsiasi altro onere gravante sulla merce, deve essere corrisposto in contanti al momento della fornitura, salvo espressa diversa indicazione concordata al momento dell'ordine. Ci riserviamo la facoltà di richiedere il pagamento [parzialmente] anticipato per ordinazioni importanti o per forniture speciali. In caso di ritardato pagamento, l'acquirente si obbliga a corrispondere gli interessi di mora nella misura superiore del 2% al tasso prime-rate ABI.

6.Tolleranza: Le tolleranze costruttive degli utensili normalizzati sono indicate nel catalogo prodotti in vigore. Per i prodotti non normalizzati ed eseguiti su richiesta del Cliente, saranno ritenute valide le tolleranze standard, salvo diversa richiesta espressa al momento dell'ordine. Per gli stessi prodotti inoltre non è possibile garantire un'assoluta esattezza nella quantità dei pezzi forniti, sarà quindi sempre ammessa la tolleranza d'uso (+/-10% della quantità ordinata) sia sui prodotti finiti, sia sui singoli elementi che li costituiscono, salvo espresse indicazioni contrarie concordate in fase di ordinazione.

7.Garanzia: Silmax garantisce che i prodotti siano esenti da difetti e vizi di fabbricazione, ed un buon funzionamento per un periodo di sei mesi. In ogni caso, la garanzia non si estende all'obbligo di risarcire danni diretti o indiretti, a cose o a persone, che possano derivare dall'impiego dei prodotti Silmax, anche in caso di rottura.

8.Resi, reclami e contestazioni: Eventuali resi di materiali saranno accettati da SILMAX solo se preventivamente autorizzati, e qualora fossero da imputare ad una causa a noi estranea ci riserviamo di richiedere un risarcimento dei costi sostenuti. Eventuali reclami riguardanti vizi, difetti, mancanza di qualità della merce fornita dovranno essere effettuati entro otto giorni dalla scoperta e fatti pervenire entro il termine perentorio di sei mesi dal ricevimento delle merci stesse, termine decorso il quale non verranno più accettati. In tal caso, il nostro obbligo resta limitato al rimborso del prezzo di vendita od alla sostituzione pura e semplice, a nostra scelta, di quella parte di merce che, a giudizio esclusivo dei nostri tecnici, sarà ritenuta difettosa di materiale o di costruzione, ovvero, sempre a nostra scelta, potremo accettare la
restituzione delle merci oggetto del reclamo, che dovranno essere rispedite in porto franco, a rischio del mittente in difetto di che ci riserviamo di rifiutarne il diritto. Resta inteso che eventuali contestazioni o reclami riguardanti una singola fornitura di merce non avranno alcun effetto sul pagamento di forniture pregresse o ancora da eseguirsi, di cui al resto dell'ordine. In nessun caso, poi, e per nessun motivo potremo essere tenuti a corrispondere qualsiasi indennizzo per eventuali danni diretti o indiretti, a cose o a persone, che possano derivare dall'impiego dei prodotti contestati. I prodotti sostituiti o rimborsati restano di nostra proprietà.

9.Clausola risolutiva espressa: fermo restando l'obbligo di rispettare le clausole del presente contratto, in caso di mancato pagamento del prezzo nei termini di cui all'art.5, il contratto si intenderà immediatamente e automaticamente risolto, senza bisogno di preavviso, ai sensi di cui all'art.1456 del Codice Civile, ed il compratore si obbliga a restituire il prodotto a richiesta della venditrice.

10.Foro Competente: nella inauspicabile ipotesi in cui dovessero insorgere dispute e/o controversie in merito alla interpretazione e/o esecuzione delle singole vendite, sono esclusivamente competenti le Autorità Giudiziari del Foro di Milano

GENERAL SALES CONDITIONS

1. Product catalog and offers: Our offers are binding for both parties if followed by written acceptance or by implication.
SILMAX reserves the right to change products and technical data included in its catalog without notice.
We will not accept orders with a value of less than € 100.00, excluding VAT. The orders we receive are considered accepted only if followed by written confirmation.

2.Prices: The supply of standard tools will be invoiced at the prices indicated in the list SILMAX in force and shall exclude VAT. SILMAX reserves the right to change the pricelist without notice. For products made on customer demand, the prices quoted in our offers are applied to the same period of validity of tenders and can not be changed. For goods offered or sold, for foreign countries, prices may be subject to revision if changes occur in exchange for money or source of payment before shipment of material, or changes in tariffs and taxes in import and customs period between the date of our offer and the actual delivery of goods to the customer.

3.Shipment: The shipping costs to the destination and any other expenses and taxes that were imposed on goods are the responsibility of the buyer, unless otherwise agreed in written form with the order. In no case then, can we be held accountable for failure, irregular or delayed delivery by rail, air transport, shipping or on land, it being understood that the goods - even if, for special arrangements, sold carriage free - always at risk of the purchaser under Article 1510 cc The failure, irregular or delayed delivery due to these causes, then we have independent, will not constitute grounds for cancellation of the order, nor any failure or delay in payment, or further claims of the buyer.

4. Delivery: The delivery times indicated and accepted are only guidelines and are calculated under normal working conditions. Any force majeure, including but not limited to war, strike, epidemic, accident, delay or interruption of any kind of transportation, shortage of materials and any other events that causes the delay, interruption or discontinuation total or part of the work and / or contract, to entitle us to suspend or cancel the supply and / or contract without any penalty or liability on our part.

5. Payment: the purchase price of the commodity, including the costs of any packaging and any other charges levied on the goods, must be paid in cash upon delivery, unless expressly stated otherwise agreed at time of order. We reserve the right to require payment [partially] in advance for large orders or special deliveries. In case of delayed payment, the buyer agrees to pay interest on late payments in excess of 2% above the first-rate of the ABI (Italian Banking Association).

6. Tolerance: The tolerances of the tools are given in the current product catalog. For products not standardized that are produced after
customer request, the valid standard tolerances will be valid, unless others were requested and confirmed at time of ordering. For the products we can not guarantee an absolute accuracy in the quantity of parts supplied, you should always use permitted tolerance (+ / -10% of the quantity ordered) and finished products, both on the individual elements that constitute them unless expressly provided otherwise agreed in the order.

7. Warranty: SILMAX ensures that products are free from defects and bad workmanship, and good for a period of six months. In any case the guarantee does not cover further damages and liabilities, direct or indirect, to property or persons, which may result from the use of products SILMAX, even in case of breakage.

8. Returns, Claims and Disputes:
Returns of materials will only be accepted if approved in advance by SILMAX, and should they be attributed to a cause unrelated to us we reserve the right to claim compensation for those costs. Any complaints about defects, problems, lack of quality of the goods supplied must be made within eight days of discovery and submitted within a deadline of six months of receipt of the goods, after which term will no longer be accepted.
In this case, our obligation is limited to a refund of the purchase price or replacement pure and simple, at our option, that part of goods which, at the sole discretion of our technicians, will be considered defective in materials or construction, or , always at our discretion, we accept the return of the goods subject of the claim, which must be returned postage paid, at the risk of the sender. Otherwise we reserve the right to refuse. It is understood that any dispute or claim concerning an individual supply of goods will have no effect on the payment of supplies pre-existing or yet to be performed, of for the rest of the order. In no case, then, for any reason we will be obliged to pay any compensation for any direct or indirect damage, to property or persons, which may result from the use of the disputed products. Replacement products or refunds shall remain our property.

9. Termination clause: subject to the requirement to comply with the provisions of this contract, in case of failure to pay the price as provided for in Article 5, the contract will be immediately and automatically terminated, without notice, in accordance with under Article art.1456 of the Civil Code, and the buyer is obligated to return the product at the request of the seller.

10. Jurisdiction: In cases where disputes arise and/or disputes regarding the interpretation and/or execution of individual transactions, are solely competent:
Judicial Authority of the Court of Milan

INDICE, Index, Verzeichnis, Spis treści

INDICE, Index, Verzeichnis, Spis treści

La qualità come scelta.