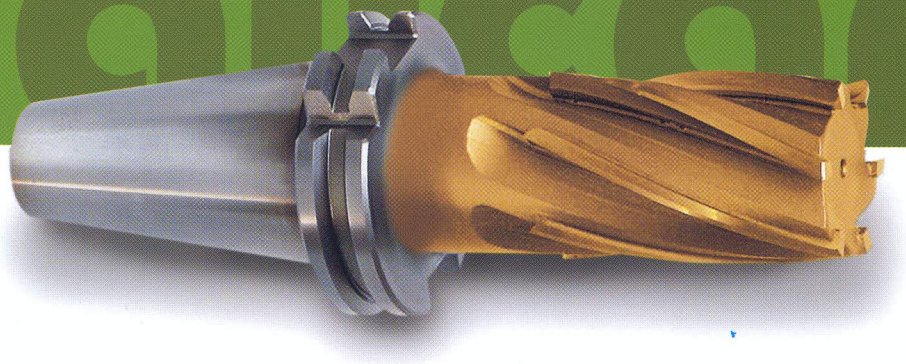
duemilaundici
2011

UTENSILI
SALDOBRASATI



OUTILS EN CARBURE BRASÉ

CARBIDE TIPPED TOOLS

HM-BESTÜCKTE WERKZEUGEN

Talicarb

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TALICARB,

società appartenente dal 1990 al gruppo Angelo Ghezzi & C. S.p.A. è particolarmente specializzata nella progettazione e realizzazione di utensili in metallo duro saldobrasato ed integrale. Produce dal 1962 frese per cave, frese per sgrossature e finitura, alesatori utensili monotaglienti secondo le normative ISO, ed ha intensificato in questi ultimi anni il suo programma di prodotti speciali a disegno. Nell'ultimo anno grazie al nostro personale altamente specializzato, ed al maturare dei massicci investimenti tecnologici effettuati (Walter CNC 6 assi, centro di lavoro Zeus, etc.) siamo in grado di presentare in questo catalogo diverse novità:

- frese a 45° con elica fortemente ritorta, inclinazione di 45° proposta per un miglior rendimento nelle operazioni di finitura;
- frese a 35° con gole molto scaricate specifiche per la lavorazione delle leghe leggere, materiali teneri e malleabili;
- frese a 2 tagli con angolo a elica a 25° per leghe leggere;
- frese raggiate semisferiche tipo "Radius" con esecuzione ad "inclinazione continua" dei 25° anche sul raggio.

Anche per il problema di fresatura con utensili di lunghezza particolare viene proposta una fresa con elica utile superiore al tipo standard senza alterarne le caratteristiche tecniche, dando così all'utilizzatore la possibilità di scelta.
Questi prodotti sono costantemente disponibili a magazzino, così come tutta la gamma di utensili in metallo duro integrale, composta di frese a 2 - 3 - 4 e più taglienti, per alta velocità, coniche per stampi, in cermet, per copiatura e per acciai temperati, punte, barrette e lime rotative. (Richiedeteci l'altro catalogo "Utensili di precisione in metallo duro integrale")

Talicarb

THE TALICARB COMPANY,

which is part of the Angelo Ghezzi & S.p.A. group since 1990, is specialized in engineering and manufacturing solid carbide and carbide tipped cutting tools. The company was founded in 1962 and ever since it has been producing slot cutters, roughing and finishing end mills, reamers and turning tools in accordance with ISO standards. In the latest years the Talicarb company has increased the production of tools according to drawing (blue print). Thanks to the professional skill of the technical personnel and large investment made in high technology machinaries (6-axle CNC machine Walter, machining center Zeus, etc.) the Talicarb is able to introduce several new products in this catalogue:

- high spiral 45° end mills the helix angle improves the finishing performance of the tool;
- 35° end mills this tool has deep flutes and it is recommended to machine light alloys, soft and malleable materials;
- ball nose end mill "Radius" the main feature of this cutter is to have a continuous 25° helix.

The Talicarb also solves the problem of miling high shoulders offering a new type of cutter with flutes longer than standard.
This new feature does not change the technical performance of the tool and the customer has the opportunity to choose the flute length that best meets his requirements. The above products are constantly available in stock as well as our whole line of solid carbide end mills with 2 - 3 - 4 and more flutes, high speed end mills, sinking taper cutters, cermet end mills, twiste drills, end mills for copy milling and for tempered steel, rods and rotary burrs. (Please ask for the other catalogue " Solid carbide precision tools")

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TALICARB

PLACCHETTE E INSERTI PER FRESA IN METALLO DURO

Plaquettes en métal dur

Carbide tips and inserts

Hartmetall- Schneidplättchen und Einsätze

UTENSILI IN METALLO DURO BRASATI

Outils de tournage en métal dur brasés

Carbide tipped turning tools

Gelötete Hartmetall-Drehwerkzeuge

FRESE SPECIALI CON RIPORTO IN METALLO DURO

Fraises speciales en carbure brasè

Special carbide brazed end mills

Sonder-hartmetall-bestückte Fräser

FRESE CON RIPORTO IN METALLO DURO

Fraises avec plaquettes en métal dur brasées

Carbide tipped milling cutters

Gelötete Hartmetall-Fräser

ALESATORI CON RIPORTO IN METALLO DURO

Alésoirs avec plaquettes en métal dur brasés

Carbide tipped reamers

Gelötete Hartmetall-Reibahlen

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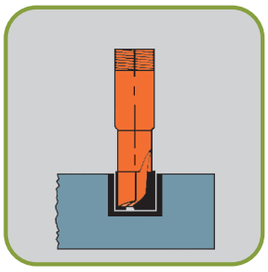

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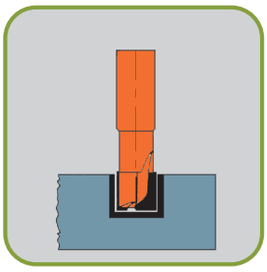

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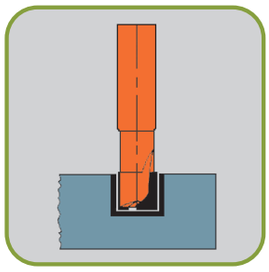

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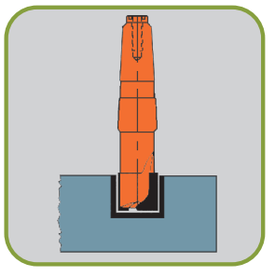

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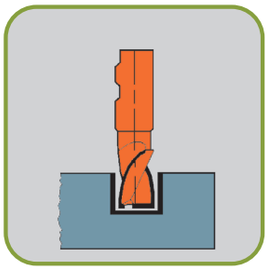

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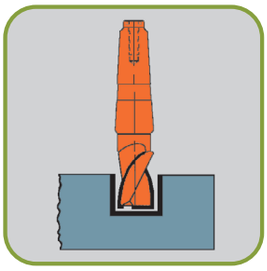

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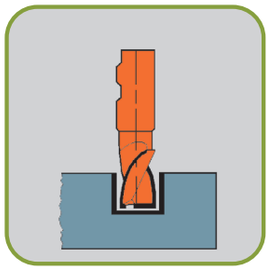

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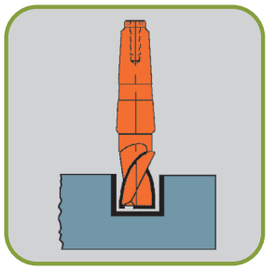

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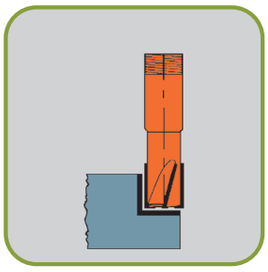

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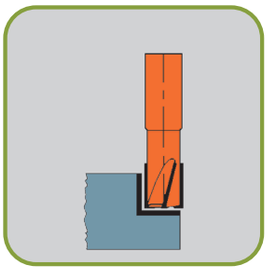

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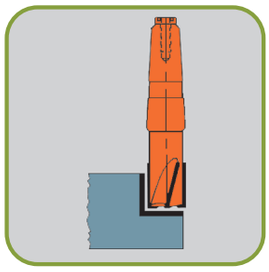

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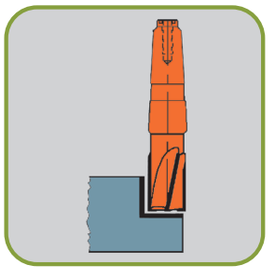

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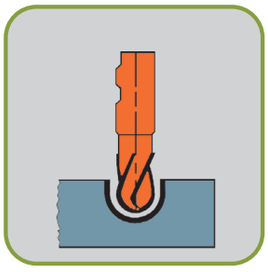

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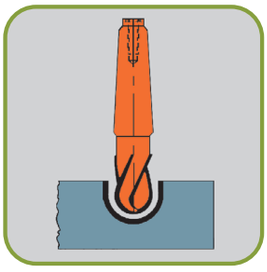

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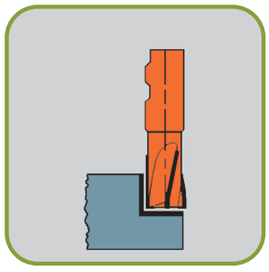

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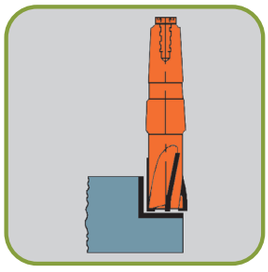

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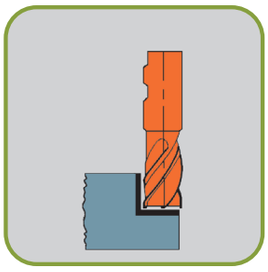

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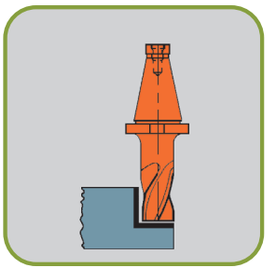

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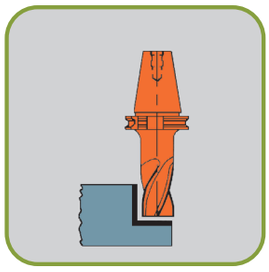

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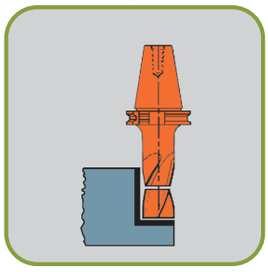

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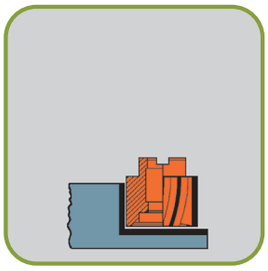

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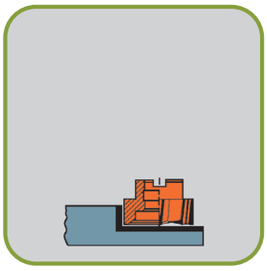

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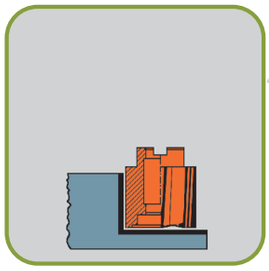

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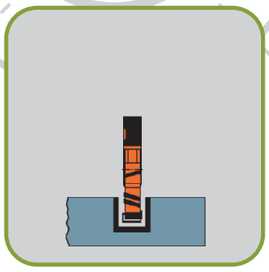

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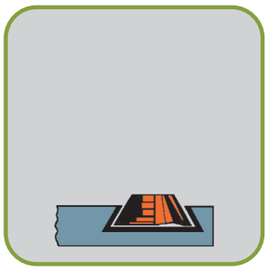

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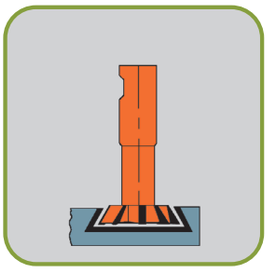

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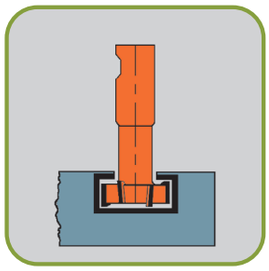

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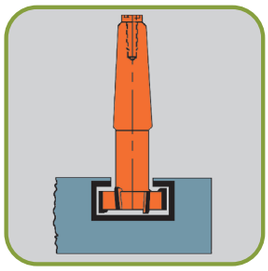

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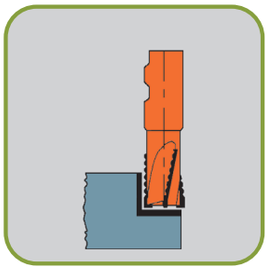

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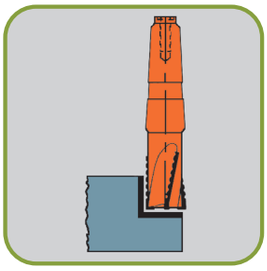

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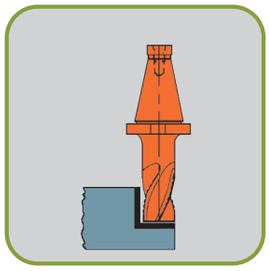

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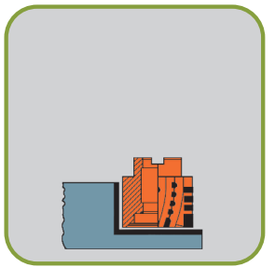

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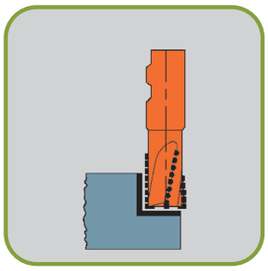

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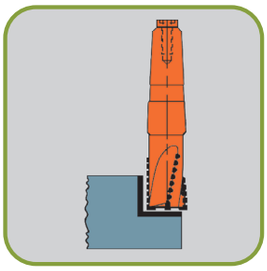

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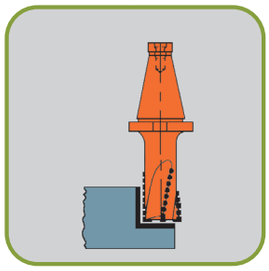

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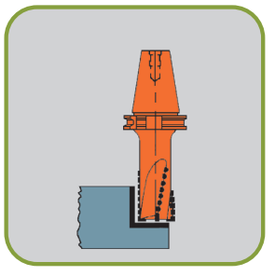

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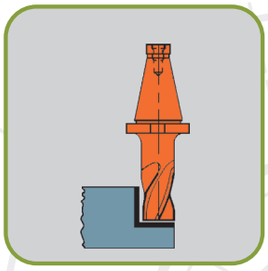

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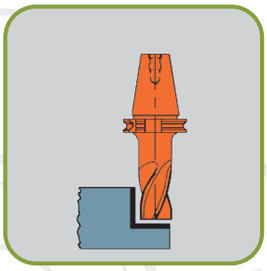

CHIAMATA GRATUITA
SERVIZIO TECNICO
800-018130

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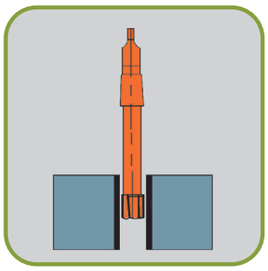

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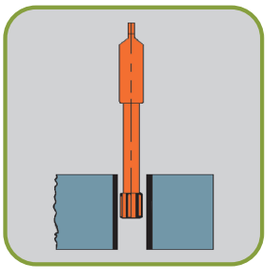

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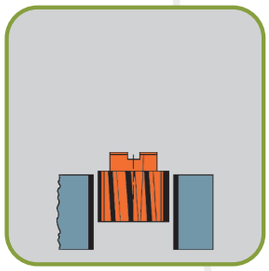

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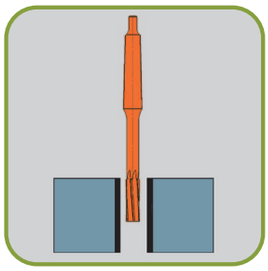

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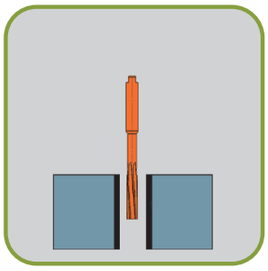

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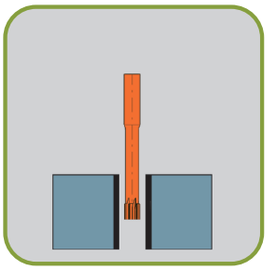

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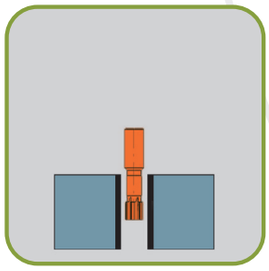

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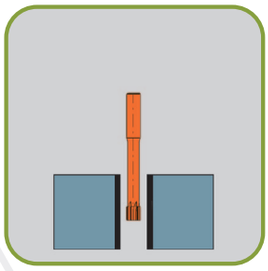

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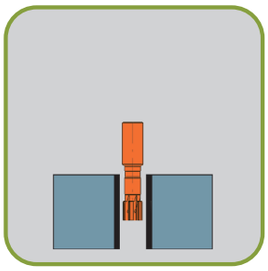

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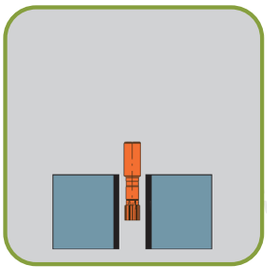

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TABELLA QUALITA'

TABELLE DES NUANCES
GRADES SCHEME
SORTEN-TABELLE

ISO Désignations Symbols Bezeichnungen		TALICARB Désignations Symbols Bezeichungen
P10	M10	ST92
P20-P25-P30	M30	ST90
P40-50		ST88
K05	M05	C930
K10-K20	M20	C910
K30	M40	C890

PER ULTERIORI INFORMAZIONI CONTATTATECI · FOR ANY INFORMATION, PLEASE CONTACT US

Angelo Ghezzi & C SpA

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ASK FOR OUR NEW TALICARB CATALOGUES

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PLACCHETTE E INSERTI PER FRESA IN METALLO DURO

PLAQUETTES EN MÉTAL DUR

CARBIDE TIPS AND INSERTS

HARMETALL-SCHNEIDPLÄTTCHEN UND EINSÄTZE

Talicarb

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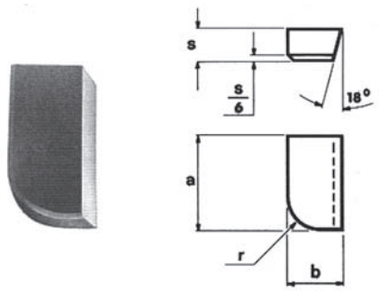
PLACCHETTE NORME ISO

PLAQUETTES SELON NORMES ISO
CARBIDE TIPS ACCORDING TO ISO NORMS
SCHNEIDPLÄTTCHEN NACH ISO-NORM

QUALITÀ K10/P25

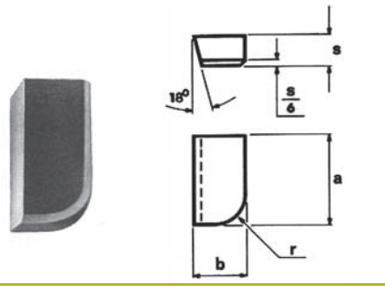
NUANCES K10/P25
GRADES K10/P25
SORTEN K10/P25

A



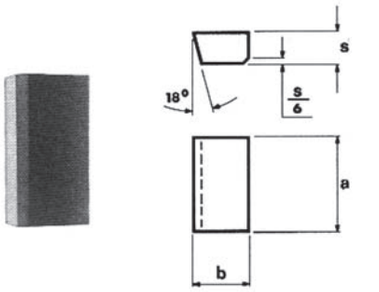
COD. ORDINE N° de commande Item number - Bestell. NR.	a	b	s	r	€
A 5	5	3	2	2	1,93
A 6	6	4	2,5	2,5	1,98
A 8	8	5	3	3	2,24
A 10	10	6	4	4	4,12
A 12	12	8	5	5	5,75
A 16	16	10	6	6	9,05
A 20	20	12	7	7	13,17
A 25	25	14	8	8	21,80
A 32	32	18	10	10	38,05

B



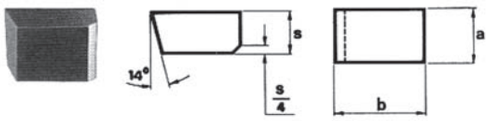
					€
B 5	5	3	2	2	1,93
B 6	6	4	2,5	2,5	1,98
B 8	8	5	3	3	2,24
B 10	10	6	4	4	4,12
B 12	12	8	5	5	5,75
B 16	16	10	6	6	9,05
B 20	20	12	7	7	13,17
B 25	25	14	8	8	21,80
B 32	32	18	10	10	38,05

C



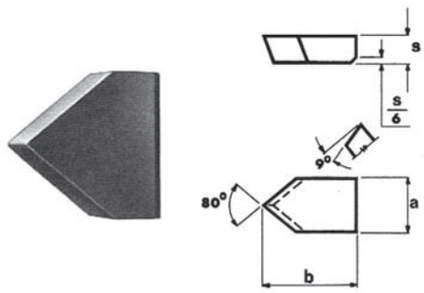
					€
C 5	5	3	2		1,93
C 6	6	4	2,5		1,98
C 8	8	5	3		2,24
C 10	10	6	4		4,12
C 12	12	8	5		5,75
C 16	16	10	6		9,05
C 20	20	12	7		13,17
C 25	25	14	8		21,80
C 32	32	18	10		38,05
C 40	40	22	12		62,40

D



					€
D 3	3,5	8	3		2,24
D 4	4,5	10	4		3,09
D 5	5,5	12	5		4,77
D 6	6,5	14	6		6,75
D 8	8,5	16	8		10,10
D 10	10,5	18	10		14,38
D 12	12,5	20	12		21,00

E



					€
E 4	4	10	2,5		2,24
E 5	5	12	3		3,30
E 6	6	13	3,5		4,41
E 8	8	16	4		5,59
E 10	10	18	5		8,22
E 12	12	20	6		12,32
E 16	16	22	7		16,50
E 20	20	25	8		23,70
E 25	25	28	9		32,60
E 32	32	32	10		54,10

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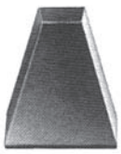
PLACCHETTE VARIE

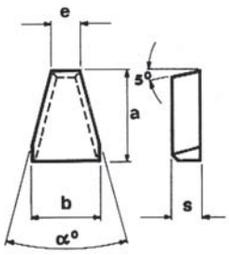
PLAQUETTES EN MÉTAL DUR
CARBIDE TIPS
HARTMETALL-SCHNEIDPLÄTTCHEN

QUALITÀ K10/P25

NUANCES K10/P25
GRADES K10/P25
SORTEN K10/P25

CR

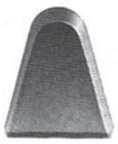


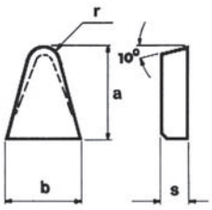


α = 34°

COD. ORDINE N° de commande Item number - Bestell. NR.	a	b	s	e	€
CR 12	15	12	5	4,5	**9,15**
CR 16	18	16	6	5,4	**17,05**
CR 20	22	20	6	7,1	**22,80**
CR 25	30	25	8	9,4	**42,80**

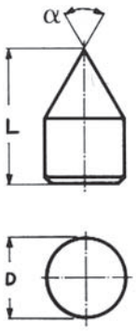
G





COD. ORDINE N° de commande Item number - Bestell. NR.	a	b	s	r	€
G 8	12	8	4	1	**5,00**
G 10	14	10	4	1,5	**6,31**
G 12	17	12	5	2,5	**9,15**
G 16	20	16	6	3,5	**16,10**
G 20	24	20	6	4,5	**24,90**
G 25	28	25	8	6	**42,80**

CP



α = 60°

COD. ORDINE N° de commande Item number - Bestell. NR.	Ø	L	€
CP 6	6	12	**4,48**
CP 8	8	16	**7,50**
CP 10	10	20	**13,69**
CP 12	12	22	**19,80**
CP 14	14	25	**25,55**
CP 18	18	32	**60,90**
CP 25	25	40	**115,50**
CP 30	30	45	**121,00**
CP 40	40	60	**273,00**
CP 50	50	63	**440,00**

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PLACCHETTE VARIE

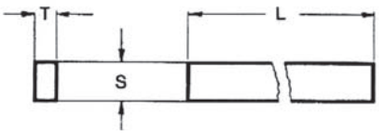
PLAQUETTES EN MÉTAL DUR
CARBIDE TIPS
HARTMETALL-SCHNEIDPLÄTTCHEN

QUALITÀ K10/P25

NUANCES K10/P25
GRADES K10/P25
SORTEN K10/P25

BR

BARRETTE RETTANGOLARI IN METALLO DURO
Barreaux réctangulaires en métal dur massif
Rectangular solid carbide blanks
Rechteckige Vollhartmetallstäbe



ESECUZIONE GREZZA - SOVRAMETALLO + 0,3 mm
Exécution brute avec surépaisseur 0,3 mm
Just sintered execution with 0,3 mm oversize
Rohe Ausführung mit 0,3 mm übermass

COD. ORDINE N° de commande Item number - Bestell. NR.	L	S	T	€
BR 3	100	3	1,5	**7,68**
BR 5	100	5	2	**10,39**
BR 6	100	6	2,5	**15,50**
BR 8	100	8	3	**19,05**
BR 10	100	10	3	**26,90**
BR 12	140	12	3,5	**45,20**
BR 15	140	15	5	**79,70**
BR 8,2	100	8	2	**15,05**
BR 10,2	100	10	2	**21,00**
BR 12,2	100	12	2	**25,55**
BR 15,2	100	15	2	**32,85**

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UTENSILI IN METALLO DURO BRASATI

OUTILS DE TOURNAGE EN MÉTAL DUR BRASÉS

CARBIDE TIPED TURNING TOOLS

GELÖTETE HARTMETALL- DREHWERKZEUGE

Talicarb

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UTENSILI PER TORNIO

OUTILS DE TOURNAGE EN MÉTAL DUR BRASÉS
CARBIDE TIPPED TURNING TOOLS
GELÖTETE HARTMETALL- DREHWERKZEUGE

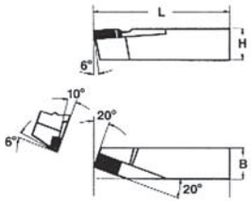
QUALITÀ K10/P25/K05/P10/P40

NUANCES K10/P25/K05/P10/P40
GRADES K10/P25/K05/P10/P40
SORTEN K10/P25/K05/P10/P40

ISO1

UTENSILE SGROSSATORE
Outil droit à charioter
Bar turning tool
Gerader Schruppstahl

UNI 4102
110



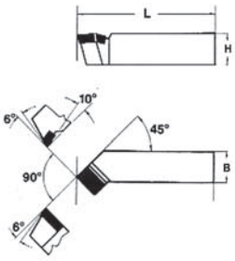
ESECUZIONE DESTRA E SINISTRA
Exécution droite et gauche
Right and left version
Rechte und linke Ausführung

PLACCHETTA Plaquette - Carbide tip Schneidplatte	H x B x L	€
C 8	10 x 10 x 90	8,60
C 10	12 x 12 x 100	11,10
C 12	16 x 16 x 110	13,35
C 16	20 x 20 x 125	17,25
C 20	25 x 25 x 140	24,95
C 25	32 x 32 x 170	40,80
C 32	40 x 40 x 200	72,60

ISO2

UTENSILE SGROSSATORE 45°
Outil à charioter 45°
45° cranked turning tool
45° Gebogener Schruppstahl

UNI 4103
111



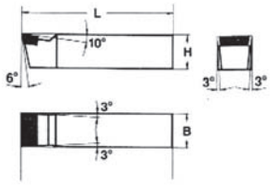
ESECUZIONE DESTRA E SINISTRA
Exécution droite et gauche
Right and left version
Rechte und linke Ausführung

PLACCHETTA Plaquette - Carbide tip Schneidplatte	H x B x L	€
C 8	10 x 10 x 90	8,60
C 10	12 x 12 x 100	11,10
C 12	16 x 16 x 110	13,35
C 16	20 x 20 x 125	17,25
C 20	25 x 25 x 140	24,95
C 25	32 x 32 x 170	40,80
C 32	40 x 40 x 200	72,60

ISO4

UTENSILE FRONTALE
Outil à planer
Straight facing tool
Kopfstahl

UNI 4107
127



PLACCHETTA Plaquette - Carbide tip Schneidplatte	H x B x L	€
C 10	10 x 10 x 90	11,10
C 12	12 x 12 x 100	14,61
C 16	16 x 16 x 110	19,10
C 20	20 x 20 x 125	26,15
C 25	25 x 25 x 140	40,10
C 12	20 x 12 x 125	16,95
C 16	25 x 16 x 140	25,40
C 20	32 x 20 x 170	35,45
C 25	40 x 25 x 200	62,00

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UTENSILI PER TORNIO

OUTILS DE TOURNAGE EN MÉTAL DUR BRASÉS
CARBIDE TIPPED TURNING TOOLS
GELÖTETE HARTMETALL- DREHWERKZEUGE

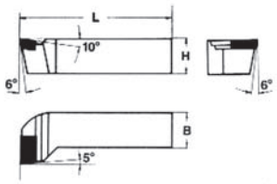
QUALITÀ K10/P25/K05/P10/P40

NUANCES K10/P25/K05/P10/P40
GRADES K10/P25/K05/P10/P40
SORTEN K10/P25/K05/P10/P40

ISO5

UTENSILE SPIANATORE
Outil à défoncer
Facing and side turning tool
Plandrehstahl

UNI 4108
126



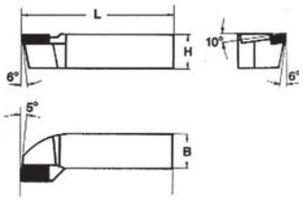
ESECUZIONE DESTRA E SINISTRA
Exécution droite et gauche
Right and left version
Rechte und linke Ausführung

PLACCHETTA Plaquette - Carbide tip Schneidplatte	H x B x L	€
C 8	10 x 10 x 90	8,60
C 10	12 x 12 x 100	11,10
C 12	16 x 16 x 110	13,35
C 16	20 x 20 x 125	17,25
C 20	25 x 25 x 140	24,95
C 25	32 x 32 x 170	40,80
C 32	40 x 40 x 200	72,60

ISO6

UTENSILE SFACCIATORE
Outil d'angle
Cranked facing tool
Eckdrehstahl

UNI 4104
117



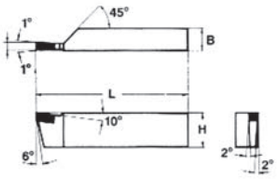
ESECUZIONE DESTRA E SINISTRA
Exécution droite et gauche
Right and left version
Rechte und linke Ausführung

PLACCHETTA Plaquette - Carbide tip Schneidplatte	H x B x L	€
C 8	10 x 10 x 90	8,60
C 10	12 x 12 x 100	11,10
C 12	16 x 16 x 110	13,35
C 16	20 x 20 x 125	17,25
C 20	25 x 25 x 140	24,95
C 25	32 x 32 x 170	40,80
C 32	40 x 40 x 200	72,60

ISO7

UTENSILE TRONCATORE
Outil à tronçonne
Parting tool
Abstechstahl

UNI 4109
150



ESECUZIONE DESTRA E SINISTRA
Exécution droite et gauche
Right and left version
Rechte und linke Ausführung

PLACCHETTA Plaquette - Carbide tip Schneidplatte	H x B x L	€
D 3	12 x 8 x 100	9,48
D 4	16 x 10 x 110	11,77
D 5	20 x 12 x 125	14,79
D 6	25 x 16 x 140	19,40
D 8	32 x 20 x 170	26,15
D 10	40 x 25 x 200	40,80
D 12	50 x 32 x 240	72,60

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UTENSILI PER TORNIO

OUTILS DE TOURNAGE EN MÉTAL DUR BRASÉS
CARBIDE TIPPED TURNING TOOLS
GELÖTETE HARTMETALL- DREHWERKZEUGE

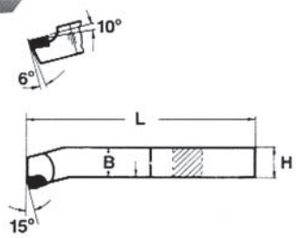
QUALITÀ K10/P25/K05/P10/P40

NUANCES K10/P25/K05/P10/P40
GRADES K10/P25/K05/P10/P40
SORTEN K10/P25/K05/P10/P40

ISO8

UTENSILE PER FORI PASSANTI
Outil à aléser
Boring tool
Innenschrupp-stahl

UNI 4110
131

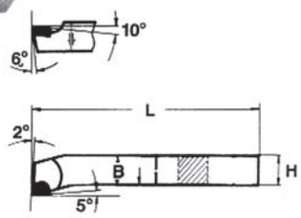


PLACCHETTA Plaquette - Carbide tip Schneidplatte	H x B x L	€
A 6	10 x 10 x 150	10,74
A 8	12 x 12 x 180	12,78
A 10	16 x 16 x 210	15,50
A 12	20 x 20 x 250	19,50
A 16	25 x 25 x 300	27,90
A 20	32 x 32 x 355	44,40
A 25	40 x 40 x 355	82,10

ISO9

UTENSILE PER FORI CIECHI
Outil à dresser les founds
Cranked internal facing tool
Inneneckstahl

UNI 4111
136

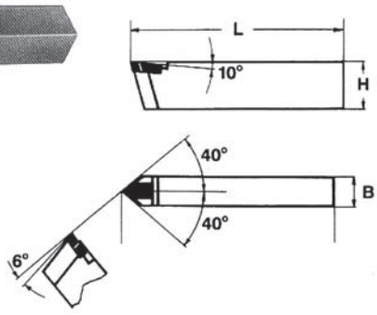


PLACCHETTA Plaquette - Carbide tip Schneidplatte	H x B x L	€
A 6	10 x 10 x 150	10,74
A 8	12 x 12 x 180	12,78
A 10	16 x 16 x 210	15,50
A 12	20 x 20 x 250	19,50
A 16	25 x 25 x 300	27,90
A 20	32 x 32 x 355	44,40
A 25	40 x 40 x 355	82,10

975

UTENSILE FINITORE
Outil droite à finir
Straight finishing tool
Schlichstahl

UNI 4105



PLACCHETTA Plaquette - Carbide tip Schneidplatte	H x B x L	€
E 4	10 x 10 x 90	8,81
E 5	12 x 12 x 100	11,41
E 6	16 x 16 x 110	13,71
E 8	20 x 20 x 125	16,80
E 10	25 x 25 x 140	23,50
E 12	32 x 32 x 170	40,80
E 16	40 x 40 x 200	72,60

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UTENSILI PER TORNIO

OUTILS DE TOURNAGE EN MÉTAL DUR BRASÉS
CARBIDE TIPPED TURNING TOOLS
GELÖTETE HARTMETALL- DREHWERKZEUGE

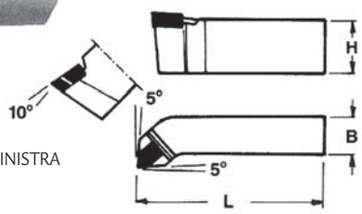
QUALITÀ K10/P25/K05/P10/P40

NUANCES K10/P25/K05/P10/P40
GRADES K10/P25/K05/P10/P40
SORTEN K10/P25/K05/P10/P40

976

UTENSILE FINITORE 45°
Outil coudé à finir 45°
Cranked finishing tool
45° gebogener Schlichtstahl

UNI 4106

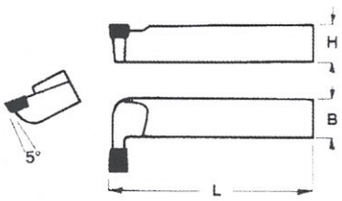


ESECUZIONE DESTRA E SINISTRA
Exécution droite et gauche
Right and left version
Rechte und linke Ausführung

PLACCHETTA Plaquette - Carbide tip Schneidplatte	H x B x L	€
E 4	10 x 10 x 90	8,81
E 5	12 x 12 x 100	11,41
E 6	16 x 16 x 110	13,71
E 8	20 x 20 x 125	16,80
E 10	25 x 25 x 140	23,50
E 12	32 x 32 x 170	40,80
E 16	40 x 40 x 200	72,60

114

UTENSILE PER INCASTRI
Outil à chambrer
Internal recessing tool
Hakenstahl

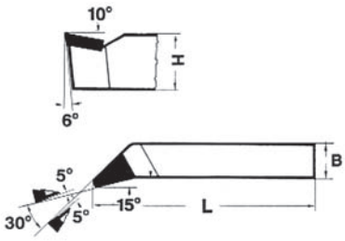


PLACCHETTA Plaquette - Carbide tip Schneidplatte	H x B x L	€
D 3	10 x 10 x **140**	12,24
D 4	12 x 12 x **160**	13,99
D 5	16 x 16 x **180**	16,95
D 6	20 x 20 x **210**	21,45
D 8	25 x 25 x **250**	33,35
☐ D 3	10 x 10 x 150	12,24
☐ D 4	12 x 12 x 180	13,99
☐ D 5	16 x 16 x 210	16,95
☐ D 6	20 x 20 x 250	21,45
☐ D 8	25 x 25 x 300	33,35

☐ Ad eliminazione

115

UTENSILE PER RACCORDI
Outil coudé à raccorder
Cranked round nose tool
Rundnasenmeibel



ESECUZIONE DESTRA E SINISTRA
Exécution droite et gauche
Right and left version
Rechte und linke Ausführung

PLACCHETTA Plaquette - Carbide tip Schneidplatte	H x B x L	€
G 12	20 x 12 x 125	23,30
G 16	25 x 16 x 140	32,45
G 20	32 x 20 x 170	41,60
G 25	40 x 25 x 200	77,40

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UTENSILI PER TORNIO

OUTILS DE TOURNAGE EN MÉTAL DUR BRASÉS
CARBIDE TIPPED TURNING TOOLS
GELÖTETE HARTMETALL- DREHWERKZEUGE

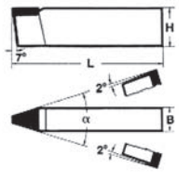
QUALITÀ K10/P25/K05/P10/P40

NUANCES K10/P25/K05/P10/P40
GRADES K10/P25/K05/P10/P40
SORTEN K10/P25/K05/P10/P40

164

UTENSILE PER GOLE TRAPEZOIDALI
Outil pour gorges des pouliers
Vee-pulley grooving tool
Keilriemen- Profistahl

α = 34° - 36° - 38° - 40°



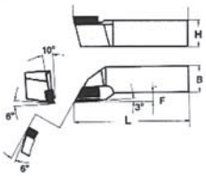
☐ Ad eliminazione

PLACCHETTA Plaquette - Carbide tip Schneidplatte	H x B x L	€
CR 12	20 x 12 x **125**	**22,45**
CR 16	25 x 16 x **140**	**28,60**
CR 20	32 x 20 x 170	**38,70**
CR 25	40 x 25 x 200	**77,40**
☐ CR 12	20 x 12 x 140	**22,45**
☐ CR 16	25 x 16 x 160	**28,60**

165

UTENSILE PER COPIA
Outil pour tours à copier
Copying lathe tool
Kopierdreh meibel

ESECUZIONE DESTRA E SINISTRA
Exécution droite et gauche
Right and left version
Rechte und linke Ausführung



☐ Ad eliminazione

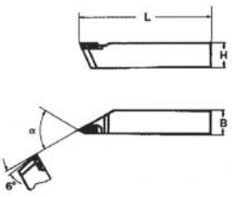
PLACCHETTA Plaquette - Carbide tip Schneidplatte	H x B x L	€
C 12	16 x 16 x **125**	**16,65**
C 16	20 x 20 x **140**	**22,15**
C 20	25 x 25 x **170**	**33,85**
☐ C 12	16 x 16 x 140	**16,65**
☐ C 16	20 x 20 x 160	**22,15**
☐ C 20	25 x 25 x 200	**33,85**

166

UTENSILE FILETTATORE ESTERNO
Outil à fileter extérieur
External threading tool
Aussengewindestahl

α = 60° - 55°

ESECUZIONE DESTRA E SINISTRA
Exécution droite et gauche
Right and left version
Rechte und linke Ausführung

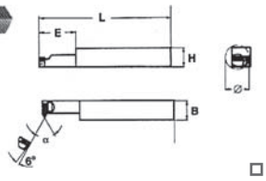


PLACCHETTA Plaquette - Carbide tip Schneidplatte	H x B x L	€
E 4	16 x 10 x 110	**12,65**
E 5	20 x 12 x 125	**16,35**
E 6	25 x 16 x 140	**20,80**
E 8	32 x 20 x 170	**33,85**

167

UTENSILE FILETTATORE INTERNO
Outil à fileter intérieur
Internal threading tool
Innengewindestahl

α = 60° - 55°



☐ Ad eliminazione

PLACCHETTA Plaquette - Carbide tip Schneidplatte	H x B x L	€
E 4	10 x 10 x **140**	**11,88**
E 5	12 x 12 x **160**	**13,99**
E 6	16 x 16 x **180**	**17,40**
E 8	20 x 20 x **210**	**22,00**
E 10	25 x 25 x **250**	**32,45**
☐ E 4	10 x 10 x 150	**11,88**
☐ E 5	12 x 12 x 180	**13,99**
☐ E 6	16 x 16 x 210	**17,40**
☐ E 8	20 x 20 x 250	**22,00**
☐ E 10	25 x 25 x 300	**32,45**

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UTENSILI ORIENTABILI

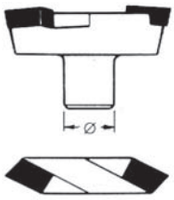
OUTIL ORIENTABLES EN MÉTAL DUR BRASÉS
CARBIDE TIPPED ROTARY TOOLS
SCHWENKBARE HARTMETALLBESTÜCKTE WERKZEUGE

QUALITÀ K10/P25/K05/P10/P40

NUANCES K10/P25/K05/P10/P40
GRADES K10/P25/K05/P10/P40
SORTEN K10/P25/K05/P10/P40

125

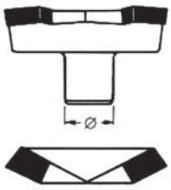
UTENSILE SGROSSATORE DESTRO
Outil d'ébauche à droite
R.H. roughing tool
Rechter Schruppstahl



PLACCHETTA Plaquette - Carbide tip Schneidplatte	Ø	€
C 12	12	26,10
C 12	14	28,60
C 16	16	34,35
C 20	18	52,20

126

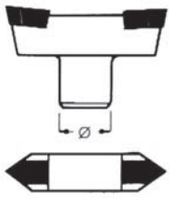
UTENSILE SGROSSATORE DESTRO-SINISTRO
Outil d'ébauche à droite et à gauche
R.H. and L. H. roughing tool
Linker and rechter Schruppstahl



PLACCHETTA Plaquette - Carbide tip Schneidplatte	Ø	€
C 12	12	26,10
C 12	14	28,60
C 16	16	34,35
C 20	18	52,20

127

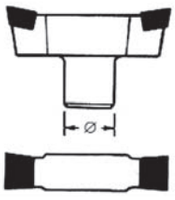
UTENSILE FINITORE
Outil de finition
Finishing tool
Schlichtmesser



PLACCHETTA Plaquette - Carbide tip Schneidplatte	Ø	€
E 4	12	26,10
E 5	14	28,60
E 6	16	33,35
E 8	18	50,70

128

UTENSILE A TESTA PIATTA
Outil pelle
Plain form tool
Kopfmesser



PLACCHETTA Plaquette - Carbide tip Schneidplatte	Ø	€
C 12	12	26,10
C 12	14	28,60
C 16	16	34,35

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UTENSILI PER INTERNI

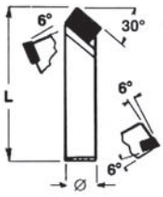
OUTILS EN MÉTAL DUR BRASÉS POUR PORTE OUTILS
CARBIDE TIPPED TOOLS FOR TOOL-HOLDERS
HARTMETALLBESTÜCKTE WERZEUGE FÜR WERKEZEUGHALTER

QUALITÀ K10/P25

NUANCES K10/P25
GRADES K10/P25
SORTEN K10/P25

142

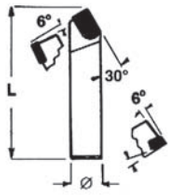
UTENSILE SGROSSATORE 60°
Outil à charioter à 60°
60° roughing tool
60° Schruppmesser



PLACCHETTA Plaquette - Carbide tip Schneidplatte	Ø x L	€
C 5	4 x 18	6,85
C 5	5 x 20	7,26
C 6	7 x 25	7,73
C 8	8 x 30	8,60
C 10	10 x 45	10,38
C 12	12 x 50	11,93
C 16	16 x 70	16,75

143

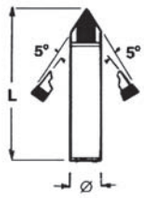
UTENSILE SGROSSATORE 90°
Outil à charioter à 90°
90° roughing tool
90° Schruppmesser



PLACCHETTA Plaquette - Carbide tip Schneidplatte	Ø x L	€
C 5	4 x 18	6,85
C 5	5 x 20	7,26
C 6	7 x 25	7,73
C 8	8 x 30	8,60
C 10	10 x 45	10,38
C 12	12 x 50	11,93
C 16	16 x 70	16,75

144

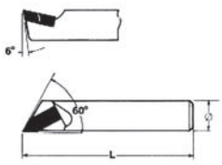
UTENSILE FINITORE
Outil de finition
Finishing tool
Schlichtwerkzeug



PLACCHETTA Plaquette - Carbide tip Schneidplatte	Ø x L	€
E 4	4 x 18	6,85
E 4	5 x 20	7,26
E 4	7 x 25	7,73
E 5	8 x 30	8,60
E 6	10 x 45	10,38
E 8	12 x 50	11,93
E 10	16 x 70	16,75

145

UTENSILE FILETTATORE 60°
Outil à filiter à 60°
60° threading tool
60° Gewindeschneidwerzeug



PLACCHETTA Plaquette - Carbide tip Schneidplatte	Ø x L	€
E 4	4 x 18	6,85
E 4	5 x 20	7,26
E 4	7 x 25	7,73
E 5	8 x 30	8,60
E 6	10 x 45	10,38
E 8	12 x 50	11,93
E 10	16 x 70	16,75

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FRESE SPECIALI CON RIPORTO IN METALLO DURO

FRAISES SPECIALES EN CARBURE BRASÉ

SPECIAL CARBIDE BRAZED END MILLS

SONDERHARTMETALL- BESTÜCKTE FRÄSER

Talicarb

PARAMETRI DI LAVORAZIONE FRESA 45°

PARAMÈTRES D'USINAGE POUR FRAISE 45°
WORKING PARAMETERS 45° END MILL
RICHTWERTTABELLE FÜR FRÄSER 45°

MATERIALI - Matière - Material - Werkstoff	Vt m/1'	F mm/z
ACCIAIO NON LEGATO FINO R=550 N/mm² Acier non allié jusqu'à R=550 N/mm² - Unalloyed Steel to R=550 N/mm² - Nichtlegierter Stahl bis R=550 N/mm²	120	0,10 ÷ 0,15
ACCIAIO NON LEGATO FINO R=850 N/mm² Acier non allié jusqu'à R=850 N/mm² - Unalloyed Steel to R=850 N/mm² - Nichtlegierter Stahl bis R=850 N/mm²	70	0,10 ÷ 0,15
ACCIAIO BASSO LEGATO Acier faiblement allié - Weakly alloyed Steel - Nichtlegierter Stahl	100	0,08 ÷ 0,12
ACCIAIO ALTAMENTE LEGATO Acier fortement allié - Highly alloyed Steel - Hochlegierter Stahl	45	0,08 ÷ 0,12
ACCIAIO INOSSIDABILE FINO R=550 N/mm² Acier inoxydable jusqu'à R=550 N/mm² - Stainless Steel to R=550 N/mm² - Rostfreier Stahl bis R=550 N/mm²	70	0,1 ÷ 0,16
ACCIAIO INOSSIDABILE FINO R=700 N/mm² Acier inoxydable jusqu'à R=700 N/mm² - Stainless Steel to R=700 N/mm² - Rostfreier Stahl bis R=700 N/mm²	60	0,1 ÷ 0,16
ACCIAIO INOSSIDABILE FINO R=800 N/mm² Acier inoxydable jusqu'à R=800 N/mm² - Stainless Steel to R=800 N/mm² - Rostfreier Stahl bis R=800 N/mm²	45	0,1 ÷ 0,16
ACCIAIO REFRATTARIO FINO R=650 N/mm² Acier réfractaire jusqu'à R=650 N/mm² - Heat-resistant Steel to R=650 N/mm² - Warmfester Stahl bis R=650 N/mm²	60	0,1 ÷ 0,15
ACCIAIO REFRATTARIO FINO R=850 N/mm² Acier réfractaire jusqu'à R=850 N/mm² - Heat-resistant Steel to R=850 N/mm² - Warmfester Stahl bis R=850 N/mm²	45	0,1 ÷ 0,15
ACCIAIO REFRATTARIO OLTRE R=850 N/mm² Acier réfractaire plus de R=850 N/mm² - Heat-resistant Steel over R=850 N/mm² - Warmfester Stahl über R=850 N/mm²	30	0,1 ÷ 0,15
GHISA FINO 200HB Fonte jusqu'à 200HB - Cast Iron to 200HB - Guss bis 200HB	120	0,16 ÷ 0,20
GHISA FINO 250HB Fonte jusqu'à 250GHB - Cast Iron to 250HB - Guss bis 250HB	95	0,16 ÷ 0,20
GHISA FINO 320HB Fonte jusqu'à 320HB - Cast Iron to 320HB - Guss bis 320HB	75	0,16 ÷ 0,20
ALLUMINIO PURO Aluminium pur - Pure Aluminium - Reinaluminium	400	0,12 ÷ 0,20
Al-Si FINO 7% Si Al-Si jusqu'à 7% Si - Al-Si to 7% Si - Al-Si bis 7% Si	250	0,12 ÷ 0,20
Al-Si FINO 12% Si Al-Si jusqu'à 12% Si - Al-Si to 12% Si - Al-Si bis 12% Si	200	0,12 ÷ 0,20
Al-Si OLTRE 12% Si Al-Si plus de 12% Si - Al-Si over 12% Si - Al-Si über 12% Si	150	0,12 ÷ 0,20
LEGHE DI TITANIO Alliages de Titane - Titanium alloys - Titanlegierungen	30 ÷ 75	0,08 ÷ 0,12
LEGHE DI RAME Alliages de Cuivre - Copper alloys - Kupferlegierungen	120	0,08 ÷ 0,16
OTTONE-BRONZO Laiton-Bronze - Brass-Bronze - Messing-Bronze	160	0,08 ÷ 0,16
MATERIE SINTETICHE Matières plastiques - Plastics - Kunststoffe	100	0,08 ÷ 0,1
TERMOPLASTICHE Matières thermoplastiques - Thermoplastics - Thermoplaste	100	0,08 ÷ 0,1
PLASTICHE DURE Matières plastiques thermodurcissables - Thermoset - Duroplast	100	0,08 ÷ 0,1
FIBRE DI VETRO Fibres de verre - Glass fiber - Glasfiber	100	0,08 ÷ 0,1
KEVLAR Kevlar - Kevlar - Kevlar	100	0,08 ÷ 0,1

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FRESE FRONTALI CON ANGOLO ELICA 45°

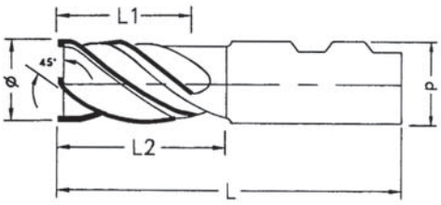
FRAISES 2 TAILLEC AVEC ANGLE HÉLICE 45°
45° HELIX ANGLE END MILLS
STIRNFRÄSER MIT SPIRALWINKEL 45°

QUALITÀ K10/P25

NUANCES K10/P25
GRADES K10/P25
SORTEN K10/P25

850

ATTACCO CILINDRICO WELDON DIN 1835B
Queue cylindrique avec méplat
Weldom cylndrical shank
Zylinderschaft mit Spannfläche



Ø e8	L	L1	L2	d h6	Z	€
16	95	30	47	16	3	**304,00**
20	115	40	59	25	3	**331,00**
25	118	50	62	25	4	**440,00**
32	125	50	65	32	4	**481,00**
40	145	63	85	32	6	**676,00**
50	157	75	97	32	6	**837,00**

Scomposizione della forza di "F" nelle sue componenti "f_1" e "f_2" con elica 25°.
25° helix angle. Resolution of cutting force "F" and "f_1" e "f_2".

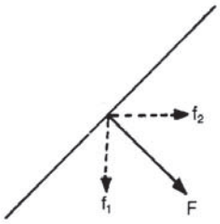


fig. 1

Scomposizione della forza di "F" nelle sue componenti "f_1" e "f_2" con elica 45°.
25° helix angle. Resolution of cutting force "F" and "f_1" e "f_2"

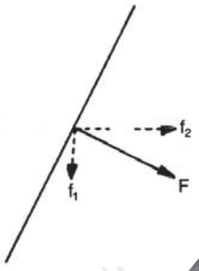
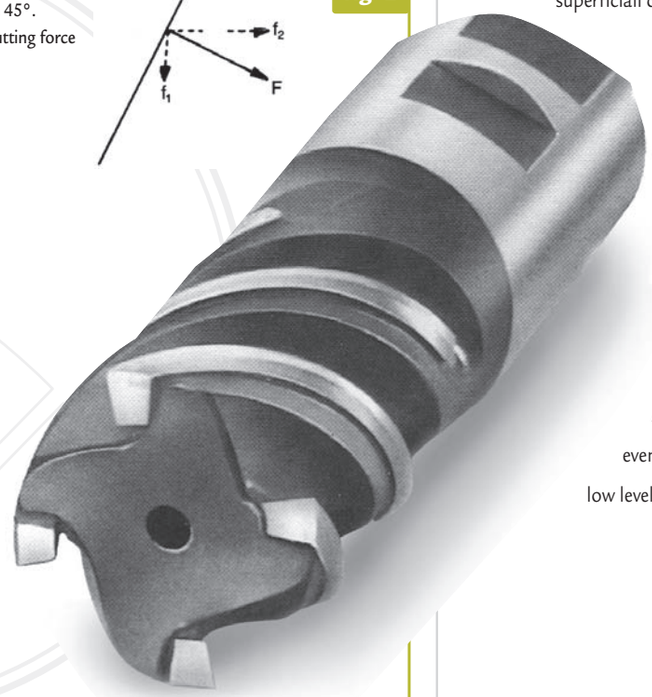


fig. 2



LE FRESE CON ELICA A 45°

vengono proposte all'utilizzatore come utensili finotori, adatti a lavorazioni di contornatura interna ed esterna.
L'elevata inclinazione dell'elica consente di ottenere, rispetto alla tradizionale 25°, un differente sviluppo delle forze di taglio presenti nelle lavorazioni (vedi fig. 1 e 2).
Così facendo l'utensile ci permette di ottenere un taglio molto dolce e fluido garantendo lavorazioni omogenee, ottime finiture superficiali con un grado di rugosità molto basso.

THE END WITH 45° HELIX ANGLE

is a finishing cutter suitable to execute inner and outer contours.
The high helix inclination developes particular cutting edge forces which are different from the ones obtained using standard 25° end mills (pls. see fig. 1 and fig. 2).
As a result, the cutt is soft and guarantees even working, execellent surface finishing and a low level of roughness.

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FRESE ELICOIDALI SEMISFERICHE

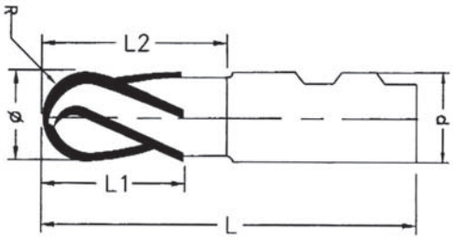
FRAISES HÉLICOÏDALES - BOUTH HÉMISPHÉRIQUE
HELICAL END MILLS - BALL NOSE
DRALLNUTIGE HALBBRUNDFRÄSER

QUALITÀ K10/P25

NUANCES K10/P25
GRADES K10/P25
SORTEN K10/P25

202

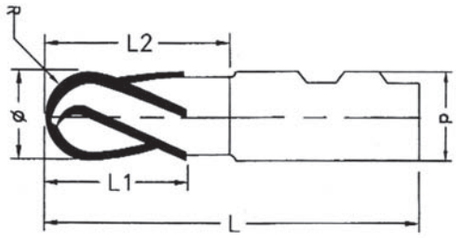
ATTACCO CILINDRICO WELDON DIN 1835B TAGLIO AL CENTRO
Queue cylindrique avec méplat Coupe au centre
Weldon cylindrical shank - Center cutting
Zylinderschaft mit Spannfläche - Mit Zentrumschneide



Ø ± 0,05	L	L1	L2	R	d h6	Z	€
16	95	30	45	8	20	3	**207,50**
20	115	40	59	10	25	3	**250,50**
25	118	50	62	12,5	25	3	**289,00**
32	125	50	65	16	32	4	**348,00**

203

SERIE LUNGA - ATTACCO CILINDRICO
WELDON DIN 1835B - TAGLIO AL CENTRO
Serie longue - Queue cylindrique avec méplat - Coupe au centre
Long series - Weldon cylindrical shank - Center cutting
Lange AusfÜhrung - Zylinderschaft mit Spannfläche - Mit Zentruschneide



Ø ± 0,05	L	L1	L2	R	d h6	Z	€
16	113	30	63	8	20	3	**211,50**
20	131	40	75	10	25	3	**256,00**
25	156	50	100	12,5	25	3	**294,00**
32	185	50	125	16	32	4	**354,00**

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FRESE ELICOIDALI “RADIUS”

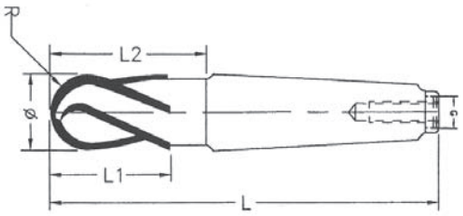
FRAISES HÉLICOÏDALES “RADIUS”
HELICAL END MILLS “RADIUS”
DRALLNUTIGE STIRNFRÄSER “RADIUS”

QUALITÀ K10/P25

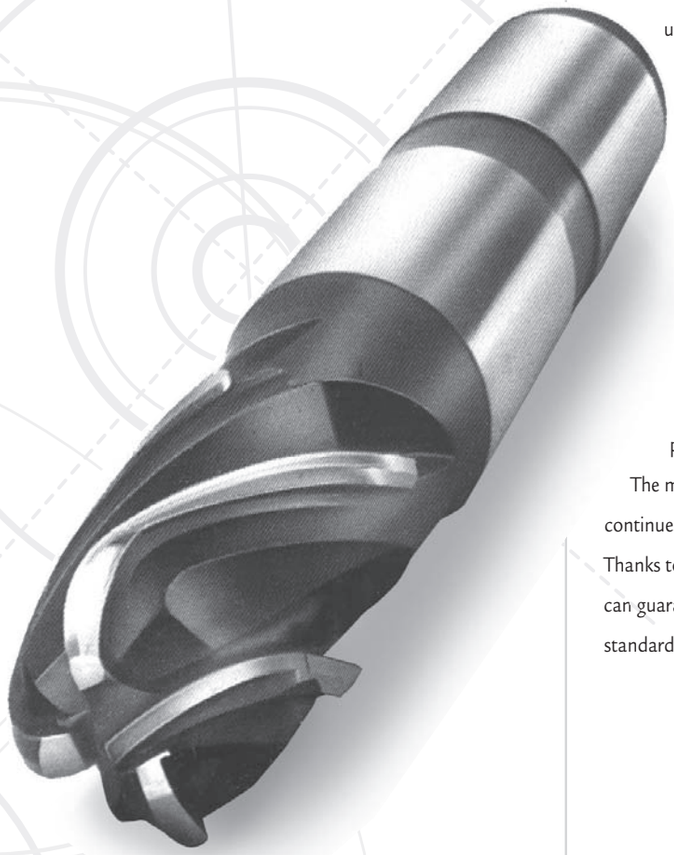
NUANCES K10/P25
GRADES K10/P25
SORTEN K10/P25

683

ATTACCO CONO MORSE DIN 228
Queue cône Morse
Morse tapershank
Zylinderschaft mit Spannfläche - Mit morsekegel



Ø e8	L	L1	L2	R	CM	Z	€
16	134	50	65	8	2	4	**432,00**
20	145	40	59	10	3	4	**422,00**
20	164	63	78	10	3	4	**476,00**
25	160	50	74	12,5	3	4	**452,00**
32	200	63	91	16	4	4	**538,00**
40	205	80	96	20	4	4	**567,00**
40	225	100	116	20	4	4	**610,00**



LE FRESE RAGGIATE “RADIUS”

sono specifiche per la realizzazione di particolari in cntornatura aventi raggi di rinforzo (punzoni in sago-ma), lavori in copiatura e profilatura.

Particolarità saliente di questo utensile è l’avere un‘elica con un’inclinazione di 25° su tutto il tagliente compreso il raggio di testa.

Grazie a questa esecuzione abbinata alla disponibilità di un dente passante dal centro, garantiamo una uniformità di taglio ed una finitura di qualità decisamente superiori alle tradizionali.

BALL NOSE END MILL “RADIUS”

are specifically designed to execute conturs having stiffening radius (for: force plugs)’ copying and profiling work.

The main feature of this tool is helix angle of 25° that continues on the ball end.

Thanks to above characteristic and to the center cutting tooth we can guarantee cutting evenness and finishing quality higher that standard.

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FRESE ELICOIDALI FRONTALI CON LUNGHEZZE SPECIALI

FRAISES HÉLICOÏDALES AVEC LONGUEURS SPÉCIALES

HELICAL END MILLS - SPECIAL LENGTHS

DRALLNUTIGE STIRNFRÄSER MIT SONDER-SCHNEIDENLÄNGEN

QUALITÀ K10/P25

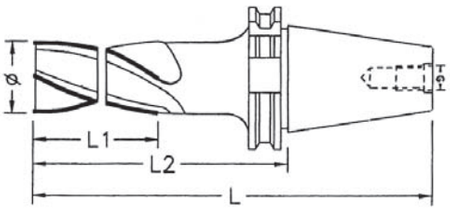
NUANCES K10/P25

GRADES K10/P25

SORTEN K10/P25

681

ATTACCO ISO DIN 69871A
Queue cône ISO
ISO taper shank
Mit ISO Steilkegel

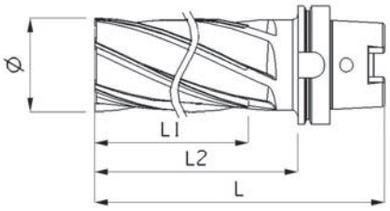


* Prezzo a richiesta - Prix sur demande - Price on request - Preis auf Aufrage

Ø e8	L min	L max	L1 min	L1 max	L2 min	L2 max	G	ISO	Z	€
40	217	317	100	200	149	249	M16	40	6	*
50	255	405	100	250	153	303	M24	50	6	*
63	260	460	100	300	158	358	M24	50	6	*

682*

ATTACCO HSK DIN 69893-1-A
Queue cône ISO
ISO taper shank
Mit ISO Steilkegel



* Prezzo a richiesta - Prix sur demande - Price on request - Preis auf Aufrage

Ø e8	L min	L max	L1 min	L1 max	L2 min	L2 max	G	HSK	Z	€
*50		276		200		225		50	6	*
*63		283		200		225		63	6	*
*80		341		250		275		80	8	*
*100		354		250		275		100	8	*

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FRESE ELICOIDALI FRONTALI CON LUNGHEZZE SPECIALI

FRAISES HÉLICOÏDALES AVEC LONGUEURS SPÉCIALES

HELICAL END MILLS - SPECIAL LENGTHS

DRALLNUTIGE STIRNFRÄSER MIT SONDER-SCHNEIDENLÄNGEN

QUALITÀ K10/P25

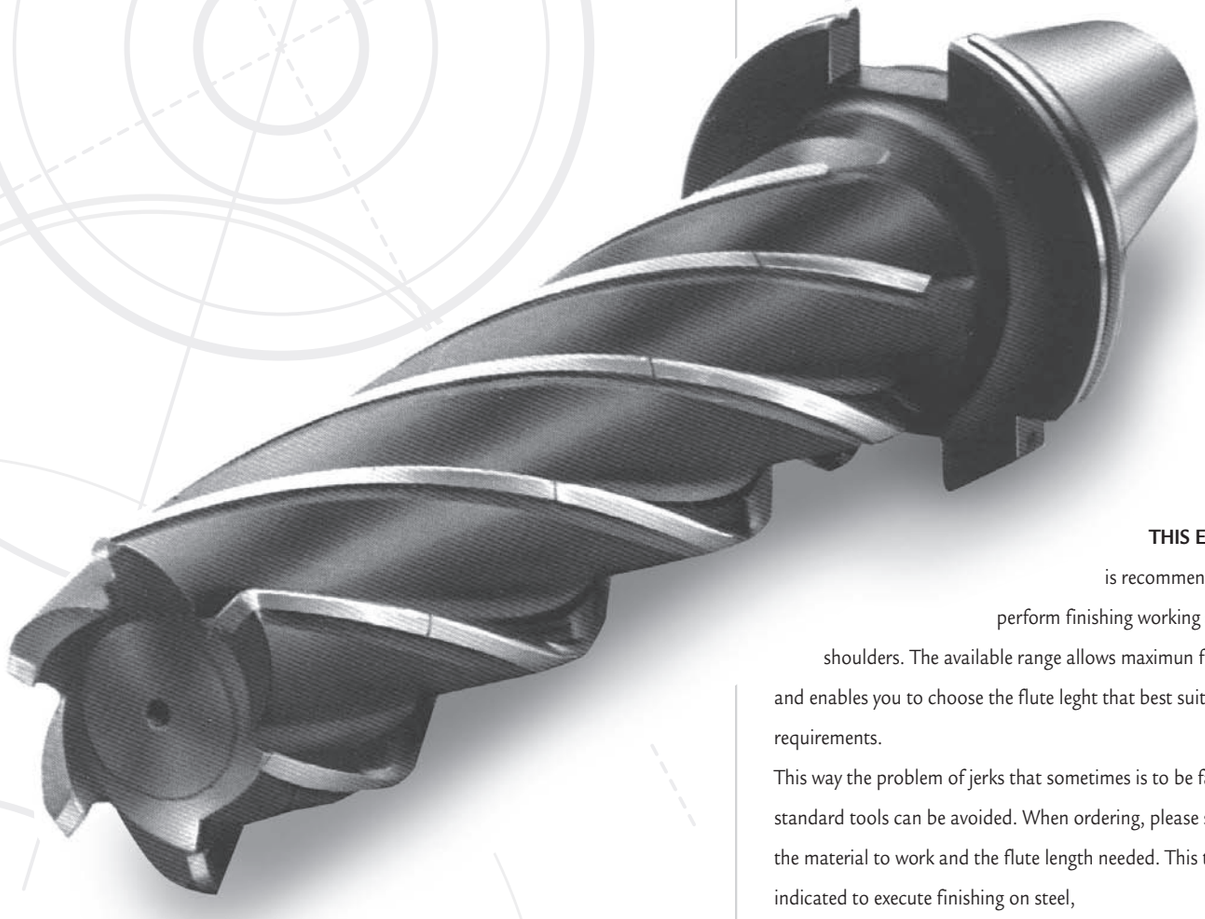
NUANCES K10/P25

GRADES K10/P25

SORTEN K10/P25

QUESTA TIPOLOGIA DI FRESE

con lunghezza speciale permette operazioni di finitura su particolari con spallamenti molto alti. Sul fronte della gamma abbiamo preferito una soluzione che ci consenta il massimo grado di flessi bilità, offrendovi la possibilità di scegliere le lunghezze come meglio si addicono alle vostre esigenze. In questo modo si evita l'obbligo talvolta imposto dalle norme di lavorare con sbalzi eccessivi, chiaramente dannosi e improduttivi.
È indispensabile specificare al momento della richiesta il tipo di materiale da lavorare e la lunghezza dell'elica necessaria.
Il campo di applicazione sono le finiture su ghisa, acciaio e leghe leggere.



THIS END MILL

is recommended to perform finishing working on high shoulders. The available range allows maximun flexibility and enables you to choose the flute leght that best suits your requirements.
This way the problem of jerks that sometimes is to be faced using standard tools can be avoided. When ordering, please specify the material to work and the flute length needed. This tool is indicated to execute finishing on steel, cast iron and light alloys.

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FRESE ELICOIDALI FRONTALI "CUT-ROUGHING"

FRAISES HÉLICOÏDALES "CUT-ROUGHING"
HELICAL END MILLS "CUT-ROUGHING"
DRALLNUTIGE STIRNFRÄSER "CUT-ROUGHING"

QUALITÀ K10/P25*

NUANCES K10/P25*
GRADES K10/P25*
SORTEN K10/P25*

PROGRAMMA DI SGROSSATURA RAPIDA "CUT-ROUGHING"

Nuove macchine e più moderni metodi nel campo della fresatura, richiedono il continuo progresso anche nella realizzazione di utensili sempre più efficienti. Le nuove frese "Cut-Roughing", sono utensili a nuovo profilo tagliente particolarmente studiati per ottenere il miglior rendimento.

Questo nuovo profilo direttamente ricavato lungo il petto dell'angolo radiale di taglio, si è dimostrato molto valido per ottenere una migliore rottura del truciolo asportato a tutto vantaggio di una migliore resa del lavoro ed in modo particolare nella esecuzione di alti spallamenti.

Si è inoltre ottenuto con l'uso di frese "Cut-Roughing" una notevole diminuzione del fenomeno di incollamento del truciolo al tagliente, fenomeno che porta ad un rapido deterioramento dello stesso. Altri vantaggi ottenuti sono un'ottima dispersione del calore, dovuta alla facile frantumazione del truciolo asportato, ed una riduzione nell'assorbimento di potenza.

I migliori vantaggi nell'uso delle frese "Cut-Roughing", si ottengono naturalmente con la combinazione tra una giusta velocità di taglio unita ad un forte avanzamento di lavoro.

QUICK "CUT-ROUGHUNG" PROGRAM

New machines and more advanced methods in the field of milling require a continuous progress also in the manufacturing of increasingly effective tools. Thenew mills of the "CUT-ROUGHING" PROGRAM are tools characterized by a new cooting profile specifically designed to achieve the best performance.

This new profile, directly created along the face of the radical cutting angle, proved to be particularly suitable for achieving a better breaking of the chip removed, wich in turn improves the efficiency of the maching, above all in the execution of high scoulders.

Moreover, the advantages of using of the "CUT-ROUGHING" mills can abviously be abtained by combining an adequate cutting speed with a considerable working feed.

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FRESE ELICOIDALI FRONTALI "CUT-ROUGHING"

FRAISES HÉLICOÏDALES "CUT-ROUGHING"
HELICAL END MILLS "CUT-ROUGHING"
DRALLNUTIGE STIRNFRÄSER "CUT-ROUGHING"

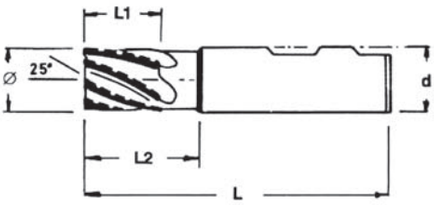
QUALITÀ K10/P25*

NUANCES K10/P25*
GRADES K10/P25*
SORTEN K10/P25*

* P25 A RICHIESTA
Sur demande - On request - Auf Aufrage

660

ATTACCO CILINDRICO WELDON DIN 1835B
Queue cylindrique avec méplat
Weldon cylindrical shank
Zylinderschft mit Spannfläche

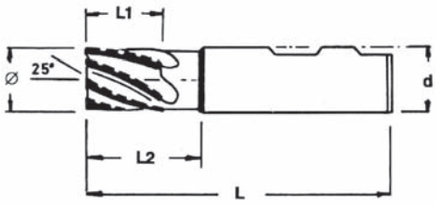


Ø e8	L	L1	L2	d h6	Z	€
20	115	40	59	25	3	281,00
32	125	50	65	32	4	455,00
36	130	50	70	32	5	557,00
40	145	63	85	32	6	578,00

660 TN

ATTACCO CILINDRICO WELDON DIN 1835B
Queue cylindrique avec méplat
Weldon cylindrical shank
Zylinderschft mit Spannfläche

CON RIVESTIMENTO TiN
Revêtues TiN
Tin -Coated
Tin-beschichtet

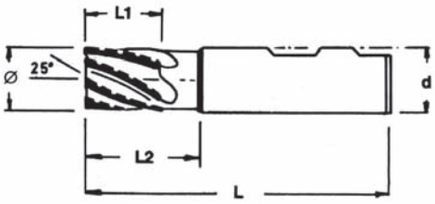


Ø e8	L	L1	L2	d h6	Z	€
20	115	40	59	25	3	333,00
32	125	50	65	32	4	525,00
36	130	50	70	32	5	632,00
40	145	63	85	32	6	670,00

660 TC

ATTACCO CILINDRICO WELDON DIN 1835B
Queue cylindrique avec méplat
Weldon cylindrical shank
Zylinderschft mit Spannfläche

CON RIVESTIMENTO TiCN
Revêtues TiCN
TiCN -Coated
TiCN-beschichtet



Ø e8	L	L1	L2	d h6	Z	€
20	115	40	59	25	3	361,00
32	125	50	65	32	4	560,00
36	130	50	70	32	5	670,00
40	145	63	85	32	6	715,00

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FRESE ELICOIDALI FRONTALI "CUT-ROUGHING"

FRAISES HÉLICOÏDALES "CUT-ROUGHING"
HELICAL END MILLS "CUT-ROUGHING"
DRALLNUTIGE STIRNFRÄSER "CUT-ROUGHING"

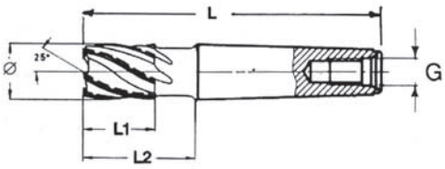
QUALITÀ K10/P25*

NUANCES K10/P25*
GRADES K10/P25*
SORTEN K10/P25*

* P25 A RICHIESTA
Sur demande - On request - Auf Aufrage

661

ATTACCO CONO MORSE DIN 228
*** ART. 661F - ATTACCO CONO MORSE DIN 2207**
Queue cône Morse
Morse taper shank
Mit Morseke gel

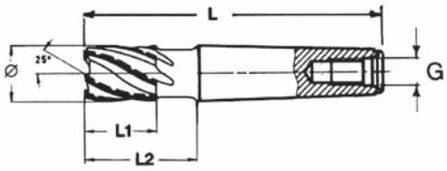


Ø e8	L	L1	L2	G	CM	Z	€
20	145	40	59	M12	3	3	**289,00**
25	160	50	74	M12	3	4	**381,00**
32	200	50	91	M16	4	4	**494,00**
40	215	63	106	M16	4	4	**662,00**
*32	213	50	81	M16	4	4	**521,00**
*36	213	50	81	M16	4	4	**587,00**
*40	232	63	100	M16	4	4	**701,00**

661 TN

ATTACCO CONO MORSE DIN 228
*** ART. 661FN - ATTACCO CONO MORSE DIN 2207**
Queue cône Morse
Morse taper shank
Mit Morsekegel

CON RIVESTIMENTO TiN
Revêtues TiN
Tin -Coated
Tin-beschichtet

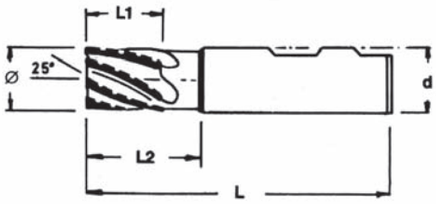


Ø e8	L	L1	L2	G	CM	Z	€
20	145	40	59	M12	3	3	**338,00**
32	200	50	80	M16	4	6	**609,00**
40	215	63	106	M16	4	6	**785,00**
*32	213	50	81	M16	4	4	**679,00**
*36	213	50	81	M16	4	5	**745,00**
*40	232	63	96	M16	4	6	**853,00**

661 TC

ATTACCO CONO MORSE DIN 228
*ATTACCO CONO MORSE DIN 2207
Queue cône Morse
Morse taper shank
Mit Morseke-gel

CON RIVESTIMENTO TiCN
Revêtues TiCN
TiCN -Coated
TiCN-beschichtet



Ø e8	L	L1	L2	G	CM	Z	€
20	145	40	59	M12	3	3	**379,00**
25	160	50	74	M12	3	4	**481,00**
*32	213	50	81	M16	4	4	**758,00**
*36	213	50	81	M16	4	5	**828,00**
*40	232	63	96	M16	4	6	**939,00**

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FRESE ELICOIDALI FRONTALI "CUT-ROUGHING"

FRAISES HÉLICOÏDALES "CUT-ROUGHING"
HELICAL END MILLS "CUT-ROUGHING"
DRALLNUTIGE STIRNFRÄSER "CUT-ROUGHING"

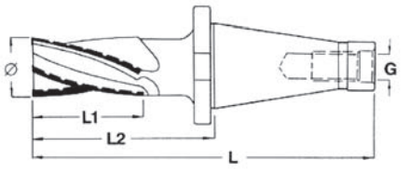
QUALITÀ K10/P25*

NUANCES K10/P25*
GRADES K10/P25*
SORTEN K10/P25*

* P25 A RICHIESTA
Sur demande - On request - Auf Aufrage

662

ATTACCO ISO DIN 2080
Queue cône ISO
ISO taper shank
Mit ISO-Steilkegel

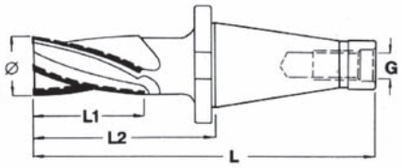


Ø e8	L	L1	L2	G	ISO	Z	€
32	180	50	87	M16	40	4	**517,00**
40	200	63	107	M16	40	6	**706,00**
50	260	80	133	M24	50	6	**1081,00**
63	280	100	153	M24	50	6	**1254,00**

662 TN

ATTACCO ISO DIN 2080
Queue cône ISO
ISO taper shank
Mit ISO-Steilkegel

CON RIVESTIMENTO TiN
Revêtues TiN
Tin -Coated
Tin-beschichtet

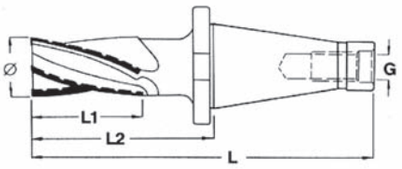


Ø e8	L	L1	L2	G	ISO	Z	€
32	180	50	87	M16	40	4	**741,00**
40	200	63	107	M16	40	6	**955,00**
50	260	80	133	M24	50	6	**1396,00**
63	280	100	153	M24	50	6	**1577,00**

662 TC

ATTACCO ISO DIN 2080
Queue cône ISO
ISO taper shank
Mit ISO-Steilkegel

CON RIVESTIMENTO TiCN
Revêtues TiCN
TiCN -Coated
TiCN-beschichtet



Ø e8	L	L1	L2	G	ISO	Z	€
32	180	50	87	M16	40	4	**853,00**
40	200	63	107	M12	40	6	**1089,00**
50	260	80	133	M24	50	6	**1570,00**
63	280	100	153	M24	50	6	**1736,00**

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FRESE CON RIPORTO IN METALLO DURO

FRAISES AVEC PLAQUETTES EN MÉTAL DUR BRASÉES

CARBIDE TIPED MILLING CUTTERS

GELÖTETE HARTMETALL- FRÄSER

Talicarb

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FRESE A 2 TAGLI

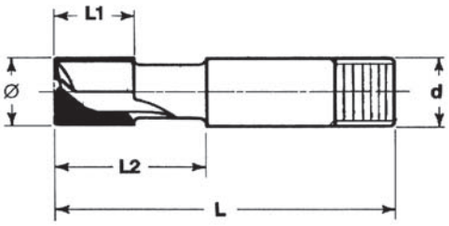
FRAISES À 2 DENTS
2 FLUTE END MILLS
ZWEISCHNEIDIGE FRÄSER

QUALITÀ K10

NUANCES K10
GRADES K10
SORTEN K10

211

ATTACCO CILINDRICO FILETTATTO DIN 1835D
TAGLIO AL CENTRO - PER CAVE
Queue cylindrique filetée - Coupe au centre - Pour rainures
Threaded cylindrical shank end mill - Center cutting
Langlochfräser - Mit Zentrumschneide Zylinderschaft mit Aussenanzugsge-winde

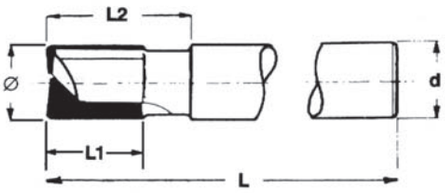


Ø e8	L	L1	L2	d h8	€
6	56	12	20	6	**45,00**
8	60	12	20	10	**47,80**
10	60	12	20	10	**50,10**
12	70	16	25	12	**55,20**
14	70	19	25	12	**56,90**
16	80	22	32	16	**60,00**
18	80	22	32	16	**72,20**
20	80	22	32	16	**76,90**
22	100	25	44	25	**107,50**
24	100	25	44	25	**116,00**
25	100	25	44	25	**121,50**
26	100	25	44	25	**128,50**
28	100	25	44	25	**128,50**
30	100	25	44	25	**144,50**
32	100	25	50	32	**153,50**
35	120	30	60	32	**178,00**
36	120	30	60	32	**184,00**
38	120	30	60	32	**191,50**
40	120	30	60	32	**216,50**

215

SIMILARE DIN 8027
Semblable à - Similar to - Ähnlich

ATTACCO CILINDRICO DIN 1835A
TAGLIO AL CENTRO - PER CAVE
Queue cylindrique - Coupe au centre - Pour rainures
Cylindrical shank end mill Center cutting
Langlochfräse - MitZentrumschnei- de Zylinderschaft



☐ ATTACCO CILINDRICO WELDON DIN 1835B
Queue cylindri-que avec méplat
Weldon cylin-drical shank
Zylinderschaft mit Spannfläche

Ø e8	L	L1	L2	d h6	€
5	56	12	20	6	**41,10**
6	56	12	20	6	**41,10**
7	56	12	20	8	**41,10**
8	56	12	20	8	**41,10**
9	60	12	20	10	**43,30**
10	60	12	20	10	**43,30**
11	70	16	25	12	**51,80**
12	70	16	25	12	**51,80**
13	70	19	25	12	**55,20**
14	70	19	25	12	**56,90**
15	80	19	32	16	**60,00**
16	80	22	32	16	**60,00**
17	80	22	32	16	**72,20**
18	80	22	32	16	**72,20**
19	90	22	40	20	**77,70**
20	90	22	40	20	**77,70**
☐ 22	100	25	44	25	**105,00**
☐ 24	100	25	44	25	**111,50**
☐ 25	100	25	44	25	**114,00**
☐ 26	100	25	44	25	**124,00**
☐ 28	100	25	44	25	**124,00**
☐ 30	100	25	44	25	**140,00**
☐ 32	100	25	44	25	**140,00**

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FRESE A 2 TAGLI

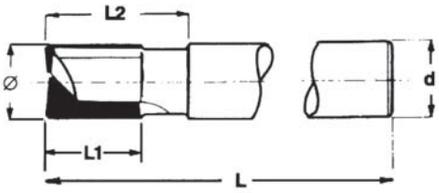
FRAISES À 2 DENTS
2 FLUTE END MILLS
ZWEISCHNEIDIGE FRÄSER

QUALITÀ K10

NUANCES K10
GRADES K10
SORTEN K10

215L

SERIE LUNGA - ATTACCO CILINDRICO
TAGLIO AL CENTRO - PER CAVE
Série longue - Queue cylindrique - Coupe au centre - Pour rainures
Long series - Straight shank end mill - Center cutting
Lange Ausführung - Langlochfräser - Mit Zentrumschneide Zylinderschaft

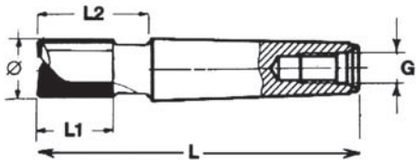


Ø e8	L	L1	L2	d h8	€
6	100	12	20	6	**48,50**
8	100	12	20	8	**51,80**
10	100	12	20	10	**55,20**
12	150	16	25	12	**60,00**
14	150	19	25	12	**65,20**
16	150	22	32	16	**73,80**
18	150	22	32	16	**82,10**
20	150	22	32	20	**88,40**

215C

SIMILARE DIN 8026
Semblable à - Similar to - Ähnlich

ATTACCO CILINDRICO DIN 1835A
TAGLIO AL CENTRO - PER CAVE
Queue cylindrique - Coupe au centre - Pour rainures
Cylindrical shank end mill Center cutting
Langlochfräse - MitZentrumschnei- de Zylinderschaft



Ø e8	L	L1	L2	G	CM	€
10	94	12	25	M10	2	**82,10**
12	94	16	25	M10	2	**82,10**
14	94	19	25	M10	2	**87,60**
15	94	19	25	M10	2	**92,30**
16	101	22	32	M10	2	**95,50**
18	101	22	32	M10	2	**99,40**
20	125	22	39	M12	3	**107,50**
22	125	25	39	M12	3	**113,00**
24	131	25	45	M12	3	**121,00**
25	131	25	45	M12	3	**125,50**
26	131	25	45	M12	3	**136,00**
28	131	25	45	M12	3	**136,00**
30	131	25	45	M12	3	**149,00**
32	131	25	45	M12	3	**162,00**
35	165	30	56	M16	4	**206,00**
40	165	30	56	M16	4	**236,50**

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FRESE FRONTALI

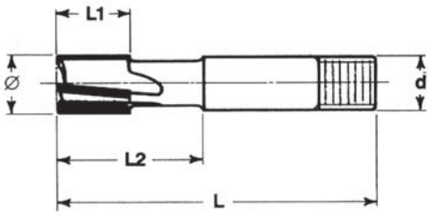
FRAISES DEUX TAILLES
END MILLS
SCHAFTFRÄSER

QUALITÀ K10

NUANCES K10
GRADES K10
SORTEN K10

212

ATTACCO CILINDRICO FILETTATO DIN 1835D
Queue cylindri-que filetée
Thereaded cylin-drical shank
Zylinderschaft mit Aussenanzugsgewinde

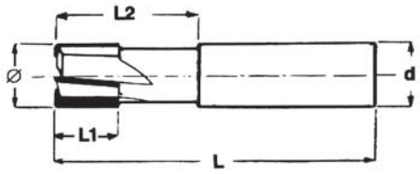


Ø e8	L	L1	L2	d h8	Z	€
8	63	12	23	10	3	**57,30**
10	63	12	23	10	3	**64,00**
12	75	16	30	12	3	**71,40**
14	75	16	30	12	4	**74,90**
16	80	16	32	16	4	**78,50**
18	80	19	32	16	4	**90,00**
20	90	19	42	16	4	**99,40**
25	100	22	44	25	4	**114,00**
30	100	22	44	25	6	**132,50**
32	110	22	50	32	6	**161,00**
35	120	25	60	32	6	**184,00**
36	120	25	60	32	6	**189,50**
40	120	25	60	32	6	**201,00**

216

SIMILARE DIN 8044
Semblable à - Similar to - Ähnlich

ATTACCO CILINDRICO DIN 1835A
Queue cylindrique
Cylindrical shanck
Zylinderschaft



☐ ATTACCO CILINDRICO WELDON DIN 1835B
Queue cylindri-que avec méplat
Weldon cylin-drical shank
Zylinderschaft mit Spannfläche

Ø e8	L	L1	L2	d h6	Z	€
8	63	12	27	8	3	**54,10**
9	63	12	23	10	3	**59,30**
10	63	12	23	10	3	**55,80**
11	75	16	30	12	3	**65,50**
12	75	16	30	12	3	**59,30**
13	75	16	30	12	4	**72,20**
14	75	16	30	16	4	**67,50**
15	80	16	32	16	4	**72,20**
16	80	16	32	16	4	**72,20**
17	80	19	32	16	4	**85,30**
18	80	19	32	20	4	**85,30**
19	90	19	40	20	4	**90,70**
20	90	19	40	25	4	**90,70**
☐ 22	100	22	50	25	4	**102,50**
☐ 24	100	22	50	25	4	**108,50**
☐ 25	100	22	50	25	4	**108,50**
☐ 26	100	22	50	25	6	**122,50**
☐ 28	100	22	50	25	6	**122,50**
☐ 30	100	22	50	25	6	**129,50**

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FRESE FRONTALI

FRAISES DEUX TAILLES
END MILLS
SCHAFTFRÄSER

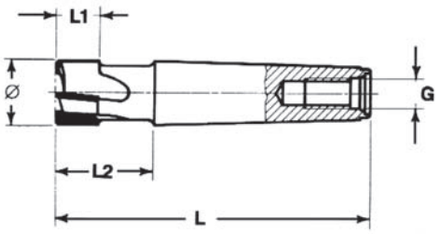
QUALITÀ K10

NUANCES K10
GRADES K10
SORTEN K10

217

SIMILARE DIN 8045
Semblable à - Similar to - Ähnlich

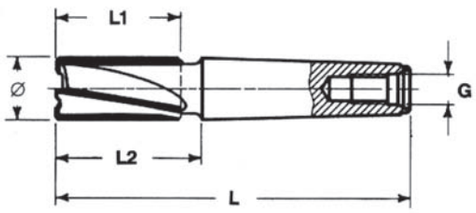
ATTACCO CONO MORSE DIN 228
*** ART. 217F - ATTACCO CONO MORSE DIN 2207**
Queue cône morse
Molrse tapershanck
Mit morsekegel



Ø js 16	L	L1	L2	G	CM	Z	€
11	105	16	36	M10	2	3	**93,90**
12	105	16	36	M10	2	4	**93,90**
13	105	16	36	M10	2	4	**93,90**
14	105	16	36	M10	2	4	**99,40**
15	105	16	36	M10	2	4	**99,40**
16	105	16	36	M10	2	4	**102,00**
18	105	19	36	M10	2	4	**113,00**
20	125	19	39	M12	3	4	**118,50**
22	125	19	39	M12	3	4	**118,50**
24	125	19	39	M12	3	4	**125,00**
25	131	19	45	M12	3	6	**131,00**
26	131	22	45	M12	3	6	**136,50**
28	131	22	45	M12	3	6	**144,50**
30	131	22	45	M12	3	6	**155,50**
32	160	22	51	M16	4	6	**163,50**
35	165	25	56	M16	4	6	**181,50**
38	165	25	56	M16	4	6	**203,50**
40	165	25	56	M16	4	6	**213,50**
*32	180	22	48	M16	4	6	**173,50**
*35	180	25	48	M16	4	6	**192,00**
*38	180	25	48	M16	4	6	**216,50**
*40	180	25	48	M16	4	6	**226,00**

317

SERIE LUNGA - ATTACCO CONo MORSE DIN 228
***ART. 317F-ATTACCO CONO MORSE DIN 2207**
Série longue - Queue cône Morse
Long series - Morse taper shank
Lange Ausführung - Mit morsekegel



Ø js 16	L	L1	L2	G	CM	Z	€
20	131	30	45	M12	3	4	**147,00**
25	136	35	50	M12	3	6	**188,50**
30	146	40	60	M12	3	6	**203,50**
35	180	40	71	M16	4	6	**235,50**
40	190	50	81	M16	4	6	**307,00**
*35	200	40	68	M16	4	6	**250,50**
*40	210	50	78	M16	4	6	**416,00**

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FRESE FRONTALI

FRAISES DEUX TAILLES
END MILLS
SCHAFTFRÄSER

QUALITÀ K10/P25*

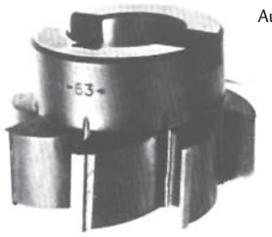
NUANCES K10/P25*
GRADES K10/P25*
SORTEN K10/P25*

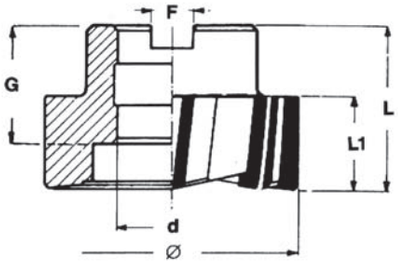
* P25 A RICHIESTA
Sur demande - On request - Auf Aufrage

218

SIMILARE DIN 8056
Semblable à - Similar to - Ähnlich

ATTACCO MANICOTTO
Fraise en bout
Shell end mill
Aufsteckfräser

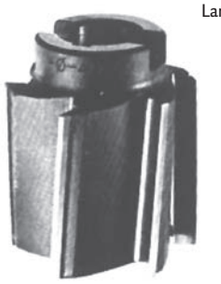


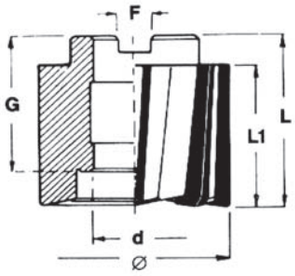


Ø js 16	L	L1	G	F	d H7	Z	€
40	28	16	19	8	16	6	**122,50**
50	32	16	22	10	22	6	**143,00**
63	40	20	28	12	27	8	**178,50**
80	45	22	30	14	32	8	**233,00**
100	50	22	35	16	40	10	**269,00**
125	60	25	40	18	40	12	**404,00**

222

SERIE LUNGA-ATTACCO MANICOTTO
Série longue - Fraise en bout
Long series - Shell end mill
Lange Ausführung - Aufsteckfräser





Ø js 16	L	L1	G	F	d H7	Z	€
40	48	40	40	8	16	6	**169,00**
50	60	50	50	10	22	6	**211,00**
63	72	60	60	12	27	8	**290,00**
80	95	80	80	14	32	8	**426,00**
100	115	100	95	16	40	10	**564,00**

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FRESE A 2 TAGLI CON ANGOLO ELICA 25°

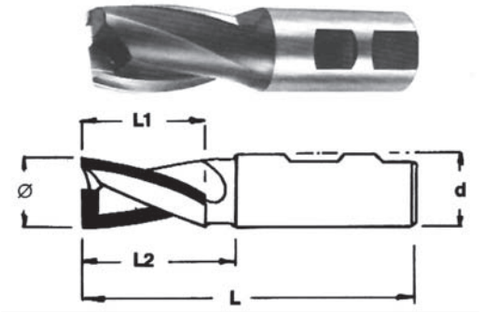
FRAISES 2 DENTS AVEC ANGLE HÉLICE 25°
2 FLUTE END MILLS - 25° HELEX ANGLE
ZWEISCHNEI- DIGE FRÄSER MIT SPIRALWINKEL 25°

QUALITÀ K10

NUANCES K10
GRADES K10
SORTEN K10

810

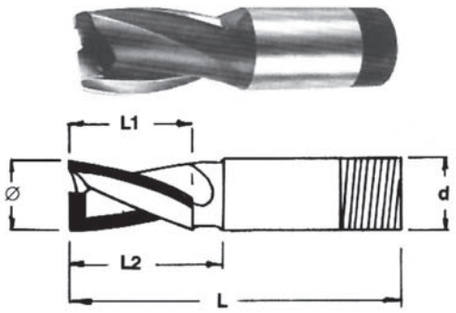
ATTACCO CILINDRICO WELDON DIN 1835B
TAGLIO AL CENTRO
Queue cylindrique avec méplat - Coupeau centre
Weldon cylindrical shank - Center cutting
Zylinderschaft mit Spannfläche - Mit Zentrumscheide



Ø +0,05 0	L	L1	L2	d h6	Z	€
16	95	30	47	16	2	**140,00**
18	115	40	65	20	2	**180,50**
20	115	40	65	20	2	**211,00**
22	118	50	62	25	2	**227,50**
25	118	50	62	25	2	**244,00**
28	121	50	65	25	2	**271,00**
32	125	50	65	32	2	**303,00**
36	145	63	85	32	2	**337,00**
40	145	63	85	32	2	**366,00**
50	170	80	110	32	2	**459,00**

811

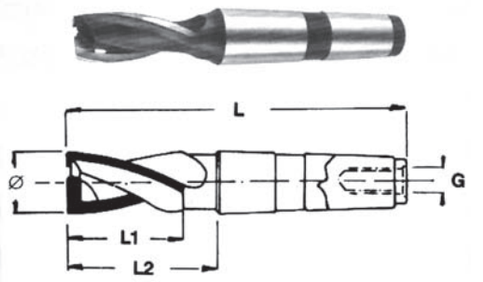
ATTACCO CILINDRICO FILETTATO DIN 1835D
TAGLIO AL CENTRO
Queue cylindrique filetée - Coupe au centre
Thereaded cylindrical shank - Center cutting
Zylinderschaft mit Aussenanzungsgewinde - Mit Zentrumscheide



Ø +0,05 0	L	L1	L2	d h8	Z	€
16	95	30	47	16	2	**140,00**
20	115	40	59	25	2	**211,00**
25	118	50	62	25	2	**244,00**
32	125	50	65	32	2	**303,00**

812

ATTACCO CONO MORSE DIN 228 - TAGLIO AL CENTRO
Queue cône Morse - Coupe au centre
Morse taper shank - Center cutting
Mit Zentrumscheide



Ø +0,05 0	L	L1	L2	G	CM	Z	€
16	115	30	46	M10	2	2	**145,50**
18	145	40	59	M12	3	2	**190,00**
20	145	40	59	M12	3	2	**216,50**
22	160	40	74	M12	3	2	**235,50**
25	160	50	74	M12	3	2	**254,50**
28	166	50	80	M12	3	2	**274,00**
32	200	50	91	M16	4	2	**307,00**
36	215	63	106	M16	4	2	**337,00**
40	215	63	106	M16	4	2	**366,00**
50	224	80	105	M16	4	2	**472,00**

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FRESE A 2 TAGLI CON ANGOLO ELICA 25° PER LEGHE LEGGERE

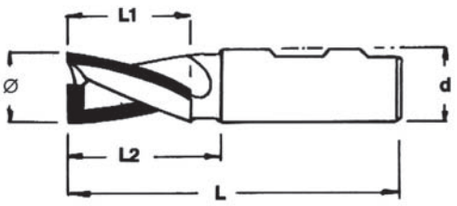
FRAISES 2 DENTS AVECANGLE HÉLI-CE 25° POUR ALLIAGES LÉGERES
2 FLUTE END MILLS - 25° HELIX ANGLE FOR LIGHT ALLOYS
ZWEISCHNEIDIGE FRÄSER MIT SPIRALWINKEL 25° FÜR LEICHTMETALL

QUALITÀ K10

NUANCES K10
GRADES K10
SORTEN K10

983

ATTACCO CILINDRICO WELDON DIN 1835B - TAGLIO AL CENTRO
Queue cylindrique avec méplat - Coupe au centre
Weldon cylindrical shank - Center cutting
Zylinderschaft mit Spannfläche - Mit Zentrumscheide

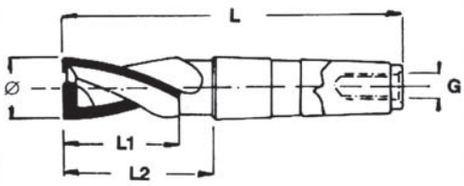


A richiesta sono realizzabili attacchi filettati e combinati.
Sur demande on peut realiser attaches filettés et combinés.
On request we can produce threated and combined shanks.
Auf Anfrage können Schafte mit Aussenanzugsgewinde und Kombischafte werden hergestellt.

Ø ±0,05	L	L1	L2	d h6	Z	€
16	88	25	40	16	2	**188,50**
16	103	40	55	16	2	**207,50**
20	105	40	55	20	2	**247,00**
20	115	50	65	20	2	**271,00**
25	116	45	60	25	2	**272,00**
25	134	63	78	25	2	**326,00**
32	125	50	65	32	2	**340,00**
32	155	80	95	32	2	**409,00**
40	140	50	70	40	2	**419,00**
40	170	80	100	40	2	**502,00**

985

ATTACCO CONO MORSE DIN 228 - UNI 521
TAGLIO AL CENTRO
Queue cône Morse - Coupe au centre
Morse taper shank - Center cutting
Mit Morsekegel - Mit Zentrumschneide



Ø ±0,05	L	L1	L2	CM	Z	€
16	116	32	47	2	2	**195,50**
16	124	40	55	2	2	**215,00**
20	143	40	57	3	2	**251,00**
20	153	50	67	3	2	**276,00**
25	146	45	60	3	2	**282,00**
25	166	63	80	3	2	**338,00**
32	172	50	63	4	2	**344,00**
32	202	80	93	4	2	**413,00**
40	172	50	63	4	2	**419,00**
40	222	100	113	4	2	**544,00**
50	172	50	63	4	2	**532,00**
50	222	100	113	4	2	**692,00**
63	212	90	103	4	2	**726,00**

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FRESE A 2 TAGLI CON ANGOLO ELICA 25° PER LEGHE LEGGERE

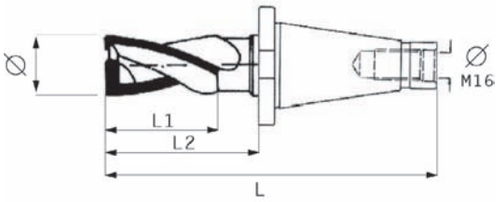
FRAISES 2 DENTS AVECANGLE HÉLI-CE 25° POUR ALLIAGES LÉGERES
2 FLUTE END MILLS - 25° HELIX ANGLE FOR LIGHT ALLOYS
ZWEISCHNEIDIGE FRÄSER MIT SPIRALWINKEL 25° FÜR LEICHTMETALL

QUALITÀ K10

NUANCES K10
GRADES K10
SORTEN K10

987

ATTACCO ISO DIN 2080
Queue cône ISO
ISO taper shank
Mit ISO-Steilkegel

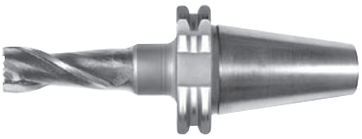


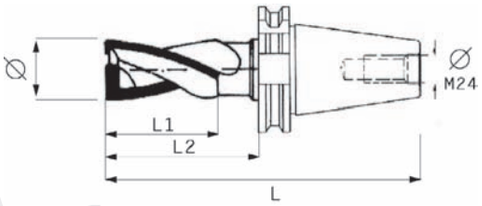
A richiesta è realizzabile l'attacco ISO 40 senza flangia.
Sur demande on peut realiser attacementes ISO 40 sans collerette.
On request we can produce ISO 40 taper shanks without flange.
Auf Anfrage kann man den Schaft ISO 40 ohne Flansch herstellen.

Ø ±0,05	L	L1	L2	ISO	Z	€
32	173	50	70	40	2	**379,00**
32	223	100	120	40	2	**453,00**
40	173	50	70	40	2	**460,00**
40	262	100	120	40	2	**597,00**
50	212	50	70	50	2	**586,00**
50	282	120	140	50	2	**761,00**
63	225	63	83	50	2	**726,00**
63	312	150	170	50	2	**1017,00**

989

ATTACCO CONO MORSE DIN 69871
TAGLIO AL CENTRO
Queue cône - Morse - Coupe au centre
Morse taper shank - Center cutting
Mit Morsekegel - Mit Zentrumschneide





Ø ±0,05	L	L1	L2	ISO	Z	€
32	158	50	70	40	2	**416,00**
32	208	100	120	40	2	**499,00**
40	158	50	70	40	2	**505,00**
40	208	100	120	40	2	**657,00**
50	191	50	70	50	2	**644,00**
50	261	120	140	50	2	**837,00**
63	204	63	83	50	2	**798,00**
63	291	150	170	50	2	**1117,00**

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FRESE ELICOIDALI FRONTALI

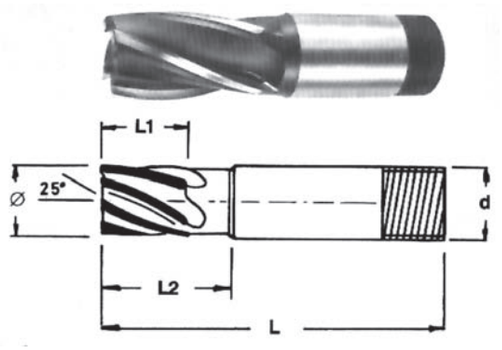
FRAISES HÉLICOÏDALES
HELICAL END MILLS
DRALLNUTIGE STIRNFRÄSER

QUALITÀ K10/P25

NUANCES K10/P25
GRADES K10/P25
SORTEN K10/P25

779

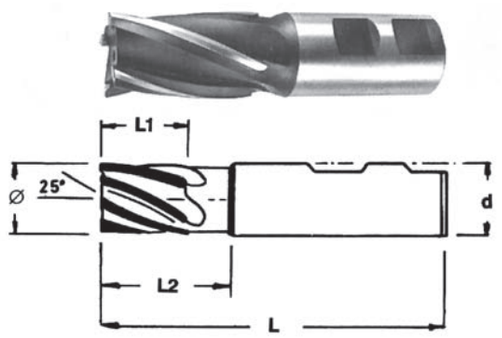
ATTACCO CILINDRICO FILETTATO DIN 1835D
Queue cylindrique filetée
Threaded cylindrical shank
Zylinderschaft mit Aussenanzugsgewinde



Ø e8	L	L1	L2	d h8	Z	€
16	95	30	47	16	3	**167,50**
20	115	40	59	25	3	**247,00**
25	118	50	62	25	4	**292,00**
32	125	50	65	32	4	**338,00**

780

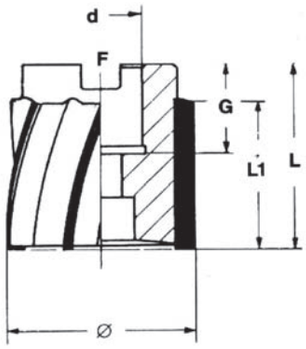
ATTACCO CILINDRICO WELDON DIN 1835B
Queue cylindrique avec méplat
Weldon cylindrical shank
Zylinderschaft mit Spannfläche



Ø e8	L	L1	L2	d h6	Z	€
16	95	30	47	16	3	**167,50**
18	109	40	59	20	3	**212,50**
20	115	40	59	25	3	**247,00**
22	118	50	62	25	4	**267,00**
25	118	50	62	25	4	**292,00**
28	121	50	65	25	4	**315,00**
32	125	50	65	32	4	**338,00**
36	130	50	70	32	5	**414,00**
38	135	50	75	32	6	**425,00**
40	145	63	85	32	6	**432,00**

879

ATTACCO A MANICOTTO
Fraise en bout
Shell end mill
Ausfsteckfräser



Ø e8	L	L1	G	F	d h7	Z	€
40	50	40	24	8,4	16	6	**281,00**
50	50	40	24	10,4	22	6	**353,00**
63	63	50	32	12,4	27	6	**445,00**
80	63	50	34	14,4	32	8	**596,00**
100	80	63	38	16,4	40	8	**719,00**

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FRESE ELICOIDALI FRONTALI

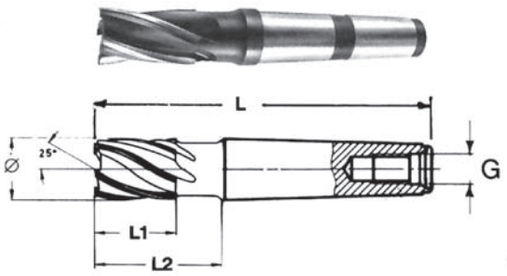
FRAISES HÉLICOÏDALES
HELICAL END MILLS
DRALLNUTIGE STIRNFRÄSER

QUALITÀ K10/P25

NUANCES K10/P25
GRADES K10/P25
SORTEN K10/P25

579

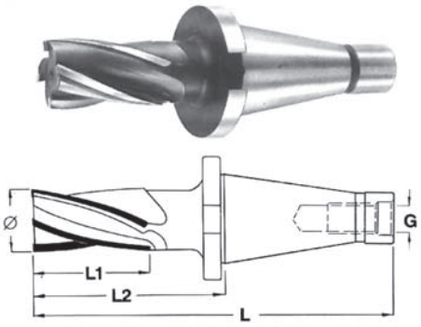
ATTACCO CONO MORSE DIN 228
***ART. 579F - ATTACCO CONO MORSE DIN 2207**
Queue cône Morse
Morse taper shank
Mit Morsekegel



Ø e8	L	L1	L2	G	CM	Z	€
16	116	30	47	M10	2	3	**184,00**
18	145	40	59	M12	3	3	**230,00**
20	145	40	59	M12	3	3	**265,00**
22	160	50	74	M12	3	4	**288,00**
25	160	50	74	M12	3	4	**310,00**
28	166	50	80	M12	3	4	**338,00**
32	200	50	80	M16	4	4	**376,00**
36	200	50	80	M16	4	5	**429,00**
40	215	63	95	M16	4	6	**481,00**
*32	213	50	81	M16	4	4	**402,00**
*36	213	50	81	M16	4	5	**455,00**
*40	228	63	96	M16	4	6	**508,00**
*50	249	80	117	M16	4	6	**755,00**

679

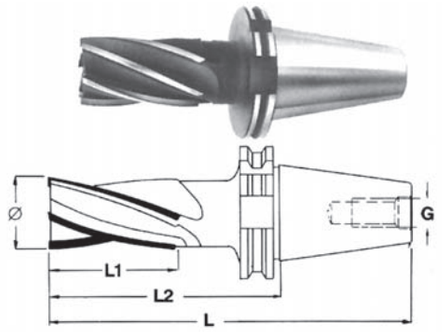
ATTACCO ISO DIN 2080
Queue cône ISO
ISO taper shank
Mit ISO-Steilkegel



Ø e8	L	L1	L2	G	ISO	Z	€
32	180	50	86	M16	40	4	**412,00**
40	200	63	106	M16	40	6	**534,00**
50	228	80	135	M16	40	6	**790,00**
50	260	80	133	M24	50	6	**900,00**
63	280	100	153	M24	50	6	**1057,00**

680

ATTACCO ISO DIN 69871A
Queue cône ISO
ISO taper shank
Mit ISO-Steilkegel



Ø e8	L	L1	L2	G	ISO	Z	€
40	180	63	112	M16	40	6	**512,00**
50	200	80	132	M16	40	6	**679,00**
50	235	80	133	M24	50	6	**837,00**
63	260	100	158	M24	50	6	**1010,00**

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FRESE ELICOIDALI FRONTALI

FRAISES HÉLICOÏDALES
HELICAL END MILLS
DRALLNUTIGE STIRNFRÄSER

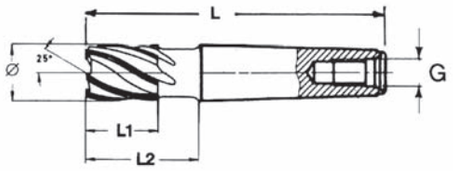
QUALITÀ K10/P25

NUANCES K10/P25
GRADES K10/P25
SORTEN K10/P25

579 TN

ATTACCO CONO MORSE DIN 228
***ART. 579FN - ATTACCO CONO MORSE**
DIN 2207
Queue cône Morse
Morse taper shank
Mit Morsekegel

CON RIVESTIMENTO TiN
Revêtues TiN
Tin -Coated
Tin-beschichtet

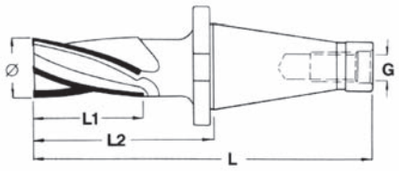


Ø e8	L	L1	L2	G	CM	Z	€
16	116	30	47	M10	2	3	**254,50**
18	145	40	59	M12	3	3	**289,00**
20	145	40	59	M12	3	3	**324,00**
22	160	50	74	M12	3	4	**351,00**
25	160	50	74	M12	3	4	**374,00**
28	166	50	80	M16	4	4	**446,00**
32	200	50	80	M16	4	4	**538,00**
36	200	50	80	M16	4	5	**583,00**
40	215	63	95	M16	4	6	**634,00**
*32	213	50	81	M16	4	4	**560,00**
*36	213	50	81	M16	4	5	**609,00**
*40	228	63	96	M16	4	6	**666,00**
*50	249	80	117	M16	4	6	**719,00**

679 TN

ATTACCO ISO DIN 2080
Queue cône ISO
ISO taper shank
Mit ISO-Steilkegel

CON RIVESTIMENTO TiN
Revêtues TiN
Tin -Coated
Tin-beschichtet

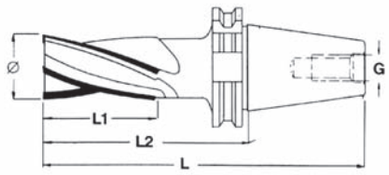


Ø e8	L	L1	L2	G	ISO	Z	€
32	180	50	86	M16	40	4	**640,00**
40	200	63	106	M16	40	6	**790,00**
50	228	80	135	M16	40	6	**1066,00**
50	260	80	133	M24	50	6	**1215,00**
63	280	100	153	M24	50	6	**1373,00**

680 TN

ATTACCO ISO DIN 69871A
Queue cône ISO
ISO taper shank
Mit ISO-Steilkegel

CON RIVESTIMENTO TiN
Revêtues TiN
Tin -Coated
Tin-beschichtet



Ø e8	L	L1	L2	G	ISO	Z	€
40	180	63	112	M16	40	6	**805,00**
50	200	80	132	M16	40	6	**962,00**
50	235	80	133	M24	50	6	**1238,00**
63	260	100	158	M24	50	6	**1396,00**

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FRESE ELICOIDALI FRONTALI

FRAISES HÉLICOÏDALES
HELICAL END MILLS
DRALLNUTIGE STIRNFRÄSER

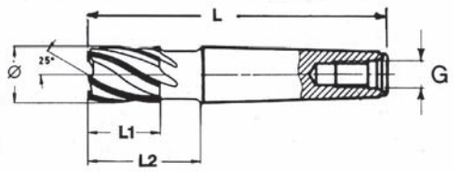
QUALITÀ K10/P25

NUANCES K10/P25
GRADES K10/P25
SORTEN K10/P25

579 TC

ATTACCO CONO MORSE DIN 228
*** ART. 579FC - ATTACCO CONO MORSE**
DIN 2207
Queue cône Morse
Morse taper shank
Mit Morsekegel

CON RIVESTIMENTO TiCN
Revêtues TiCN
TiCN -Coated
TiCN-beschichtet

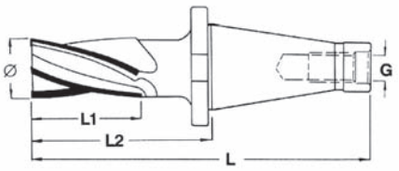


Ø e8	L	L1	L2	G	CM	Z	€
16	116	30	47	M10	2	3	**289,00**
18	145	40	59	M12	3	3	**325,00**
20	145	40	59	M12	3	3	**355,00**
22	160	50	74	M12	3	4	**406,00**
25	160	50	74	M12	3	4	**448,00**
28	166	50	80	M16	4	4	**515,00**
32	200	50	80	M16	4	4	**584,00**
36	200	50	80	M16	4	5	**636,00**
40	215	63	95	M16	4	6	**690,00**
*32	213	50	81	M16	4	4	**640,00**
*36	213	50	81	M16	4	5	**692,00**
*40	228	63	96	M16	4	6	**745,00**
*50	249	80	117	M16	4	6	**797,00**

679 TC

ATTACCO ISO DIN 2080
Queue cône ISO
ISO taper shank
Mit ISO-Steilkegel

CON RIVESTIMENTO TiCN
Revêtues TiCN
TiCN -Coated
TiCN-beschichtet

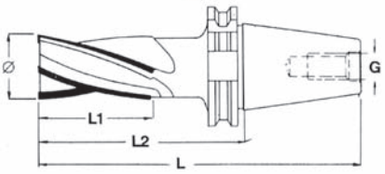


Ø e8	L	L1	L2	G	ISO	Z	€
32	180	50	86	M16	40	4	**758,00**
40	200	63	106	M16	40	6	**932,00**
50	228	80	135	M16	40	6	**1152,00**
50	260	80	133	M24	50	6	**1380,00**
63	280	100	153	M24	50	6	**1546,00**

680 TC

ATTACCO ISO DIN 69871A
Queue cône ISO
ISO taper shank
Mit ISO-Steilkegel

CON RIVESTIMENTO TiCN
Revêtues TiCN
TiCN -Coated
TiCN-beschichtet



Ø e8	L	L1	L2	G	ISO	Z	€
40	180	63	112	M16	40	6	**900,00**
50	200	80	132	M16	40	6	**1113,00**
50	235	80	133	M24	50	6	**1349,00**
63	260	100	158	M24	50	6	**1507,00**

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FRESE A SGROSSARE

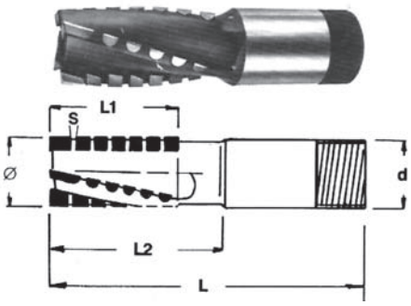
FRAISES D'ÉBAUCHE
ROUGHING END MILLS
SCHRUPPFRÄSER

QUALITÀ K10/P25

NUANCES K10/P25
GRADES K10/P25
SORTEN K10/P25

312

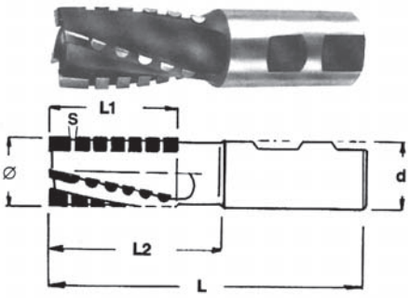
ATTACCO CILINDRICO FILETTATO DIN 1835D
Queue cylindrique filetée
Threaded cylindrical shank
Zylinderschaft mit Aussenanzugsgewinde



Ø e8	L	L1	L2	d h8	Z	S ■■	€
16	95	40	47	16	3	2,5	**150,50**
20	115	44	59	25	4	2,5	**169,00**
25	118	52	62	25	4	2,5	**208,00**
32	125	57	65	32	4	3,0	**254,50**
16	95	34	47	16	3	1,2	**157,50**
20	115	45	59	25	4	1,2	**178,00**
25	118	50	62	25	4	1,2	**218,50**
32	130	60	70	32	4	1,4	**266,00**

412

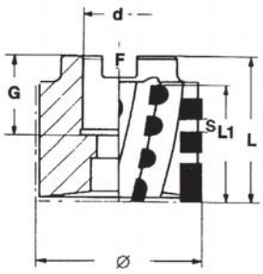
ATTACCO CILINDRICO WELDON DIN 1835 B
Queue cylindrique avec méplat
Weldon cylindrical shank
Zylinderschaft mit Spannfläche



Ø e8	L	L1	L2	d h8	Z	S ■■	€
16	95	40	47	16	3	2,5	**150,50**
20	115	44	59	25	4	2,5	**169,00**
25	118	52	62	25	4	2,5	**208,00**
32	125	57	65	32	4	3,0	**254,50**
16	95	34	47	16	3	1,2	**157,50**
20	115	45	59	25	4	1,2	**178,00**
25	118	50	62	25	4	1,2	**218,50**
32	130	60	70	32	4	1,4	**266,00**
36	140	70	80	32	4	1,4	**351,00**
38	150	80	90	32	4	1,4	**368,00**
40	155	80	95	32	4	1,4	**376,00**

322

ATTACCO A MANICOTTO
Fraise en bout
Shell end mill
Aufsteckfräser



Ø js 16	L	L1	G	F	d h8	Z	S ■■	€
50	45	35	24	10,4	22	6	3,0	**252,50**
63	63	50	32	12,4	27	6	3,0	**307,00**
80	70	60	34	14,4	32	8	3,0	**409,00**
50	45	35	24	10,4	22	6	1,4	**279,00**
63	63	50	32	12,4	27	6	1,4	**338,00**
80	70	60	34	14,4	32	8	1,4	**450,00**
100	70	60	38	16,4	40	8	1,4	**494,00**

■■ SPECIFICARE IL VALORE DI "S" CON ANGOLO ELICA 20°
Spécifier la valeur "S" avec angle hélice 20° - Indicate value of "S" with 20° helix angle - Die Steigung "S" genau anzugeben mit Siralwinkel 20°

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FRESE A SGROSSARE

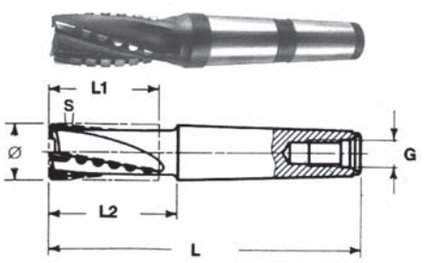
FRAISES D'ÉBAUCHE
ROUGHING END MILLS
SCHRUPPFRÄSER

QUALITÀ K10/P25

NUANCES K10/P25
GRADES K10/P25
SORTEN K10/P25

417

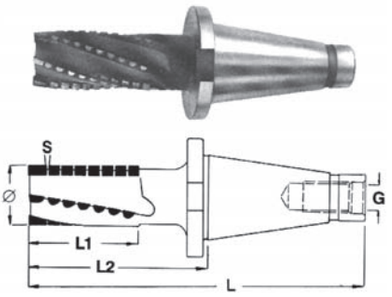
ATTACCO CONO MORSE DIN 228
***ART. 417F - ATTACCO CONO MORSE DIN 2207**
Queue cône Morse
Morse taper shank
Mit Morsekegel



Ø js 16	L	L1	L2	G	CM	Z	S ■■	€
20	145	44	59	M12	3	4	2,5	**188,50**
20	145	45	59	M12	3	4	1,2	**206,50**
25	160	50	74	M12	3	4	2,5	**206,50**
25	160	50	74	M12	3	4	1,2	**227,50**
28	160	52	74	M12	3	4	2,5	**214,50**
28	160	54	74	M12	3	4	1,2	**236,00**
32	200	60	81	M16	4	4	3,0	**267,00**
40	215	80	96	M16	4	4	3,0	**310,00**
*32	213	60	73	M16	4	4	1,4	**295,00**
*36	213	60	73	M16	4	4	1,4	**316,00**
*40	228	80	88	M16	4	4	1,4	**341,00**

517

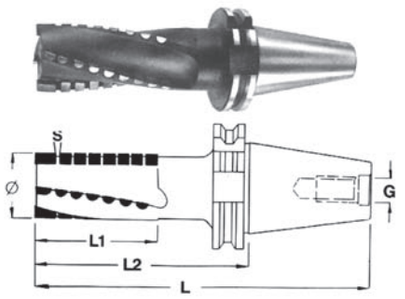
ATTACCO ISO DIN 2080
Queue cône ISO
ISO taper shank
Mit ISO-Steilkegel



Ø js 16	L	L1	L2	G	ISO	Z	S ■■	€
40	220	80	126	M16	40	4	3,0	**374,00**
50	275	100	148	M24	50	6	3,0	**701,00**
63	295	115	168	M24	50	6	3,0	**777,00**
32	190	60	96	M16	40	4	1,4	**371,00**
40	220	80	126	M16	40	4	1,4	**414,00**
50	275	100	148	M24	50	6	1,4	**772,00**
63	295	115	168	M24	50	6	1,4	**853,00**

617

ATTACCO ISO DIN 69871A
Queue cône ISO
ISO taper shank
Mit ISO-Steilkegel



Ø js 16	L	L1	L2	G	ISO	Z	S ■■	€
40	220	80	132	M16	40	4	3,0	**425,00**
50	220	100	152	M16	40	6	3,0	**689,00**
50	255	100	153	M24	50	6	3,0	**736,00**
63	275	115	173	M24	50	8	3,0	**876,00**
40	220	80	132	M16	40	4	1,4	**468,00**
50	220	100	152	M16	40	6	1,4	**758,00**
50	255	100	153	M24	50	8	1,4	**813,00**
63	275	115	173	M24	50	8	1,4	**962,00**

■■ SPECIFICARE IL VALORE DI "S" CON ANGOLO ELICA 20°
Spécifier la valeur "S" avec angle hélice 20° - Indicate value of "S" with 20° helix angle - Die Steigung "S" genau anzugeben mit Siralwinkel 20°

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FRESE A SGROSSARE

FRAISES D'ÉBAUCHE
ROUGHING END MILLS
SCHRUPPFRÄSER

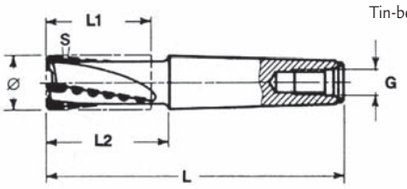
QUALITÀ K10/P25

NUANCES K10/P25
GRADES K10/P25
SORTEN K10/P25

417 TN

ATTACCO CONO MORSE DIN 228
***ART. 417FN - ATTACCO CONO MORSE DIN 2207**
Queue cône Morse
Morse taper shank
Mit Morsekegel

CON RIVESTIMENTO TiN
Revêtues TiN
Tin -Coated
Tin-beschichtet

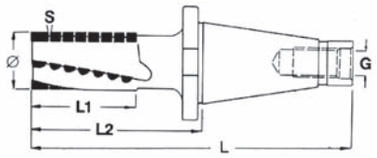


Ø js 16	L	L1	L2	G	CM	Z	S ■■	€
20	145	44	59	M12	3	4	2,5	**252,00**
25	160	50	74	M12	3	4	2,5	**275,00**
28	160	52	74	M12	3	4	2,5	**293,00**
32	200	60	81	M16	4	4	3,0	**436,00**
40	215	80	96	M16	4	4	3,0	**481,00**
20	145	45	59	M12	3	4	1,2	**272,00**
25	160	50	74	M12	3	4	1,2	**297,00**
28	160	54	74	M12	3	4	1,2	**316,00**
*32	213	60	81	M16	4	4	1,4	**468,00**
*36	213	60	81	M16	4	4	1,4	**485,00**
*40	228	80	96	M16	4	4	1,4	**512,00**

517 TN

ATTACCO ISO DIN 2080
Queue cône ISO
ISO taper shank
Mit ISO-Steilkegel

CON RIVESTIMENTO TiN
Revêtues TiN
Tin -Coated
Tin-beschichtet

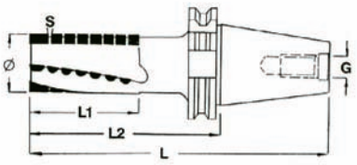


Ø js 16	L	L1	L2	G	ISO	Z	S ■■	€
40	220	80	126	M16	40	4	3,0	**623,00**
50	275	100	148	M24	50	6	3,0	**1002,00**
63	295	115	168	M24	50	6	3,0	**1073,00**
32	190	60	96	M16	40	4	1,4	**587,00**
40	220	80	126	M16	40	4	1,4	**657,00**
50	275	100	148	M24	50	6	1,4	**1066,00**
63	295	115	168	M24	50	6	1,4	**1136,00**

617 TN

ATTACCO ISO DIN 2080
Queue cône ISO
ISO taper shank
Mit ISO-Steilkegel

CON RIVESTIMENTO TiN
Revêtues TiN
Tin -Coated
Tin-beschichtet



Ø js 16	L	L1	L2	G	ISO	Z	S ■■	€
40	220	80	132	M16	40	4	3,0	**683,00**
50	220	100	152	M16	40	6	3,0	**946,00**
50	255	100	152	M24	50	6	3,0	**1018,00**
63	275	115	173	M24	50	6	3,0	**1199,00**
40	220	80	132	M16	40	4	1,4	**724,00**
50	220	100	152	M16	40	6	1,4	**1018,00**
50	255	100	152	M24	50	6	1,4	**1089,00**
63	275	115	173	M24	50	6	1,4	**1286,00**

■■ SPECIFICARE IL VALORE DI "S" CON ANGOLO ELICA 20°
Spécifier la valeur "S" avec angle hélice 20° - Indicate value of "S" with 20° helix angle - Die Steigung "S" genau anzugeben mit Siralwinkel 20°

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FRESE A SGROSSARE

FRAISES D'ÉBAUCHE
ROUGHING END MILLS
SCHRUPPFRÄSER

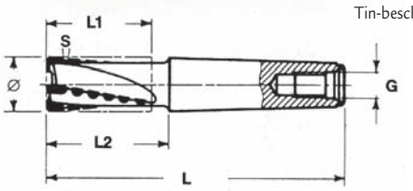
QUALITÀ K10/P25

NUANCES K10/P25
GRADES K10/P25
SORTEN K10/P25

417 TC

ATTACCO CONO MORSE DIN 228
ANGOLO ELICA 20°
* ATTACCO CONO MORSE DIN 2207
Queue cône Morse - Angle hélice 20°
Morse taper shank - 20° helix angle
Mit Morsekegel -Spiralwinker 20°

CON RIVESTIMENTO TiN
Revêtues TiN
Tin -Coated
Tin-beschichtet

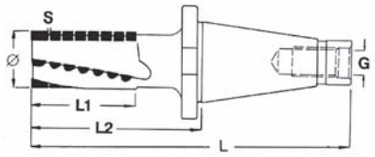


Ø js 16	L	L1	L2	G	CM	Z	S	€
20	145	45	59	M12	3	4	1,2	**303,00**
25	160	50	74	M12	3	4	1,2	**329,00**
28	160	54	74	M12	3	4	1,2	**354,00**
*32	213	60	81	M16	4	4	1,4	**547,00**
*36	213	60	81	M16	4	4	1,4	**570,00**
*40	228	80	96	M16	4	4	1,4	**596,00**

517 TC

ATTACCO ISO DIN 2080
Queue cône ISO
ISO taper shank
Mit ISO-Steilkegel

CON RIVESTIMENTO TiN
Revêtues TiN
Tin -Coated
Tin-beschichtet

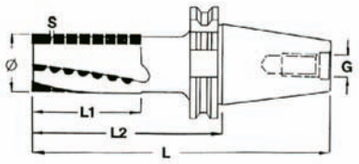


Ø js 16	L	L1	L2	G	ISO	Z	S	€
32	190	60	96	M16	40	4	1,4	**706,00**
40	220	80	126	M16	40	4	1,4	**797,00**
50	275	100	148	M24	50	6	1,4	**1238,00**
63	295	115	168	M24	50	6	1,4	**1310,00**

617 TC

ATTACCO ISO DIN 69871A
ANGOLO ELICA 20°
Queue cône ISO - Angle hélice 20°
ISO taper shank - 20° helix angle
Mit ISO-Steikegel - Spiralwinker 20°

CON RIVESTIMENTO TiN
Revêtues TiN
Tin -Coated
Tin-beschichtet



Ø js 16	L	L1	L2	G	ISO	Z	S	€
40	220	80	132	M16	40	4	1,4	**860,00**
50	220	100	152	M16	40	6	1,4	**1152,00**
50	255	100	152	M24	50	6	1,4	**1238,00**
63	275	115	173	M24	50	6	1,4	**1451,00**

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FRESE AD ANGOLO

FRAISES CONIQUES 2 TAILLES
SINGLES ANGLE CUTTERS
WINKELFRÄSER

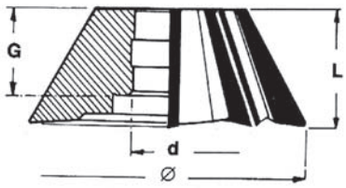
QUALITÀ K10/P25

NUANCES K10/P25
GRADES K10/P25
SORTEN K10/P25

219

SIMILARE DIN 842
Semblable à - Similar to - Ähnlich

A RICHIESTA
Sur demande
On request
Auf Anfrage

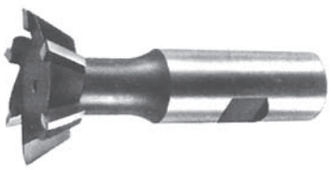


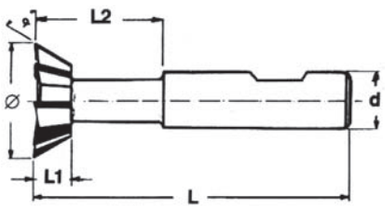
	Ø js 16	L	G	d h7	Z	€
α 60°	50	16	10	13	6	**197,00**
	63	22	12	16	8	**235,50**
	80	29	15	22	8	**292,00**
	100	37	21	27	10	**374,00**
	125	45	28	32	12	**504,00**
α 55°	50	15	10	13	6	**197,00**
	63	21	12	16	8	**235,50**
	80	27	15	22	8	**292,00**
	100	34	21	27	10	**374,00**
	125	43	28	32	12	**504,00**
α 50°	50	15	10	13	6	**197,00**
	63	20	12	16	8	**235,50**
	80	25	15	22	8	**292,00**
	100	32	21	27	10	**374,00**
	125	40	28	32	12	**504,00**

220

SIMILARE DIN 1833
Semblable à - Similar to - Ähnlich

ATTACCO CILINDRICO WELDON DIN 1835B
Queue cylindrique avec méplat
Weldon cylindrical shank
Zylinderschaft mit Spannfläche





	Ø js 16	L	L1	L2	d h6	Z	€
α 60°	20	68	7	23	12	6	**124,00**
	25	70	8	25	12	6	**138,00**
	32	80	10	32	16	6	**160,50**
	40	85	12	35	20	6	**205,00**
α 50°	20	68	6	23	12	6	**124,00**
	25	70	7	25	12	6	**138,00**
	32	80	9	32	16	6	**160,50**
	40	85	11	35	20	6	**205,00**

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FRESE PER CAVE A “T”

FRAISES POUR RAINURES À “T”
T-SLOT CUTTERS
NUTENFRÄSER T-PROFILE

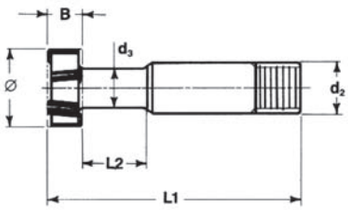
QUALITÀ K10

NUANCES K10
GRADES K10
SORTEN K10

241

SIMILARE DIN 851 AD
Semblable à - Similar to - Ähnlich

ATTACCO CILINDRICO
FILETTATO DIN 1835D
Queue cylindrique filetée
Threaded cylindrical shank
Zylinderschaft mit Aussenanzugsgewinde

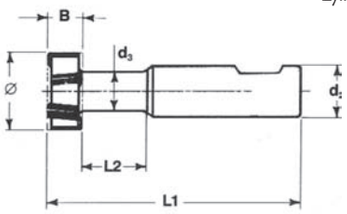


Ø h11	L1	B k11	L2	d3	d3 h8	Z	€
12,5	57	6	7	5	10	6	**90,00**
16	62	8	10	7	10	6	**99,40**
19	70	9	13	8	12	6	**116,00**
22	74	10	16	10	12	6	**121,50**
25	82	11	17	12	16	6	**139,00**
28	85	12	20	13	16	6	**139,00**

242

SIMILARE DIN 851 AB
Semblable à - Similar to - Ähnlich

ATTACCO WELDON
Queue cylindrique avec méplat
Weldon cylindrical shank
Zylinderschaft mit Spannfläche

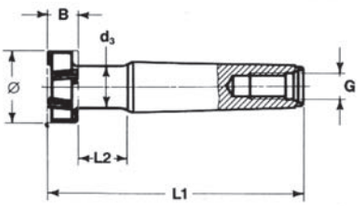


Ø h11	L1	B k11	L2	d3	d3 h8	Z	€
12,5	57	6	7	5	10	6	**90,00**
16	62	8	10	7	10	6	**99,40**
19	70	9	13	8	12	6	**116,00**
22	74	10	16	10	12	6	**121,50**
25	82	11	17	12	16	6	**139,00**
28	85	12	20	13	16	6	**139,00**

240

SIMILARE DIN 851 B
Semblable à - Similar to - Ähnlich

ATTACCO CONO MORSE
Queue cône Morse
Morse taper shank
Mit Morsekegel



Ø h11	L1	B k11	L2	d3	G	CM	Z	€
22	97	10	8	10	M10	2	6	**120,00**
25	100	11	11	12	M10	2	6	**140,50**
28	104	12	14	13	M10	2	6	**144,50**
32	109	14	19	15	M10	2	8	**171,50**
36	131	16	19	17	M12	3	8	**185,50**
40	136	18	23	19	M12	3	8	**216,50**
45	141	20	27	21	M12	3	8	**243,00**
50	147	22	35	23	M12	3	8	**320,00**
56	180	24	36	28	M16	4	8	**383,00**

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FRESE A DISCO K10

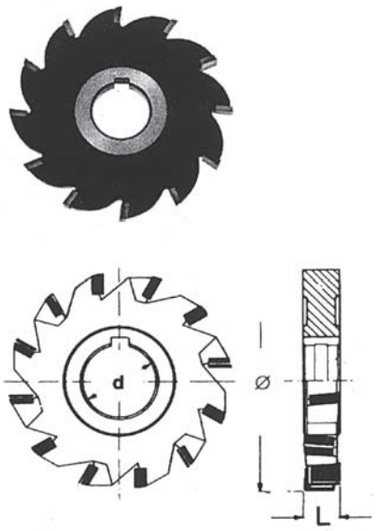
FRAISE 3 TAILLES
STAGGERED TOOTH MILLING CUTTERS
SCHEIBENFRÄSER

QUALITÀ K10

NUANCES K10
GRADES K10
SORTEN K10

334

SIMILARE DIN 8047 A
Semblable à - Similar to - Ähnlich



Ø js 16	L k 11	d h7	Z	€
63	6	22	8	147,00
63	8	22	8	155,50
63	10	22	8	160,50
63	12	22	8	172,50
80	6	27	8	167,50
80	8	27	8	175,50
80	10	27	8	183,00
80	12	27	8	194,50
100	6	27	10	203,00
100	6	32	10	203,00
100	8	27	10	211,50
100	8	32	10	211,50
100	10	27	10	224,50
100	10	32	10	224,50
100	12	27	10	241,50
100	12	32	10	241,50
100	14	27	10	250,50
100	14	32	10	250,50
100	16	27	10	264,00
100	16	32	10	264,00
125	6	32	12	267,00
125	8	32	12	279,00
125	10	32	12	290,00
125	12	32	12	300,00
125	14	32	12	316,00
125	16	32	12	333,00
125	18	32	12	348,00
125	20	32	12	348,00
160	10	40	16	459,00
160	12	40	16	459,00
160	14	40	16	472,00
160	16	40	16	498,00
160	18	40	16	512,00
160	20	40	16	512,00
200	14	40	20	732,00
200	16	40	20	772,00
200	18	40	20	790,00

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ALESATORI CON RIPORTO IN METALLO DURO

ALÉSOIRS AVEC PLAQUETTES EN MÉTAL DUR BRASÉS

CARBIDE TIPPED REAMERS

GELÖTETE HARTMETALL- REIBAHLEN

Talicarb

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ALESATORI A MACCHINA

ALÉSOIRS POUR MACHINES
MACHINE REAMERS
MASCHINENREIBAHLEN

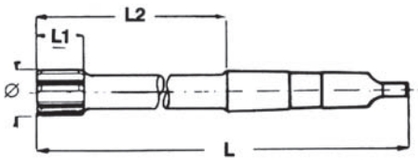
QUALITÀ K10

NUANCES K10
GRADES K10
SORTEN K10

228

SIMILARE DIN 8051
Semblable à - Similar to - Ähnlich

ATTACCO CONICO
Queue conique
Taper shank
Morsekegel



Ø H7	L	L1	L2	CM	Z	€
5	170	12	104	1	4	81,80
6	170	12	104	1	4	81,80
7	170	16	104	1	4	81,80
8	170	16	104	1	4	82,70
9	170	19	104	1	4	84,30
10	170	19	104	1	4	82,70
11	170	19	104	1	4	86,00
12	182	19	116	1	6	94,20
13	182	19	116	1	6	94,20
14	189	19	123	1	6	94,20
15	204	19	124	2	6	95,90
16	210	22	130	2	6	107,50
17	214	22	134	2	6	107,50
18	219	22	139	2	6	108,50
19	223	22	143	2	6	117,50
20	228	22	148	2	6	117,50
21	228	25	148	2	6	123,50
22	237	25	157	2	6	134,00
23	237	25	157	2	6	135,50
■ 24	268	25	169	3	6	142,50
■ 25	268	25	169	3	6	142,50
■ 26	273	25	174	3	6	144,00
■ 27	277	30	178	3	8	163,50
■ 28	277	30	178	3	8	163,50
■ 29	281	30	182	3	8	164,00
■ 30	281	30	182	3	8	164,00
■ 31	281	30	182	3	8	181,50
■ 32	281	30	182	3	8	181,50
■ 33	281	30	182	3	8	244,00
■ 34	310	30	186	4	8	244,00
■ 35	310	30	186	4	8	252,00
■ 36	310	30	186	4	8	252,00
■ 37	310	30	186	4	8	261,00
■ 38	310	30	186	4	8	261,00
■ 39	310	30	186	4	8	261,00
■ 40	310	30	186	4	8	261,00

■ ESECUZIONE A TAGLIENTI INCLINATI NEGATIVI
Exécution avec denture hélicoïdale negative
Helical flutes with negative rake angle
Gedrallte Ausführung mit Minus-Spanwinkel

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ALESATORI A MACCHINA

ALÉSOIRS POUR MACHINES
MACHINE REAMERS
MASCHINENREIBAHLEN

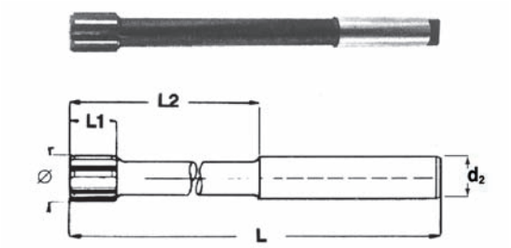
QUALITÀ K10

NUANCES K10
GRADES K10
SORTEN K10

229

SIMILARE DIN 8050
Semblable à - Similar to - Ähnlich

ATTACCO CILINDRICO
Queue cylindrique
Straight shank
Zylinderschaft



■ METALLO DURO INTEGRALE
Carbure massif
Solid carbide
Vollhartmetall

Ø H7	L	L1	L2	d2 h8	Z	€
■ 2/INT	49	12	28	2	4	**53,60**
■ 3/INT	60	15	28	3	4	**56,00**
■ 4/INT	75	19	42	4	4	**62,40**
■ 5/INT	86	21	42	5	4	**72,50**
5	100	12	70	5	4	**69,50**
6	100	12	70	6	4	**69,50**
7	100	16	70	8	4	**72,20**
8	118	16	85	8	4	**72,20**
9	125	19	85	10	4	**82,80**
10	132	19	90	10	4	**82,80**
11	132	19	90	12	4	**88,40**
12	150	19	100	12	6	**91,70**
13	160	19	110	14	6	**97,50**
14	170	19	115	14	6	**93,50**
15	170	19	115	16	6	**97,50**
16	180	22	120	16	6	**107,00**
17	190	22	130	18	6	**122,00**
18	190	22	130	18	6	**117,50**
19	200	22	130	20	6	**123,00**
20	200	22	130	20	6	**123,50**

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ALESATORI A MACCHINA

ALÉSOIRS POUR MACHINES
MACHINE REAMERS
MASCHINENREIBAHLEN

QUALITÀ K10

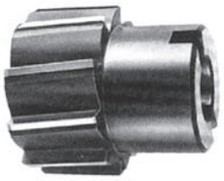
NUANCES K10
GRADES K10
SORTEN K10

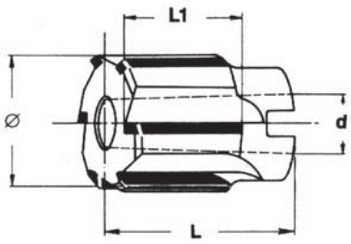
230

SIMILARE DIN 8054
Semblable à - Similar to - Ähnlich

ATTACCO A MANICOTTO
Fraise en bout
Shell end mill
Aufsteckfräser

FORO CONICO 1:30 - TAGLIENTI INCLINATI NEGATIVI
Alésage conique 1:30 - Denture hélicoïdale negative
Taper hole 1:30 - Helical flutes with negative rake angle
Konische Bohrung 1:30 - Gedrallte Ausführung mit Minus-Spanwinkel





Ø H7	L	L1	d H7	Z	€
30	45	30	16	6	**142,50**
31	45	30	16	6	**142,50**
32	45	30	16	6	**143,00**
33	45	30	16	6	**154,00**
34	45	30	16	6	**154,00**
35	45	30	16	6	**154,00**
36	50	30	16	6	**162,50**
37	50	30	16	6	**162,50**
38	50	30	16	6	**162,50**
39	50	30	16	6	**167,50**
40	50	30	16	6	**167,50**
42	50	30	19	8	**185,00**
43	50	30	19	8	**185,00**
44	50	30	19	8	**185,00**
45	50	30	19	8	**191,50**
46	56	30	19	8	**193,50**
47	56	30	19	8	**193,50**
48	56	30	19	8	**201,00**
49	56	30	19	8	**201,00**
50	56	30	19	8	**201,00**
52	56	30	22	10	**212,50**
54	63	30	22	10	**212,50**
55	63	30	22	10	**212,50**
57	63	30	22	10	**236,00**
58	63	30	22	10	**236,00**
60	63	30	22	10	**236,00**
62	63	30	27	10	**265,00**
65	71	30	27	10	**265,00**
68	71	30	27	10	**290,00**
69	71	30	27	10	**290,00**
70	71	30	27	10	**290,00**
72	71	30	32	12	**313,00**
75	71	30	32	12	**313,00**
80	71	30	32	12	**333,00**
85	71	30	32	12	**371,00**
90	71	40	40	12	**402,00**
95	71	40	40	12	**425,00**
100	71	40	40	12	**472,00**
105	71	40	40	14	**514,00**
110	71	40	40	14	**570,00**
115	71	40	40	14	**609,00**
120	71	40	40	14	**646,00**

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ALESATORI A MACCHINA

ALÉSOIRS POUR MACHINES
MACHINE REAMERS
MASCHINENREIBAHLEN

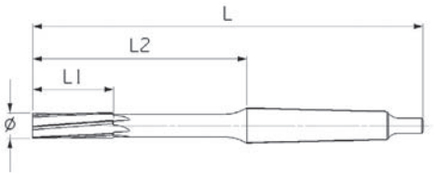
QUALITÀ K10

NUANCES K10
GRADES K10
SORTEN K10

231

SIMILARE DIN 8094
Semblable à - Similar to - Ähnlich

ATTACCO CONICO
Queue conique
Taper shank
Morsekegel



Ø H7	L	L1	L2	CM	Z	€
*5	133	30	67	1	4	**90,00**
*6	138	30	72	1	4	**90,00**
*7	150	30	84	1	4	**90,00**
8	156	30	90	1	4	**90,90**
9	162	30	96	1	4	**92,70**
10	168	45	102	1	6	**90,90**
11	175	45	109	1	6	**94,60**
12	182	45	116	1	6	**104,00**
13	182	45	116	1	6	**104,00**
14	189	45	123	1	6	**113,00**
15	204	45	124	2	6	**115,00**
16	210	45	130	2	6	**129,00**
17	214	56	134	2	6	**129,00**
18	219	56	139	2	6	**130,00**
19	223	56	143	2	6	**141,00**
20	228	56	148	2	6	**141,00**
21	232	56	152	2	6	**148,50**
22	237	56	157	2	6	**161,00**
23	241	56	161	2	6	**163,50**
24	268	70	169	3	6	**171,50**
25	268	70	169	3	6	**171,50**
26	273	70	174	3	6	**172,50**
27	277	70	178	3	6	**195,50**
28	277	70	178	3	6	**195,50**
29	281	70	182	3	6	**196,50**
30	281	70	182	3	6	**196,50**
31	285	70	186	3	6	**217,50**
32	317	70	193	4	6	**217,50**
34	321	70	197	4	6	**293,00**
35	321	70	197	4	6	**293,00**
36	325	70	201	4	6	**302,00**
38	329	70	205	4	6	**302,00**
40	329	70	205	4	6	**313,00**

ESECUZIONE A TAGLIENTI INCLINATI NEGATIVI
Exécution avec denture hélicoïdale negative
Helical flutes with negative rake angle
Gedrallte Ausführung mit Minus-spanwinkel

* Talicarb Norm

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ALESATORI A MACCHINA

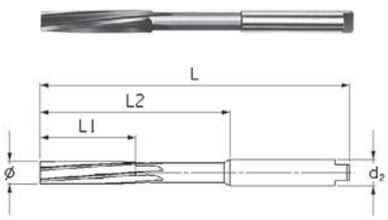
ALÉSOIRS POUR MACHINES
MACHINE REAMERS
MASCHINENREIBAHLEN

QUALITÀ K10

NUANCES K10
GRADES K10
SORTEN K10

232

SIMILARE DIN 8093
Semblable à - Similar to - Ähnlich



ATTACCO CILINDRICO
Queue cylindrique
Straight shank
Zylinderschaft

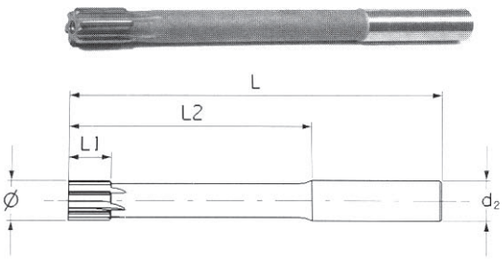
ESECUZIONE A TAGLIENTI INCLINATI NEGATIVI
Exécution avec denture hélicoïdale negative
Helical flutes with negative rake angle
Gedrallte Ausführung mit Minus-spanwinkel

Ø H7	L	L1	L2	d2 e9	Z	€
5	86	25	52	5	4	**76,40**
6	93	26	57	5	4	**76,40**
7	109	31	69	7	4	**79,40**
8	117	33	75	8	4	**79,40**
9	125	36	81	9	4	**91,20**
10	133	38	87	10	6	**91,20**
11	142	41	96	10	6	**97,30**
12	151	44	105	10	6	**101,00**
13	151	44	105	10	6	**107,50**
14	160	47	110	12	6	**112,50**
15	162	50	112	12	6	**117,50**
16	170	52	120	12	6	**128,00**
17	175	54	123	14	6	**147,00**
18	182	56	130	14	6	**141,00**
19	189	58	131	16	6	**147,50**
20	195	60	137	16	6	**149,00**

233

TALICARB NORM
Semblable à - Similar to - Ähnlich

ATTACCO CILINDRICO CON REFRIGERAZIONE RADIALE*
Queue cylindrique Sortie du réfrigerant à côté du coupant
Straight shank With inner coolant feed - outlet at blade level
Zylinderschaft Mit innenkühlung aus den Schneiden



*** Art 233A - Su richiesta attacco cilindrico con refrigerazione assiale**
-Sur demande sortie du réfrigérant au centre - On request outlet from centre
Auf Anfrage Innenkühlung aus der Mitte

Ø H7	L	L1	L2	d2 e9	Z	€
6	123	12	85	12	4	**320,00**
7	123	16	85	12	4	**320,00**
8	123	16	85	12	4	**320,00**
9	123	19	85	12	6	**373,00**
10	160	19	115	12	6	**400,00**
11	160	19	115	12	6	**400,00**
12	160	19	115	12	6	**400,00**
13	160	19	115	12	6	**400,00**
14	160	19	115	12	6	**400,00**
15	160	19	115	12	6	**400,00**
16	180	22	130	16	6	**433,00**
17	180	22	130	16	6	**433,00**
18	180	22	130	16	6	**433,00**
19	200	22	140	20	6	**475,00**
20	200	22	140	20	6	**475,00**
21	200	22	140	20	6	**475,00**
22	200	22	140	20	6	**475,00**
23	200	22	140	20	6	**475,00**
24	200	22	140	20	6	**475,00**
25	200	22	140	20	6	**475,00**
26	210	22	150	25	6	**522,00**
27	210	22	150	25	6	**522,00**
28	210	22	150	25	6	**522,00**
29	210	22	150	25	6	**522,00**
30	210	22	150	25	6	**522,00**

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ALESATORI A MACCHINA

ALÉSOIRS POUR MACHINES
MACHINE REAMERS
MASCHINENREIBAHLEN

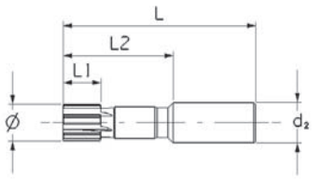
QUALITÀ K10

NUANCES K10
GRADES K10
SORTEN K10

234

TALICARB NORM
Semblable à - Similar to - Ähnlich

ATTACCO CILINDRICO CON REFRIGERAZIONE RADIALE*
Queue cylindrique Sortie du réfrigerant à côté du coupant
Straight shank With inner coolant feed - outlet at blade level
Zylinderschaft Mit innenkühlung aus den Schneiden



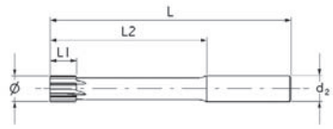
*** Art 234A - Su richiesta attacco cilindrico con refrigerazione assiale**
-Sur demande sortie du réfrigérant au centre - On request outlet from centre
Auf Anfrage Innenkühlung aus der Mitte

Ø H7	L	L1	L2	d2 h6	Z	€
6	78	12	40	12	4	320,00
7	78	16	40	12	4	320,00
8	78	16	40	12	4	320,00
9	88	19	50	12	6	373,00
10	95	19	50	12	6	400,00
11	95	19	50	12	6	400,00
12	95	19	50	12	6	400,00
13	95	19	50	12	6	400,00
14	95	19	50	12	6	400,00
15	95	19	50	12	6	400,00
16	100	22	50	16	6	433,00
17	100	22	50	16	6	433,00
18	100	22	50	16	6	433,00
19	120	22	60	20	6	475,00
20	120	22	60	20	6	475,00
21	120	22	60	20	6	475,00
22	120	22	60	20	6	475,00
23	120	22	60	20	6	475,00
24	120	22	60	20	6	475,00
25	120	22	60	20	6	475,00
26	135	22	75	20	6	522,00
27	135	22	75	25	6	522,00
28	135	22	75	25	6	522,00
29	135	22	75	25	6	522,00
30	135	22	75	25	6	522,00

T235

TALICARB NORM
Semblable à - Similar to - Ähnlich

ATTACCO CILINDRICO CON REFRIGERAZIONE RADIALE*
Queue cylindrique Sortie du réfrigerant à côté du coupant
Straight shank With inner coolant feed - outlet at blade level
Zylinderschaft Mit innenkühlung aus den Schneiden



ALESATORI REGISTRABILI - ESPANSIONE MAX 0,1 MM PER IL Ø NOMINALE
Alésoirs expansible - développment max 0,1 mm au delá du diamètre nominal
Expanding reamers - max expansion 0,1 mm above the nominal diameter
Nachstellbar Reihbahlen - nachstellbereich max. 0,1 mm über dem Nenndurchmesser

*** Art 235A - Su richiesta attacco cilindrico con refrigerazione assiale**
-Sur demande sortie du réfrigérant au centre - On request outlet from centre
Auf Anfrage Innenkühlung aus der Mitte

Ø H7	L	L1	L2	d2 h6	Z	€
8	123	16	85	12	4	410,00
9	123	19	85	12	4	476,00
10	160	19	115	12	6	515,00
11	160	19	115	12	6	515,00
12	160	19	115	12	6	515,00
13	160	19	115	12	6	515,00
14	160	19	115	12	6	515,00
15	160	19	115	12	6	515,00
16	180	22	130	16	6	563,00
17	180	22	130	16	6	563,00
18	180	22	130	16	6	563,00
19	200	22	140	20	6	627,00
20	200	22	140	20	6	627,00
21	200	22	140	20	6	627,00
22	200	22	140	20	6	627,00
23	200	22	140	20	6	627,00
24	200	22	140	20	6	627,00
25	200	22	140	20	6	627,00
26	210	22	150	25	6	692,00
27	210	22	150	25	6	692,00
28	210	22	150	25	6	692,00
29	210	22	150	25	6	692,00
30	210	22	150	25	6	692,00

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ALESATORI A MACCHINA

ALÉSOIRS POUR MACHINES
MACHINE REAMERS
MASCHINENREIBAHLEN

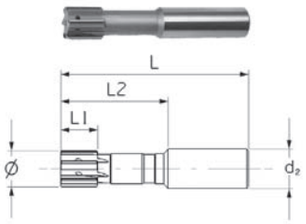
QUALITÀ CERMET (SU RICHIESTA)

NUANCES CERMET (Sur demande)
GRADES CERMET (On request)
SORTEN CERMET (Auf Anfrage)

236

TALICARB NORM
Semblable à - Similar to - Ähnlich

ATTACCO CILINDRICO CON REFRIGERAZIONE RADIALE*
Queue cylindrique Sortie du réfrigerant à côté du coupant
Straight shank With inner coolant feed - outlet at blade level
Zylinderschaft Mit innenkühlung aus den Schneiden



*** Art 236A - Su richiesta attacco cilindrico con refrigerazione assiale**
Sur demande sortie du réfrigérant au centre - On request outlet from centre
Auf Anfrage Innenkühlung aus der Mitte

Ø H7	L	L1	L2	d2 e9	Z	€
8	78	16	40	12	4	512,00
9	88	19	50	12	4	647,00
10	95	19	50	12	6	675,00
11	95	19	50	12	6	675,00
12	95	19	50	12	6	675,00
13	95	19	50	12	6	675,00
14	95	19	50	12	6	675,00
15	95	19	50	12	6	675,00
16	100	22	50	16	6	693,00
17	100	22	50	16	6	693,00
18	100	22	50	16	6	693,00
19	120	22	60	20	6	745,00
20	120	22	60	20	6	745,00
21	120	22	60	20	6	745,00
22	120	22	60	20	6	745,00
23	120	22	60	20	6	745,00
24	120	22	60	20	6	745,00
25	120	22	60	20	6	745,00
26	135	22	75	25	6	793,00
27	135	22	75	25	6	793,00
28	135	22	75	25	6	793,00
29	135	22	75	25	6	793,00
30	135	22	75	25	6	793,00

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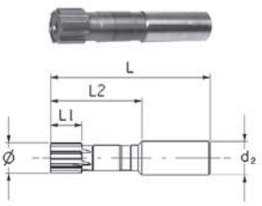
TALICARB NORM
Semblable à - Similar to - Ähnlich

ATTACCO CILINDRICO CON REFRIGERAZIONE RADIALE*
Queue cylindrique Sortie du réfrigerant à côté du coupant
Straight shank With inner coolant feed - outlet at blade level
Zylinderschaft Mit innenkühlung aus den Schneiden



ALESATORI REGISTRABILI - ESPANSIONE MAX 0,1 mm PER IL Ø NOMINALE
Alésoirs expansible - développment max 0,1 mm au delá du diamètre nominal
Expanding reamers - max expansion 0,1 mm above the nominal diameter
Nachstellbar Reihbahlen - nachstellbereich max. 0,1 mm über dem Nenndurchmesser

*** Art 236A - Su richiesta attacco cilindrico con refrigerazione assiale**
Sur demande sortie du réfrigérant au centre - On request outlet from centre
Auf Anfrage Innenkühlung aus der Mitte

Ø H7	L	L1	L2	d2 e9	Z	€
8	78	16	40	12	4	682,00
9	88	19	50	12	4	862,00
10	95	19	50	12	6	899,00
11	95	19	50	12	6	899,00
12	95	19	50	12	6	899,00
13	95	19	50	12	6	899,00
14	95	19	50	12	6	899,00
15	95	19	50	12	6	899,00
16	100	22	50	16	6	925,00
17	100	22	50	16	6	925,00
18	100	22	50	16	6	925,00
19	120	22	60	20	6	994,00
20	120	22	60	20	6	994,00
21	120	22	60	20	6	994,00
22	120	22	60	20	6	994,00
23	120	22	60	20	6	994,00
24	120	22	60	20	6	994,00
25	120	22	60	20	6	994,00
26	135	22	75	25	6	1058,00
27	135	22	75	25	6	1058,00
28	135	22	75	25	6	1058,00
29	135	22	75	25	6	1058,00
30	135	22	75	25	6	1058,00

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TABELLE TECNICHE
TOLLERANZE

TABLEAUX TECHNIQUES - TOLÉRANCES

TECHNICAL MANUFACTURING DATA - TOLERANCES

RICHTWEITTABELLEN - HERSTELLUNGS TOLERANZE

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VALORI ORIENTATIVI DI FRESATURA - VELOCITÀ - AVANZAMENTO

PARAMÉTRES INDICATIFS POUR FRAISAGE - VITESSE-AVANCE

MILLING APPROXIMATE PARAMETERS - SPEEDFEED

RICHTWERTTABELLE FÜR FRÄSER - SCHNITTGESCHWINDIGKEIT UND VORSCHUB

A = VALORI PER FRESE INFERIORI m/m 20
Pour fraises jusqu'à 20 m/m de diamétre - For mills to 20 m/m diameter - Für Fräserdurchmesse s 20 m/m

B = VALORI PER FRESE DA m/m 20 FINO A m/m 40
Pour fraises de 20 m/m à 40 m/m de diamétre - For mills from 20 m/m to 40 m/m diameter - Für Fräserdurchmesser von 20 m/m bis 40 m/m

ACCIAI NON LEGATI CON BASSO TENORE DI CARBONIO
Aciers non alliés avec faible teneur en carbone
Unalloyed steel low carbon
Nichtlegierte niedriggekohlte Stähle

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A	0,06 - 0,12	0,04 - 0,08	90 - 170	120 - 230
B	0,06 - 0,2	0,04 - 0,1	90 - 170	120 - 230

ACCIAI NON LEGATI O DEBOLMENTE LEGATI R= da450 a 850 N/mm^2
Aciers non alliés ou faiblement alliés
Unalloyed or weakly alloyed steels
Nicht-oder niedriglegierte Stähle

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A	0,06 - 0,12	0,04 - 0,08	70 - 140	100 - 180
B	0,06 - 0,15	0,04 - 0,1	70 - 140	100 - 180

ACCIAI FUSI DI MEDIA QUALITÀ
Aciers coulés de moyenne qualité
Medium quality cast steel
Stahlguss mittlerer Qualität

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A	0,06 - 0,12	0,04 - 0,08	50 - 140	60 - 180
B	0,06 - 0,15	0,04 - 0,1	50 - 140	60 - 180

ACCIAI FORTEMENTE LEGATI R= da 1000 a 1600 N/mm^2
Aciers fortement alliés
Highly alloyed steels
Hochlegierte Stähle

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A	0,05 - 0,1	0,04 - 0,08	55 - 90	65 - 100
B	0,05 - 0,1	0,04 - 0,08	55 - 90	65 - 100

GHISA GRIGIA DI MEDIA DUREZZA
Fonte grise de moyenne dureté
Medium hardness grey cast iron
Grauguss mittlerer Härta

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A	0,06 - 0,12	0,04 - 0,08	50 - 80	60 - 90
B	0,06 - 0,2	0,04 - 0,15	50 - 80	60 - 90

LEGHE LEGGERE (AlSi)
Alliages légers (AlSi)
Light alloys (AlSi)
AlSi-Legierungen

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A	0,05 - 0,2	0,03 - 0,08	300 - 800	400 - 900
B	0,05 - 0,2	0,03 - 0,1	300 - 800	400 - 900

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VALORI ORIENTATIVI DI FRESATURA - VELOCITÀ - AVANZAMENTO

PARAMÉTRES INDICATIFS POUR FRAISAGE - VITESSE-AVANCE

MILLING APPROXIMATE PARAMETERS - SPEEDFEED

RICHTWERTTABELLE FÜR FRÄSER - SCHNITTGESCHWINDIGKEIT UND VORSCHUB

A = VALORI PER FRESE FRONTALI CON FORO
Pour fraises 2 tailles avec trou - For end mills with hole - Richtwerte für Aufsteckfräser

B = VALORI PER FRESE FRONTALI CON GAMBO
Pour fraises 2 tailles avec queue - For schank end mills - Richtwerte für Schaftfräser

ACCIAI NON LEGATI CON BASSO TENORE DI CARBONIO
Aciers non alliés avec faible teneur en carbone
Unalloyed steel low carbon
Nichtlegierte niedriggekohlte Stähle

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A	0,1 - 0,4	0,1 - 0,2	80 - 170	100 - 230
B	0,08 - 0,2	0,06 - 0,1	90 - 170	120 - 230

ACCIAI NON LEGATI O DEBOLMENTE LEGATI R= da450 a 850 N/mm^2
Aciers non alliés ou faiblement alliés
Unalloyed or weakly alloyed steels
Nicht-oder niedriglegierte Stähle

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A	0,1 - 0,4	0,1 - 0,2	70 - 140	100 - 180
B	0,08 - 0,2	0,08 - 0,2	70 - 140	100 - 180

ACCIAI FUSI DI MEDIA QUALITÀ
Aciers coulés de moyenne qualité
Medium quality cast steel
Stahlguss mittlerer Qualität

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A	0,1 - 0,4	0,1 - 0,2	50 - 140	60 - 140
B	0,08 - 0,2	0,06 - 0,1	50 - 140	60 - 140

ACCIAI FORTEMENTE LEGATI R= da 1000 a 1600 N/mm^2
Aciers fortement alliés
Highly alloyed steels
Hochlegierte Stähle

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A	0,1 - 0,2	0,1	55 - 90	55 - 100
B	0,06 - 0,15	0,05 - 0,1	50 - 90	65 - 100

GHISA GRIGIA DI MEDIA DUREZZA
Fonte grise de moyenne dureté
Medium hardness grey cast iron
Grauguss mittlerer Härta

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A	0,1 - 0,4	0,1 - 0,2	60 - 90	70 - 120
B	0,08 - 0,2	0,06 - 0,1	60 - 90	70 - 120

LEGHE LEGGERE (AlSi)
Alliages légers (AlSi)
Light alloys (AlSi)
AlSi-Legierungen

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A	0,06 - 0,12	0,04 - 0,08	70 - 140	100 - 180
B	0,06 - 0,15	0,04 - 0,1	70 - 140	100 - 180

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VALORI ORIENTATIVI DI FRESATURA - VELOCITÀ - AVANZAMENTO

PARAMÉTRES INDICATIFS POUR FRAISAGE - VITESSE-AVANCE

MILLING APPROXIMATE PARAMETERS - SPEEDFEED

RICHTWERTTABELLE FÜR FRÄSER - SCHNITTGESCHWINDIGKEIT UND VORSCHUB

A = VALORI PER FRESE ELICOIDALI CON PIÙ TAGLI
Pour fraises hélicoïdales avec plusieurs dents - For helical end mills with several flutes - Richtwerte für multi-Schneidende Spiralfräser

B = VALORI PER FRESE ELICOIDALI CON 2 TAGLI
Pour fraises hélicoïdales avec 2 dents - For helical 2 flute end mills - Richtwerte für Zweischneidende Spiralfräser

ACCIAI NON LEGATI CON BASSO TENORE DI CARBONIO
Aciers non alliés avec faible teneur en carbone
Unalloyed steel low carbon
Nichtlegierte niedriggekohlte Stähle

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A		0,04 - 0,15		90 - 200

ACCIAI NON LEGATI O DEBOLMENTE LEGATI R= da450 a 850 N/mm^2
Aciers non alliés ou faiblement alliés
Unalloyed or weakly alloyed steels
Nicht-oder niedriglegierte Stähle

AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
	0,04 - 0,15		90 - 200

ACCIAI FUSI DI MEDIA QUALITÀ
Aciers coulés de moyenne qualité
Medium quality cast steel
Stahlguss mittlerer Qualität

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A		0,04 - 0,15		60 - 180

ACCIAI FORTEMENTE LEGATI R= da 1000 a 1600 N/mm^2
Aciers fortement alliés
Highly alloyed steels
Hochlegierte Stähle

AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
			90 - 200

GHISA GRIGIA DI MEDIA DUREZZA
Fonte grise de moyenne dureté
Medium hardness grey cast iron
Grauguss mittlerer Härta

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A		0,04 - 0,2		60 - 100
B	0,06 - 0,2	0,05 - 0,15	50 - 80	

LEGHE LEGGERE (AlSi)
Alliages légers (AlSi)
Light alloys (AlSi)
AlSi-Legierungen

AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
0,05 - 0,2	0,03 - 0,1	300 - 800	400 - 900
0,05 - 0,2	0,03 - 0,2	300 - 800	400 - 900

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VALORI ORIENTATIVI DI FRESATURA - VELOCITÀ - AVANZAMENTO

PARAMÉTRES INDICATIFS POUR FRAISAGE - VITESSE-AVANCE

MILLING APPROXIMATE PARAMETERS - SPEEDFEED

RICHTWERTTABELLE FÜR FRÄSER - SCHNITTGESCHWINDIGKEIT UND VORSCHUB

A = VALORI PER FRESE FRONTALI
Pour fraises deux tailles - For end mills - Richtwerte für Aufsteckfräser

B = VALORI PER FRESE AD ANGOLO
Pour fraises conique deux tailles · For single angle milling cutters · Richtwerte für Winkelfräser

C = VALORI PER FRESE A TRE TAGLI ALTERNATI
Pour fraises trois tailles alternés - For staggered side-tooth milling cutters - Richtwerte für Scheibenfräser

A

B

C

ACCIAI NON LEGATI CON BASSO TENORE DI CARBONIO
Aciers non alliés avec faible teneur en carbone
Unalloyed steel low carbon
Nichtlegierte niedriggekohlte Stähle

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A	0,1 - 0,3	0,1 - 0,2	80 - 150	100 - 190

ACCIAI NON LEGATI O DEBOLMENTE LEGATI R= da450 a 850 N/mm^2
Aciers non alliés ou faiblement alliés
Unalloyed or weakly alloyed steels
Nicht-oder niedriglegierte Stähle

AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
0,1 - 0,3	0,1 - 0,2	60 - 120	80 - 150

ACCIAI FUSI DI MEDIA QUALITÀ
Aciers coulés de moyenne qualité
Medium quality cast steel
Stahlguss mittlerer Qualität

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A	0,1 - 0,3	0,1 - 0,2	50 - 90	60 - 110

ACCIAI FORTEMENTE LEGATI R= da 1000 a 1600 N/mm^2
Aciers fortement alliés
Highly alloyed steels
Hochlegierte Stähle

AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
0,1 - 0,3	0,1	45 - 80	50 - 90

GHISA GRIGIA DI MEDIA DUREZZA
Fonte grise de moyenne dureté
Medium hardness grey cast iron
Grauguss mittlerer Härta

	AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
	SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
A	0,1 - 0,3	0,1 - 0,2	60 - 80	70 - 90
B	0,06 - 0,2	0,04 - 0,15	50 - 80	60 - 90
C	0,12 - 0,2	0,05 - 0,12	50 - 70	60 -90

LEGHE LEGGERE (AlSi)
Alliages légers (AlSi)
Light alloys (AlSi)
AlSi-Legierungen

AVANZAMENTO PER DENTE Avance par dent Feed per flute Vorschub pro Schneide		VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	
SGROSSATURA S_z [mm] Dégrossisage - Roughing Schruppen	FINITURA S_z [mm] Finissage - Finishing Schlichten	SGROSSATURA v [m/min] Dégrossisage - Roughing Schruppen	FINITURA v [m/min] Finissage - Finishing Schlichten
0,05 - 0,2	0,05 - 0,1	300 - 800	400 - 1000
	0,15 - 0,3		200 - 600

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TABELLA DI CONVERSIONE DELLA VELOCITÀ PER FRESE CON RIPORTO IN METALLO DURO

TABELLE DE CONVERSION DE VITESSE POUR FRAISES BRASÉES

CONVERSION CHART OF CUTTING SPEED FOR CARBIDE TIPPED END MILLS

UMRECHNUNG DER SCHNITTGESCHWINDIGKEIT FÜR HARTMETALL-BESTÜCKTE FRÄSER

Ø FRESA Fraise Mill - Fräser	VELOCITÀ DI TAGLIO IN METRI AL MINUTO PRIMO Vitesse de coupe m/mm Cutting speed m/mm Schnittgeschwindigkeit m/mm								
	30	40	50	60	80	100	120	150	200
16	595	795	995	1195	1590	1990	2385	2985	3980
18	530	705	885	1060	1415	1770	2120	2650	3535
20	475	635	795	955	1275	1590	1910	2385	3185
25	380	510	635	765	1020	1275	1525	1910	2545
28	340	455	570	680	910	1135	1365	1705	2275
32	300	395	495	595	795	995	1195	1490	1990
40	240	320	395	475	635	790	955	1185	1580
50	190	255	315	380	505	630	765	945	1260
63	150	200	250	300	405	505	605	760	1010
80	120	160	200	240	320	400	480	600	800
100	95	130	160	190	255	320	380	480	640
125	75	100	125	150	200	250	305	375	500
160	60	80	100	120	160	200	240	300	400

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VELOCITÀ DI TAGLIO E AVANZAMENTO IN ALESATURA

VITESSE DE COUPE ET AVANCE POUR ALÉSAGE

CUTTING SPEED AND FEED FOR REAMING

FÜR DIE EINZELNEN WERKSTOFFE EMPFOHLENE REIBAHLEN-SCHNITTGESWINDIGKEITEN UND VORSCHÜBE

MATERIALI Matière Material Werkstoff	VELOCITÀ DI TAGLIO Vitesse de coupe Cutting speed Schnittgeschwindigkeit	AVANZAMENTI PER GIRO CON ALESATORI DI Ø Avance par tour avec alésoirs de Ø Feed per turn with reamers of Ø Vorschub pro Umdrehung je. nach Ø			REFRIGERANTE Réfrigérant Coolan Schmierung
	m/min	FINO A Jusqu'à - To - Bis 10 mm	FINO A Jusqu'à - To - Bis 20 mm	OLTRE Plus de - Over - Über 20 mm	
ACCIAIO con Acier avec - Steel with - Stahl mit **R = 1000 N/mm²**	10 ÷ 15	0,2	0,4	0,6	ACQUA EMULS. – OLIO Emulsion d'huile - Huile Oil-in-water,emulsion - Oil öl-in-wasser-Emulsion - Erdöl
GHISA con Fonte avec - Cast iron with - Guesseisen mit **R = 180-220 N/mm²**	10 ÷ 15	0,2	0,4	0,6	ACQUA EMULS. – OLIO Emulsion d'huile - Huile Oil-in-water,emulsion - Oil öl-in-wasser-Emulsion - Erdöl
GHISA con Fonte avec - Cast iron with - Guesseisen mit **R = 260-330 N/mm²**	8 ÷ 12	0,2	0,4	0,6	ACQUA EMULS. – OLIO Emulsion d'huile - Huile Oil-in-water,emulsion - Oil öl-in-wasser-Emulsion - Erdöl
GHISA con Fonte avec - Cast iron with - Guesseisen mit **HB 400**	6 ÷ 10	0,2	0,3	0,4	ACQUA EMULS. – OLIO Emulsion d'huile - Huile Oil-in-water,emulsion - Oil öl-in-wasser-Emulsion - Erdöl
GHISA DURA IN CONCHIGLIA Fonte dure en conquille Chilled cast iron - Hartguss	6 ÷ 8	0,15	0,2	0,3	ACQUA EMULS. – OLIO Emulsion d'huile - Huile Oil-in-water,emulsion - Oil öl-in-wasser-Emulsion - Erdöl
ACCIAIO LEGATO Cr Ni con Acier allié Cr Ni avec Cr Ni alloyed steel with Cr Ni-Legierter Stahl **1000 N/mm²**	10 ÷ 12	0,2	0,4	0,5	ACQUA EMULS. – OLIO Emulsion d'huile - Huile Oil-in-water,emulsion - Oil öl-in-wasser-Emulsion - Erdöl
ACCIAIO LEGATO Cr Ni con Acier allié Cr Ni avec Cr Ni alloyed steel with Cr Ni-Legierter Stahl **1400 N/mm²**	6 ÷ 8	0,15	0,3	0,4	ACQUA EMULS. – OLIO Emulsion d'huile - Huile Oil-in-water,emulsion - Oil öl-in-wasser-Emulsion - Erdöl
OTTONE – BRONZO Laiton-Bronze Brass-Bronze Messing-Bronze	15 ÷ 30	0,2	0,4	0,6	ACQUA EMULS. – OLIO Emulsion d'huile - Huile Oil-in-water,emulsion - Oil öl-in-wasser-Emulsion - Erdöl
BRONZO DURO Bronze au manganèse Manganese Bronze Mangan Bronze	12 ÷ 25	0,15	0,3	0,5	ACQUA EMULS. – OLIO Emulsion d'huile - Huile Oil-in-water,emulsion - Oil öl-in-wasser-Emulsion - Erdöl
ALLUMINIO E SUE LEGHE Aluminium et alliages Aluminium and alloys Alu-Legierungen	15 ÷ 30	0,2	0,4	0,6	PETROLIO – ALCOOL Pétrole - alcool Petroleum - alcohol Erdöl - Alkohol
MATERIALI SINTETICI Matières synthétiques - Plastics Thermoplastische Kunststoffe	15 ÷ 30	0,2	0,4	0,6	A SECCO A sec - Without - Ohne

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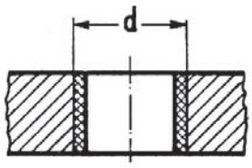
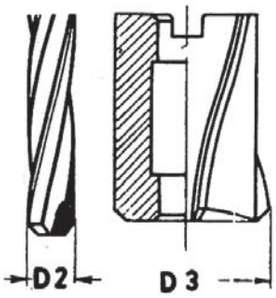
PREFORI PER ALLARGATURA ED ALESATURA

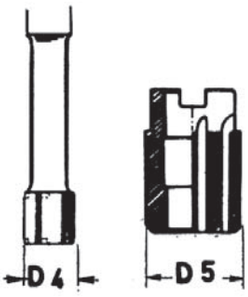
PRÉTROUS POUR ÉVASEMENT ET ALÉSAGE
TAPPING DRILLS FOR COUNTER BORING AND REAMING
KERNLOCHDURCHMESSER FÜR AUFBOHREN UND REIBEN

ESEMPI PER ESECUZIONE DI FORI H 7 - H 8 - E 9
Examples avec trous H7 - H8 - E9
Examples with H7 - H8 - E9 holes
Beispiele mit Bohrungen H7 - H8 - E9

LAVORAZIONE Usinage Working Bearbeitungsbeschreibung	FORATURA Perçage Drilling Bohren	ALLARGATURA Évasement Counterboring Aufbohren	ALESATURA Alésage Reaming Reiben







DIAMETRO NOMINALE Diamétre nominal Nominal diameter Nenndurchmesser d	TOLLERANZA Tolérance Tolerance Toleranz H7	H8	E9	D1	D2	D3	MATERIALE DA ASPORTARE Matière à emporter Material to remove Abtragungszugabe	D4	D5	MATERIALE DA ASPORTARE Matière à emporter Material to remove Abtragungszugabe
9	0	0	+ 0,025	7,5	8,8	–	1,3	9	–	0,2
10	+ 0,015	+ 0,022	+ 0,061	8,5	9,8	–		10	–	
11				9,5	10,8	–		11	–	
12				10,5	11,8	–		12		–
14	0	0	+ 0,032	12,5	13,8	–		14		–
15	+ 0,018	+ 0,027	+ 0,075	13,5	14,8	–	1,3	15	–	0,2
16				14,5	15,8	–		16		–
18				16,5	17,8	–		18		–
20				18	19,7	–	1,7	20		20
22				20	21,7	–		22		22
24	0	0	+ 0,040	21,5	23,7	–		24		24
25	+ 0,021	+ 0,033	+ 0,092	22,5	24,7	24,7	2,2	25	25	0,3
28				25,5	27,7	27,7		28		28
30				27,5	29,7	29,7		30		30
32				29	31,6	31,6		32		32
34				31	33,6	33,6		–		34
36				33	35,6	35,6		–		36
38	0	0	+ 0,050	35	37,6	37,6	2,6	–		38
40	+ 0,025	+ 0,039	+ 0,112	37	39,6	39,6		–		40
42				39	41,6	41,6		–		42
45				42	44,6	44,6		–		45
50				47	49,6	49,6		–		50
52				49	–	51,6	2,6	–	52	0,4
56				52	–	55,6		–		56
60				56	–	59,6		–		60
63	0	0	+ 0,060	59	–	62,6	3,6	–		63
68	+ 0,030	+ 0,046	+ 0,134	64	–	67,6		–		68
70				65	–	69,6		–		70
75				70	–	74,6	4,6	–		75
80				75	–	79,6		–		80

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TOLLERANZE RELATIVE ALLA COSTRUZIONE DI FRESE

TOLÉRANCES RELATIVES À LA CONSTRUCTION DE FRAISES
BUILDING TOLERANCES FOR MILLING CUTTERS
HERSTELLUNGS-TOLERANZEN FÜR FRÄSER

VALORI ESPRESSI IN MICRON
Valeurs en Micron
Values in Micron
Werte in µm. Ausgedrückt

Ø	h_8	h_{11}	k_{11}	k_{16}	f_8	e_8	d_9	j^s_{16}	s_{15}
1 ÷ 3	0 - 14	0 - 60	+ 60 0	+ 600 0	- 6 - 20	- 14 - 28	- 20 - 45	+ 300 - 300	+ 415 + 15
3 ÷ 6	0 - 18	0 - 75	+ 75 0	+ 750 0	- 10 - 28	- 20 - 38	- 30 - 60	+ 375 - 375	+ 499 + 19
6 ÷ 10	0 - 22	0 - 90	+ 90 0	+ 900 0	- 13 - 35	- 25 - 47	- 40 - 76	+ 450 - 450	+ 603 + 23
10 ÷ 18	0 - 27	0 - 110	+ 110 0	+ 1100 0	- 16 - 43	- 32 - 59	- 50 - 93	+ 550 - 550	+ 728 + 28
18 ÷ 30	0 - 33	0 - 130	+ 130 0	+ 1300 0	- 20 - 53	- 40 - 73	- 65 - 117	+ 650 - 650	+ 875 + 35
30 ÷ 50	0 - 39	0 - 160	+ 160 0	+ 1600 0	- 25 - 64	- 50 - 89	- 80 - 142	+ 800 - 800	+ 1043 + 43
50 ÷ 65	0 - 46	0 - 190	+ 190 0	+ 1900 0	- 30 - 76	- 60 - 106	- 100 - 174	+ 950 - 950	+ 1250 + 53
80 ÷ 100	0 - 54	0 - 220	+ 220 0	+ 2200 0	- 36 - 90	- 72 - 126	- 120 - 207	+ 110 - 1100	- -
100 ÷ 120	0 - 54	0 - 220	+ 220 0	+ 2200 0	- 36 - 90	- 72 - 126	- 120 - 207	+ 1100 - 1100	- -
120 ÷ 140	0 - 63	0 - 250	+ 250 0	+ 2500 0	- 43 - 106	- 85 - 148	- 145 - 245	+ 1250 - 1250	- -
140 ÷ 160	0 - 63	0 - 250	+ 250 0	+ 2500 0	- 43 - 106	- 85 - 148	- 145 - 245	+ 1250 - 1250	- -
160 ÷ 180	0 - 63	0 - 250	+ 250 0	+ 2500 0	- 43 - 106	- 85 - 148	- 145 - 245	+ 1250 - 1250	- -
180 ÷ 200	0 - 72	0 - 290	+ 290 0	+ 2900 0	- 52 - 122	- 100 - 172	- 170 - 285	+ 1450 - 1450	- -

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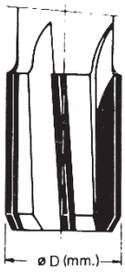
TOLLERANZE RELATIVE ALLA COSTRUZIONE DI ALESATORI

TOLÉRANCES RELATIVES À LA CONSTRUCTION D'ALÉSOIRS

BUILDING TOLERANCES FOR REAMERS

HERSTELLUNGS-TOLERANZEN FÜR REIBAHLEN

VALORI ESPRESSI IN MICRON
Valeurs en Micron
Values in Micron
Werte in µm. Ausgedrückt



Ø	A9	A11	B8	B9	B11	C8	C9	C11
1 ÷ 3	+ 291 + 282	+ 321 + 300	+ 151 + 146	+ 161 + 152	+ 191 + 170	+ 71 + 66	+ 81 + 72	+ 111 + 90
3 ÷ 6	+ 295 + 284	+ 333 + 306	+ 155 + 148	+ 165 + 154	+ 203 + 176	+ 85 + 78	+ 95 + 84	+ 133 + 106
6 ÷ 10	+ 310 + 297	+ 365 + 324	+ 168 + 160	+ 180 + 167	+ 226 + 194	+ 98 + 90	+ 110 + 97	+ 156 + 124
10 ÷ 18	+ 326 + 310	+ 383 + 344	+ 172 + 162	+ 186 + 170	+ 243 + 204	+ 117 + 107	+ 131 + 115	+ 188 + 149
18 ÷ 30	+ 344 + 325	+ 410 + 364	+ 188 + 176	+ 204 + 185	+ 270 + 224	+ 138 + 126	+ 154 + 135	+ 220 + 174
30 ÷ 40	+ 362 + 340	+ 446 + 390	+ 203 + 189	+ 222 + 200	+ 306 + 250	+ 153 + 139	+ 172 + 150	+ 256 + 200
40 ÷ 50	+ 372 + 350	+ 456 + 400	+ 215 + 199	+ 232 + 210	+ 316 + 260	+ 163 + 149	+ 182 + 160	+ 266 + 210
50 ÷ 65	+ 402 + 376	+ 501 + 434	+ 229 + 212	+ 252 + 226	+ 351 + 284	+ 179 + 162	+ 202 + 176	+ 301 + 234
65 ÷ 80	+ 422 + 396	+ 521 + 454	+ 239 + 222	+ 262 + 236	+ 361 + 294	+ 189 + 172	+ 212 + 186	+ 311 + 244
80 ÷ 100	+ 453 + 422	+ 567 + 490	+ 265 + 246	+ 293 + 262	+ 407 + 330	+ 215 + 196	+ 243 + 212	+ 357 + 280
100 ÷ 120	+ 483 + 452	+ 597 + 520	+ 283 + 266	+ 313 + 282	+ 427 + 350	+ 225 + 206	+ 253 + 222	+ 367 + 290
120 ÷ 140	+ 545 + 510	+ 672 + 584	+ 313 + 290	+ 345 + 310	+ 472 + 384	+ 253 + 230	+ 285 + 250	+ 412 + 324
140 ÷ 160	+ 605 + 570	+ 732 + 644	+ 333 + 310	+ 365 + 330	+ 492 + 404	+ 263 + 240	+ 295 + 260	+ 422 + 334
160 ÷ 180	+ 665 + 630	+ 792 + 704	+ 363 + 340	+ 395 + 360	+ 522 + 434	+ 283 + 260	+ 315 + 280	+ 442 + 354

Ø	D8	D9	D10	D11	E7	E8	E9	F6	F7	F8	F9	G6	G7	H6	H7	H8
1 ÷ 3	+ 31 + 26	+ 41 + 32	+ 54 + 40	+ 71 + 50	+ 22 + 18	+ 25 + 20	+ 35 + 26	+ 11 + 8	+ 14 + 10	+ 17 + 12	+ 27 + 18	+ 7 + 4	+ 10 + 6	+ 5 + 2	+ 8 + 4	+ 11 + 6
3 ÷ 6	+ 45 + 38	+ 55 + 44	+ 70 + 53	+ 93 + 66	+ 30 + 25	+ 35 + 28	+ 45 + 34	+ 16 + 13	+ 20 + 15	+ 25 + 18	+ 35 + 24	+ 10 + 7	+ 14 + 9	+ 6 + 3	+ 10 + 5	+ 15 + 8
6 ÷ 10	+ 58 + 50	+ 70 + 57	+ 89 + 68	+ 116 + 84	+ 37 + 31	+ 43 + 35	+ 55 + 42	+ 20 + 16	+ 25 + 19	+ 31 + 23	+ 43 + 30	+ 12 + 8	+ 17 + 11	+ 7 + 3	+ 12 + 6	+ 18 + 10
10 ÷ 18	+ 72 + 62	+ 86 + 70	+ 109 + 84	+ 143 + 104	+ 47 + 40	+ 54 + 44	+ 68 + 52	+ 25 + 21	+ 31 + 24	+ 38 + 28	+ 52 + 36	+ 15 + 11	+ 21 + 14	+ 9 + 5	+ 15 + 8	+ 22 + 12
18 ÷ 30	+ 93 + 81	+ 109 + 90	+ 136 + 106	+ 175 + 129	+ 57 + 49	+ 68 + 56	+ 84 + 65	+ 31 + 26	+ 37 + 29	+ 48 + 36	+ 64 + 45	+ 18 + 13	+ 24 + 16	+ 11 + 6	+ 17 + 9	+ 28 + 16
30 ÷ 50	+ 113 + 99	+ 132 + 110	+ 165 + 130	+ 216 + 160	+ 71 + 62	+ 83 + 69	+102 + 80	+ 38 + 32	+ 46 + 37	+ 58 + 44	+ 77 + 55	+ 22 + 16	+ 30 + 21	+ 13 + 7	+ 21 + 12	+ 33 + 19
50 ÷ 80	+ 139 + 122	+ 162 + 136	+ 202 + 160	+ 261 + 194	+ 85 + 74	+ 99 + 82	+122 + 96	+ 46 + 39	+ 55 + 44	+ 69 + 52	+ 92 + 66	+ 26 + 19	+ 35 + 24	+ 16 + 9	+ 25 + 14	+ 39 + 22
80 ÷ 120	+ 165 + 146	+ 193 + 162	+ 239 + 190	+ 307 + 230	+101 + 88	+ 117 + 98	+145 +114	+ 54 + 46	+ 65 + 52	+ 81 + 62	+109 + 78	+ 30 + 22	+ 41 + 28	+ 18 + 10	+ 29 + 16	+ 45 + 26
120 ÷ 180	+ 198 + 175	+ 230 + 195	+ 281 + 225	+ 357 + 269	+119 +105	+ 138 + 115	+170 +135	+ 64 + 55	+ 77 + 63	+ 96 + 73	+128 + 93	+ 35 + 26	+ 48 + 34	+ 21 + 12	+ 34 + 20	+ 53 + 30

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TOLLERANZE RELATIVE ALLA COSTRUZIONE DI ALESATORI

TOLÉRANCES RELATIVES À LA CONSTRUCTION D'ALÉSOIRS

BUILDING TOLERANCES FOR REAMERS

HERSTELLUNGS-TOLERANZEN FÜR REIBAHLEN

VALORI ESPRESSI IN MICRON
Valeurs en Micron
Values in Micron
Werte in µm. Ausgedrückt

Ø	H9	H10	H11	H12	J6	J7	J8	Js6	Js7	Js8	Js9	K6	K7	K8	M6	M7
1 ÷ 3	+ 21 + 12	+ 34 + 20	+ 51 + 30	+ 85 + 50	+ 1 - 2	+ 2 - 2	+ 3 - 2	+ 2 - 1	+ 3 - 1	+ 4 - 1	+ 8 - 1	- 1 - 4	- 2 - 6	- 3 - 8	- 3 - 6	- 4 - 8
3 ÷ 6	+ 25 + 14	+ 40 + 23	+ 63 + 36	+ 102 + 60	+ 3 0	+ 4 - 1	+ 7 0	+ 2 - 1	+ 4 - 1	+ 6 - 1	+ 10 - 1	0 - 3	+ 1 - 4	+ 2 - 5	- 3 - 6	- 2 - 7
6 ÷ 10	+ 30 + 17	+ 49 + 28	+ 76 + 44	+ 127 + 74	+ 3 - 1	+ 5 - 1	+ 8 0	+ 3 - 1	+ 5 - 1	+ 7 - 1	+ 12 - 1	0 - 4	+ 2 - 4	+ 2 - 6	- 5 - 9	- 3 - 9
10 ÷ 18	+ 36 + 20	+ 59 + 34	+ 93 + 54	+ 153 + 90	+ 4 0	+ 7 0	+ 10 0	+ 3 - 1	+ 6 - 1	+ 9 - 1	+ 15 - 1	0 - 4	+ 3 - 4	+ 3 - 7	- 6 - 10	- 3 - 10
18 ÷ 30	+ 44 + 25	+ 71 + 41	+ 110 + 64	+ 178 + 104	+ 6 + 1	+ 8 0	+ 15 + 3	+ 4 - 1	+ 7 - 1	+ 11 - 1	+ 18 - 1	0 - 5	+ 2 - 6	+ 5 - 7	- 6 - 11	- 4 - 12
30 ÷ 50	+ 52 + 30	+ 85 + 50	+ 136 + 80	+ 212 + 124	+ 7 + 1	+ 10 + 1	+ 18 + 4	+ 5 - 1	+ 8 - 1	+ 13 - 1	+ 21 - 1	0 - 6	+ 3 - 6	+ 6 - 8	- 7 - 13	- 4 - 13
50 ÷ 80	+ 62 + 36	+ 102 + 60	+ 161 + 94	+ 255 + 150	+ 10 + 3	+ 13 + 2	+ 21 + 4	+ 6 - 1	+ 10 - 1	+ 16 - 1	+ 25 - 1	+ 1 - 6	+ 4 - 7	+ 7 - 10	- 8 - 15	- 5 - 16
80 ÷ 120	+ 73 + 42	+ 119 + 70	+ 187 + 110	+ 297 + 174	+ 12 + 4	+ 16 + 3	+ 25 + 6	+ 7 - 1	+ 12 - 1	+ 18 - 1	+ 30 - 1	0 - 8	+ 4 - 9	+ 7 - 12	- 10 - 18	- 6 - 19
120 ÷ 180	+ 85 + 50	+ 136 + 80	+ 212 + 124	+ 340 + 200	+ 14 + 5	+ 20 + 6	+ 31 + 8	+ 8 - 1	+ 14 0	+ 22 - 1	+ 35 0	0 - 9	+ 6 - 8	+ 10 - 13	- 12 - 21	- 6 - 20

Ø	M8	N6	N7	N8	N9	N10	N11	P6	P7	R6	R7	S6	S7	T6	U6	U7
1 ÷ 3	- 5 - 10	- 5 - 8	- 6 - 10	- 7 - 12	- 8 - 17	- 10 - 24	- 13 - 34	- 7 - 10	- 8 - 12	- 11 - 14	- 12 - 16	- 15 - 18	- 16 - 20	- 19 - 22	- 19 - 22	- 20 - 24
3 ÷ 6	- 1 - 8	- 7 - 10	- 6 - 11	- 5 - 12	- 5 - 16	- 8 - 25	- 12 - 39	- 11 - 14	- 10 - 15	- 14 - 17	- 13 - 18	- 18 - 21	- 17 - 22	- 22 - 25	- 22 - 25	- 21 - 26
6 ÷ 10	- 3 - 11	- 9 - 13	- 7 - 13	- 7 - 15	- 6 - 19	- 9 - 30	- 14 - 46	- 14 - 18	- 12 - 18	- 18 - 22	- 16 - 22	- 22 - 26	- 20 - 26	- 27 - 31	- 27 - 31	- 25 - 31
10 ÷ 18	- 3 - 13	- 11 - 15	- 8 - 15	- 8 - 18	- 7 - 23	- 11 - 36	- 17 - 56	- 17 - 21	- 14 - 21	- 22 - 26	- 19 - 26	- 27 - 31	- 24 - 31	- 32 - 36	- 32 - 36	- 29 - 36
18 ÷ 24	- 1	- 13	- 11	- 8	- 8	- 13	- 20	- 20	- 18	- 26	- 24	- 33	- 31	- 39	- 39 - 44	- 37 - 45
24 ÷ 30	- 13	- 18	- 19	- 20	- 27	- 43	- 66	- 25	- 26	- 31	- 32	- 38	- 39	- 44	- 46 - 51	- 44 - 52
30 ÷ 40	- 1	- 15	- 12	- 9	- 10	- 15	- 24	- 24	- 21	- 32	- 29	- 41	- 38	- 46 - 52	- 58 - 64	- 55 - 64
40 ÷ 50	- 15	- 21	- 21	- 23	- 32	- 50	- 80	- 30	- 30	- 38	- 38	- 47	- 47	- 52 - 58	- 68 - 74	- 65 - 74
50 ÷ 65	- 2	- 17	- 14	- 11	- 12	- 18	- 29	- 29	- 26	- 38 - 45	- 35 - 46	- 50 - 57	- 47 - 58	- 63 - 70	- 84 - 91	- 81 - 92
65 ÷ 80	- 19	- 24	- 25	- 28	- 38	- 60	- 96	- 36	- 37	- 40 - 47	- 37 - 48	- 56 - 63	- 53 - 64	- 72 - 79	- 99 -106	- 96 -107
80 ÷ 100	- 3	- 20	- 16	- 13	- 14	- 21	- 33	- 34	- 30	- 48 - 56	- 44 - 57	- 68 - 76	- 64 - 77	- 88 - 96	-121 -129	-117 -130
100 ÷ 120	- 22	- 28	- 29	- 32	- 45	- 70	-110	- 42	- 43	- 51 - 59	- 47 - 60	- 76 - 84	- 72 - 85	-101 -109	-141 -149	-137 -150
120 ÷ 140										- 60 - 69	- 54 - 68	- 89 - 98	- 83 - 97	-119 -128	-167 -176	-161 -175
140 ÷ 160	- 2 - 25	- 24 - 33	- 18 - 32	- 14 - 37	- 15 - 50	- 24 - 80	- 38 -126	- 40 - 49	- 34 - 48	- 62 - 71	- 56 - 70	- 97 -106	- 91 -105	-131 -140	-187 -196	-181 -195
160 ÷ 180										- 65 - 74	- 59 - 73	-105 -114	- 99 -113	-143 -152	-207 -216	-201 -215

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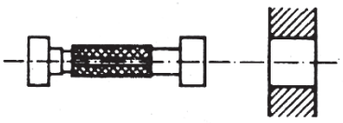
TOLLERANZE ISO - FORO BASE

TOLÉRANCES ISO POUR ALÉSAGE BASE

ISO-TOLERANCES FOR BASE HOLE

ISO-TOLERANZEN FÜR EINHEITSBOHRUNGEN

VALORI ESPRESSI IN MICRON
Valeurs en Micron
Values in Micron
Werte in µm. Ausgedrückt



GRUPPI DIMENSIONI mm Groupes-Dimensions Groups-Sizes Gruppen-Abmessungen		>1 ≤3		>3 ≤6		>6 ≤10		>10 ≤18		>18 ≤30		>30 ≤50		>50 ≤80		>80 ≤120		>120 ≤180	
6a QUALITÀ Qualité - Quality Sorte	G 6	+ 3	+ 10	+ 4	+ 12	+ 5	+ 14	+ 6	+ 17	+ 7	+ 20	+ 9	+ 25	+ 10	+ 29	+12	+ 34	+ 14	+ 39
	H 6	0	+ 7	0	+ 8	0	+ 9	0	+ 11	0	+ 13	0	+ 16	0	+ 19	0	+ 22	0	+ 25
	J 6	- 4	+ 3	- 4	+ 4	- 4	+ 5	- 5	+ 6	- 5	+ 8	- 6	+ 10	- 6	+ 13	- 6	+ 16	- 7	+ 18
	K 6	-	-	-	-	- 7	+ 2	- 9	+ 2	-11	+ 2	-13	+ 3	- 15	+ 4	-18	+ 4	- 21	+ 4
	M 6	- 7	0	- 9	- 1	-12	- 3	- 15	- 4	-17	- 4	-20	- 4	- 24	- 5	-28	- 6	- 33	- 8
	N 6	-11	- 4	- 13	- 5	- 16	- 7	- 20	- 9	-24	-11	-28	- 12	- 33	- 14	-38	- 16	- 45	- 20
7a QUALITÀ Qualité - Quality Sorte	E 7	+14	+ 23	+ 20	+ 32	+ 25	+ 40	+ 32	+ 50	+40	+ 61	+ 50	+ 75	+ 60	+ 90	+72	+107	+ 85	+ 125
	F 7	+ 7	+ 16	+ 10	+ 22	+ 13	+ 28	+ 16	+ 34	+20	+ 41	+ 25	+ 50	+ 30	+ 60	+36	+ 71	+ 43	+ 83
	G 7	+ 3	+ 12	+ 4	+ 16	+ 5	+ 20	+ 6	+ 24	+ 7	+ 28	+ 9	+ 34	+ 10	+ 40	+12	+ 47	+ 14	+ 54
	H 7	0	+ 9	0	+ 12	0	+ 15	0	+ 18	0	+ 21	0	+ 25	0	+ 30	0	+ 35	0	+ 40
	J 7	- 6	+ 3	- 7	+ 5	- 7	+ 8	- 8	+ 10	- 9	+ 12	-11	+ 14	- 12	+ 18	-13	+ 22	- 14	+ 26
	K 7	-	-	-	-	- 10	+ 5	- 12	+ 6	-15	+ 6	-18	+ 7	- 21	+ 9	-25	+ 10	- 28	+ 12
	M 7	- 9	0	- 12	0	- 15	0	- 18	0	-21	0	-25	0	- 30	0	-35	0	- 40	0
	N 7	-13	- 4	- 16	- 4	- 19	- 4	- 23	- 5	-28	- 7	-33	- 8	- 39	- 9	-45	- 10	- 52	- 12
	P 7	-16	- 7	- 20	- 8	- 24	- 9	- 29	- 11	-35	- 14	-42	- 17	- 51	- 21	-59	- 24	- 68	- 28
8a QUALITÀ Qualité - Quality Sorte	D 8	+20	+ 34	+ 30	+ 48	+ 40	+ 62	+ 50	+ 77	+65	+ 98	+ 80	+119	+100	+146	+120	+174	+145	+ 208
	E 8	+14	+ 28	+ 20	+ 38	+ 25	+ 47	+ 32	+ 59	+40	+ 73	+ 50	+ 89	+ 60	+106	+72	+126	+ 85	+ 148
	F 8	+ 7	+ 21	+ 10	+ 28	+ 13	+ 35	+ 16	+ 43	+20	+ 53	+ 25	+ 64	+ 30	+ 76	+36	+ 90	+ 43	+ 106
	H 8	0	+ 14	0	+ 18	0	+ 22	0	+ 27	0	+ 33	0	+ 39	0	+ 46	0	+ 54	0	+ 63
	J 8	- 7	+ 7	- 9	+ 9	- 10	+ 12	- 12	+ 15	-13	+ 20	-15	+ 24	- 18	+ 28	-20	+ 34	- 22	+ 41
	K 8	-	-	-	-	- 16	+ 6	- 19	+ 8	-23	+ 10	-27	+ 12	- 32	+ 14	-38	+ 16	- 43	+ 20
	M 8	-	-	-	-	- 21	+ 1	- 25	+ 2	-29	+ 4	-34	+ 5	- 41	+ 5	-48	+ 6	- 55	+ 8
	N 8	-15	- 1	- 20	- 2	- 25	- 3	- 30	- 3	-36	- 3	-42	- 3	- 50	- 4	-58	- 4	- 67	- 4
9a QUALITÀ Qualité - Quality Sorte	D 9	+20	+ 45	+ 30	+ 60	+ 40	+ 76	+ 50	+ 93	+65	+117	+ 80	+142	+100	+174	+120	+207	+145	+ 245
	E 9	+14	+ 39	+ 20	+ 50	+ 25	+ 61	+ 32	+ 75	+40	+ 92	+ 50	+112	+ 60	+134	+72	+159	+ 85	+ 185
	H 9	0	+ 25	0	+ 30	0	+ 36	0	+ 43	0	+ 52	0	+ 62	0	+ 74	0	+ 87	0	+ 100
	J 9	-13	+ 12	- 15	+ 15	- 18	+ 18	- 22	+ 21	-26	+ 26	-31	+ 31	- 37	+ 37	-44	+ 43	- 50	+ 50
10a QUALITÀ Qualité - Quality Sorte	D 10	+20	+ 60	+ 30	+ 78	+ 40	+ 98	+ 50	+120	+65	+149	+ 80	+180	+100	+220	+120	+260	+145	+ 305
	H 10	0	+ 40	0	+ 48	0	+ 58	0	+ 70	0	+ 84	0	+100	0	+120	0	+140	0	+ 160
	J 10	-20	+ 20	- 24	+ 24	- 29	+ 29	- 35	+ 35	-42	+ 42	-50	+ 50	- 60	+ 60	-70	+ 70	- 80	+ 80
11a QUALITÀ Qualité - Quality Sorte	D 11	+20	+ 80	+ 30	+105	+ 40	+130	+ 50	+160	+65	+195	+ 80	+240	+100	+290	+120	+340	+145	+ 395
	H 11	0	+ 60	0	+ 75	0	+ 90	0	+110	0	+130	0	+160	0	+190	0	+220	0	+ 250
	J 11	-30	+ 30	- 38	+ 37	- 45	+ 45	- 55	+ 55	-65	+ 65	-80	+ 80	- 95	+ 95	-110	+110	-125	+ 125

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TOLLERANZE ISO - ALBERO BASE

TOLÉRANCES ISO POUR ARBRE BASE

ISO-TOLERANCES FOR STANDARD SHAFT

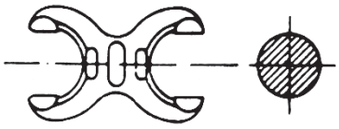
ISO-TOLERANZEN FÜR EINHEITSWELLEN

VALORI ESPRESSI IN MICRON

Valeurs en Micron

Values in Micron

Werte in µm. Ausgedrückt



GRUPPI DIMENSIONI mm Groupes-Dimensions Groups-Sizes Gruppen-Abmessungen		>1 ≤3		>3 ≤6		>6 ≤10		>10 ≤18		>18 ≤30		>30 ≤50		>50 ≤80		>80 ≤120		>120 ≤180	
5a QUALITÀ Qualité - Quality Sorte	g 5	- 3	- 8	- 4	- 9	- 5	- 11	- 6	- 14	- 7	- 16	- 9	- 20	- 10	- 23	-12	- 27	- 14	- 32
	h 5	0	- 5	0	- 5	0	- 6	0	- 8	0	- 9	0	- 11	0	- 13	0	- 15	0	- 18
	j 5	+ 4	- 1	+ 4	- 1	+ 4	- 2	+ 5	- 3	+ 5	- 4	+ 6	- 5	+ 6	- 7	+ 6	- 9	+ 7	- 11
	k 5	-	-	-	-	+ 7	+ 1	+ 9	+ 1	+11	+ 2	+13	+ 2	+15	+ 2	+18	+ 3	+ 21	+ 3
	m 5	+ 7	+ 2	+ 9	+ 4	+12	+ 6	+15	+ 7	+17	+ 8	+20	+ 9	+24	+11	+28	+13	+ 33	+ 15
	n 5	+11	+ 6	+13	+ 8	+16	+10	+20	+12	+24	+15	+28	+17	+33	+20	+38	+23	+ 45	+ 27
6a QUALITÀ Qualité - Quality Sorte	g 6	- 3	- 10	- 4	- 12	- 5	- 14	- 6	- 17	- 7	- 20	- 9	- 25	- 10	- 29	-12	- 34	- 14	- 39
	h 6	0	- 7	0	- 8	0	- 9	0	- 11	0	- 13	0	- 16	0	- 19	0	- 22	0	- 25
	j 6	+ 6	- 1	+ 7	- 1	+ 7	- 2	+ 8	- 3	+ 9	- 4	+11	- 5	+12	- 7	+13	- 9	+ 14	- 11
	k 6	-	-	-	-	+10	+ 1	+12	+ 1	+15	+ 2	+18	+ 2	+21	+ 2	+25	+ 3	+ 28	+ 3
	m 6	+ 9	+ 2	+12	+ 4	+15	+ 6	+18	+ 7	+21	+ 8	+25	+ 9	+30	+11	+35	+13	+ 40	+ 15
	n 6	+13	+ 6	+16	+ 8	+19	+10	+23	+12	+28	+15	+33	+17	+39	+20	+45	+23	+ 52	+ 27
	p 6	+16	+ 9	+20	+12	+24	+15	+29	+18	+35	+22	+42	+26	+51	+32	+59	+37	+ 68	+ 43
7a QUALITÀ Qualité - Quality Sorte	e 7	-14	- 23	- 20	- 32	- 25	- 40	- 32	- 50	- 40	- 61	- 50	- 75	- 60	- 90	-72	-107	- 85	- 125
	f 7	- 7	- 16	- 10	- 22	- 13	- 28	- 16	- 34	- 20	- 41	- 25	- 50	- 30	- 60	-36	- 71	- 43	- 83
	h 7	0	- 9	0	- 12	0	- 15	0	- 18	0	- 21	0	- 25	0	- 30	0	- 35	0	- 40
	j 7	+ 7	- 2	+ 9	- 3	+10	- 5	+12	- 6	+13	- 8	+15	- 10	+18	- 12	+20	- 15	+ 22	- 18
	k 7	-	-	-	-	+16	+ 1	+19	+ 1	+23	+ 2	+27	+ 2	+32	+ 2	+38	+ 3	+ 43	+ 3
	m 7	-	-	-	-	+21	+ 6	+25	+ 7	+29	+ 8	+34	+ 9	+41	+11	+48	+13	+ 55	+ 15
	n 7	+15	+ 6	+20	+ 8	+25	+10	+30	+12	+36	+15	+42	+17	+50	+20	+58	+23	+ 67	+ 27
8a QUALITÀ Qualité - Quality Sorte	d 8	-20	- 34	- 30	- 48	- 40	- 62	- 50	- 77	- 65	- 93	- 80	-119	-100	-146	-120	-174	-145	- 208
	e 8	-14	- 28	- 20	- 38	- 25	- 47	- 32	- 59	- 40	- 73	- 50	- 89	- 60	-106	-72	-126	- 85	- 148
	f 8	- 7	- 21	- 10	- 28	- 13	- 35	- 16	- 43	- 20	- 53	- 25	- 64	- 30	- 76	-36	- 90	- 43	- 106
	h 8	0	- 14	0	- 18	0	- 22	0	- 27	0	- 33	0	- 39	0	- 46	0	- 54	0	- 63
	j 8	+ 7	- 7	+ 9	- 9	+11	- 11	+14	- 13	+17	- 16	+20	- 19	+23	- 23	+27	- 27	+ 32	- 31
	k 8	+14	0	+18	0	+22	0	+27	0	+33	0	+39	0	+46	0	+54	0	+ 63	0
9a QUALITÀ Qualité - Quality Sorte	d 9	-20	- 45	- 30	- 60	- 40	- 76	- 50	- 93	- 65	-117	- 80	-142	-100	-174	-120	-207	-145	- 245
	e 9	-14	- 39	- 20	- 50	- 25	- 61	- 32	- 75	- 40	- 92	- 50	-112	- 60	-134	-72	-159	- 85	- 185
	h 9	0	- 25	0	- 30	0	- 36	0	- 43	0	- 52	0	- 62	0	- 74	0	- 87	0	- 100
	j 9	+13	- 12	+15	- 15	+18	- 18	+22	- 21	+26	- 26	+31	- 31	+37	- 37	+44	- 43	+ 50	- 50
	k 9	+25	0	+30	0	+36	0	+43	0	+52	0	+62	0	+74	0	+87	0	+100	0
10a QUALITÀ Qualité - Quality Sorte	d 10	-20	- 60	- 30	- 78	- 40	- 98	- 50	-120	- 65	-149	- 80	-180	-100	-220	-120	-260	-145	- 305
	h 10	0	- 40	0	- 48	0	- 58	0	- 70	0	- 84	0	-100	0	-120	0	-140	0	- 160
	j 10	+20	- 20	+24	- 24	+29	- 29	+35	- 35	+42	- 42	+50	- 50	+60	- 60	+70	- 70	+ 80	- 80
	k 10	+40	0	+48	0	+58	0	+70	0	+84	0	+100	0	+120	0	+140	0	+160	0
11a QUALITÀ Qualité - Quality Sorte	d 11	-20	- 80	- 30	-105	- 40	-130	- 50	-160	- 65	-195	- 80	-240	-100	-290	-120	-340	-145	- 395
	h 11	0	- 60	0	- 75	0	- 90	0	-110	0	-130	0	-160	0	-190	0	-220	0	- 250
	j 11	+30	- 30	+38	- 37	+45	- 45	+55	- 55	+65	- 65	+80	- 80	+95	- 95	+110	-110	+125	- 125
	k 11	+60	0	+75	0	+90	0	+110	0	+130	0	+160	0	+190	0	+220	0	+250	0

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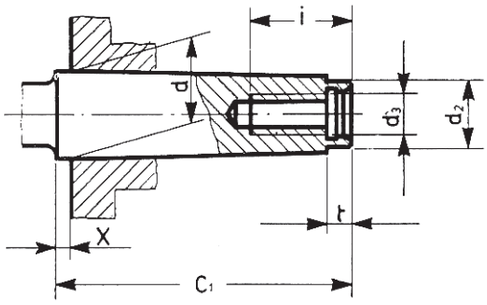
ATTACCHI CONO MORSE DIN 228 - UNI 521

QUEUES CÔNE MORSE
MORSE TAPER SHANKS
MORSEKEGEL SCHÄFTE

UNI 521 - CODOLO CON FORO FILETTATO - TIPO A
Queue avec trou fileté Type A
Shank with threaded hole Type A
Morsekegel mit Innengewinde Ausführung A



DESIGNAZIONE Désignation Designation Bezeichnung					CONICITÀ Conicité Taper Kegeligkeit		CODOLO CON LORO FILETTATO Queue avec trou fileté Shank with threaded hole Morsekegel mit Innengewinde				
TIPO Type - Type Ausführung		CODOLO Queue - Shank Schaft	d mm	x mm	p%	1 : K	c_1 mm	d_2 mm	d_3 mm	i mm	t mm
A	–	Metrico 4 Métrique - Metric - Metrish	4	2	5	1 : 20	25	2,5	–	–	2
A	–	Metrico 6 Métrique - Metric - Metrish	6	3			35	4	–	–	3
A	–	Morse 0	9.045	3	5.250	1 : 19.212	53	6	–	–	4
A	B	Morse 1	12.065	3,5	4.988	1 : 20.047	57	9	M 6	16	5
A	B	Morse 2	17.780	5	4.995	1 : 20.020	69	14	M 10	24	5
A	B	Morse 3	23.825	5	5.020	1 : 19.922	86	19	M 12	28	7
A	B	Morse 4	31.267	6,5	5.194	1 : 19.254	109	25	M 16	32	9
A	B	Morse 5	44.399	6,5	5.263	1 : 19.002	136	35,7	M 20	40	10
A	B	Morse 6	63.348	8	5.214	1 : 19.180	190	51	M 24	50	16
A	B	Metrico 80 Métrique - Metric - Metrish	80				204	67	M 30	65	24
A	B	Metrico 100 Métrique - Metric - Metrish	100	10			242	85	M 36	80	30
A	B	Metrico 120 Métrique - Metric - Metrish	120	12	5	1 : 20	280	102	M 36	80	36
A	B	Metrico 160 Métrique - Metric - Metrish	160	16			356	138	M 48	100	48
A	B	Metrico 200 Métrique - Metric - Metrish	200	20			432	174	M 48	100	60

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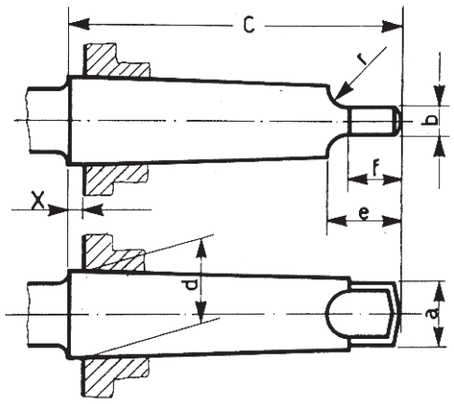
ATTACCHI CONO MORSE DIN 228 - UNI 521

QUEUES CÔNE MORSE
MORSE TAPER SHANKS
MORSEKEGEL SCHÄFTE

UNI 521 - CODOLO CON FORO FILETTATO - TIPO A
Queue avec trou fileté Type A
Shank with threaded hole Type A
Morsekegel mit Innengewinde Ausführung A



DESIGNAZIONE Désignation Designation Bezeichnung					CONICITÀ Conicité Taper Kegeligkeit		CODOLO CON LORO FILETTATO Queue avec trou fileté Shank with threaded hole Morsekegel mit Innengewinde					
TIPO Type - Type Ausführung		CODOLO Queue - Shank Schaft	d mm	x mm	p%	1 : K	c mm	f mm	a mm	b mm	e mm	r mm
A	–	Metrico 4 Métrique - Metric - Metrish	4	2	5	1 : 20	–	–	–	–	–	–
A	–	Metrico 6 Métrique - Metric - Metrish	6	3			–	–	–	–	–	–
A	–	Morse 0	9.045	3	5.250	1 : 19.212	59,5	6,5	6	3,9	10,5	4
A	B	Morse 1	12.065	3,5	4.988	1 : 20.047	65,5	8,5	8,7	5,2	13,5	5
A	B	Morse 2	17.780	5	4.995	1 : 20.020	80	10	13,5	6,3	16	6
A	B	Morse 3	23.825	5	5.020	1 : 19.922	99	13	18,5	7,9	20	7
A	B	Morse 4	31.267	6,5	5.194	1 : 19.254	124	16	24,5	11,9	24	8
A	B	Morse 5	44.399	6,5	5.263	1 : 19.002	156	19	35,7	15,9	29	10
A	B	Morse 6	63.348	8	5.214	1 : 19.180	218	27	51	19	40	13
A	B	Metrico 80 Métrique - Metric - Metrish	80				228	24	67	26	48	24
A	B	Metrico 100 Métrique - Metric - Metrish	100	10			270	28	85	32	58	30
A	B	Metrico 120 Métrique - Metric - Metrish	120	12	5	1 : 20	312	32	102	38	68	36
A	B	Metrico 160 Métrique - Metric - Metrish	160	16			396	40	138	50	88	48
A	B	Metrico 200 Métrique - Metric - Metrish	200	20			480	48	174	62	108	60

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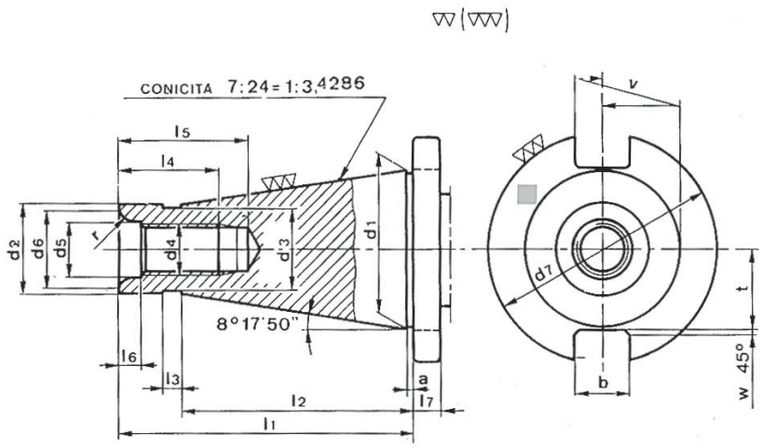
ATTACCHI PER FRESE CONO ISO DIN 2080

CÔNE ISO POUR FRAISES

ISO-TAPER FOR END MILLS

ISO-STEIKEGEL FÜR SCHAFTFRÄSER



CONO ISO Cône ISO ISO Taper ISO-Steikegel		30	40	45	50	55	60
a	± 0,2	1,6	1,6	3,2	3,2	3,2	3,2
b	H12	16,1	16,1	19,3	25,7	25,7	25,7
d_1		31,75	44,45	57,15	69,85	88,9	107,95
	a10	17,4	25,3	32,4	39,6	50,4	60,2
d_2	max.	17,11	25,00	32,09	39,29	50,06	59,86
	min.	17,04	24,92	31,99	39,19	49,94	59,74
d_3		16,5	24	30	38	48	58
d_4		M 12	M 16	M 20	M 24	M 24	M 30
d_5		13	17	21	26	26	32
d_6		15,5	21	26	31	31	42
d_7	0 0,4	50	63	80	97,5	130	156
l_1		70	95	110	130	168	210
l_2		50	67	86	105	130	165
l_3		3	5	6	8	9	10
l_4		24	32	40	47	47	59
l_5	min.	33,5	42,5	52,5	61,5	61,5	76
l_6	0 + 0,5	5,5	8,2	10	11,5	11,5	14
l_7	± 0,15	8	10	12	12	14	16
t	max	16,2	22,5	29	35,3	45	60
r		3	4	6	6	6	8
v		0,06	0,06	0,1	0,1	0,1	0,1
w		1,6	1,6	1,6	2	2	2

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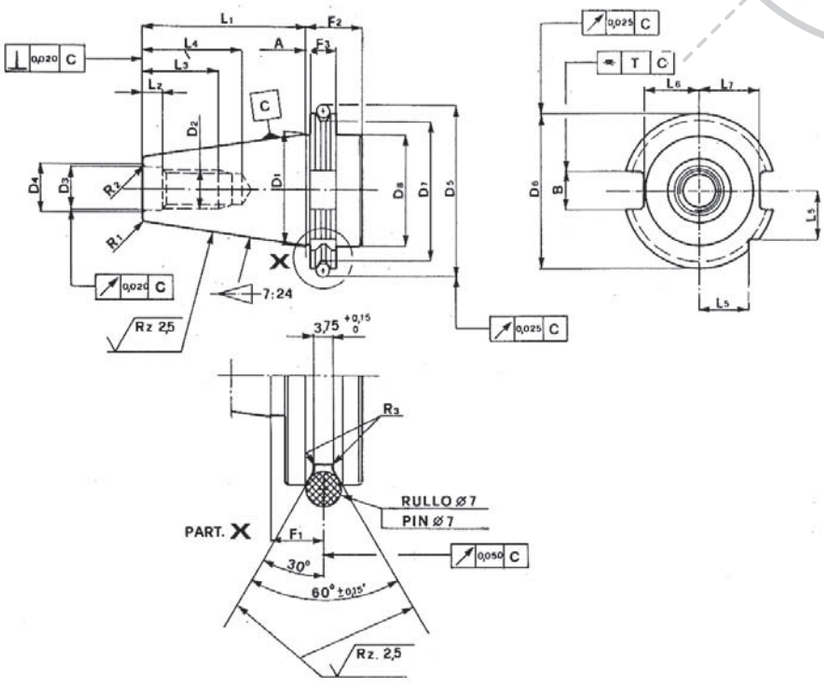
ATTACCO PER FRESE CONO ISO DIN 69871 A

CÔNE ISO POUR FRAISES

ISO-TAPER FOR END MILLS

ISO-STEIKEGEL FÜR SCHAFTFRÄSER



CONO ISO Cône ISO ISO Taper ISO-Steikegel		40	45	50
A	± 0,1		3,2	
B	H12	16,1	19,3	25,7
D_1		44,5	57,15	69,85
D_2		M 16	M 20	M 24
D_3	H7	17	21	25
D_4	max	19	23,4	28
D_5	± 0,05	72,3	91,35	107,25
D_6	0 - 0,1	63,55	82,55	97,50
D_7	0 - 0,5	56,25	75,25	91,25
D_8	max	50	63	80
F_8	± 0,1		11,1	

CONO ISO Cône ISO ISO Taper ISO-Steikegel		40	45	50
F_2	min.		35	
F_3	0 - 0,1		15,9	
L_1	0 - 0,3	68,4	10	11,5
L_2	+ 0,5 0	8,2	10	11,5
L_3	min.	32	40	47
L_4	min.	42,5	52,5	61,5
L_5	0 - 0,3	18,5	24	30
L_7	0 - 0,4	22,8	29,1	35,5
R_1	0 - 0,5	1,2	2	2,5
R_2	0 - 0,5	1	1,2	1,5
T		0,12	0,12	0,20

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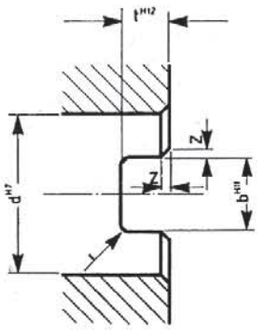
ATTACCO PER FRESE UNI 3809 (DIN 138) con dente frontale di trascinamento

QUEUE POUR FRAISES UNI-3809 (DIN 138) AVEC TENON D'ENTRAÎNEMENT FRONTAL

SHANK FOR MILLS UNI 3809 (DIN 138) WITH TANG DRIVE

FRÄSERSCHAFT GEMÄSS UNI 3809 (DIN 138) MIT QUERNUT



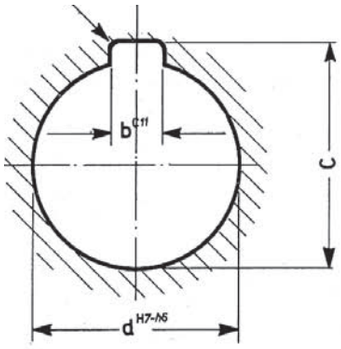
d mm	b mm	t mm	r mm	z mm
5	-	-	-	-
8	5,4	4	0,6	0,4
10	6,4	4,5	0,8	0,5
13	8,4	5	1	0,5
16	8,4	5,6	1	0,6
19	10,4	6,3	1,2	0,6
22	10,4	6,3	1,2	0,6
27	12,4	7	1,2	0,8
32	14,4	8	1,6	0,8
40	16,4	9	2	1
50	18,4	10	2	1
60	20,5	11,2	2	1

ATTACCO PER FRESE UNI 3810 (DIN 138) con cava di trascinamento longitudinale

QUEUE POUR FRAISES UNI 3810 (DIN 138) AVEC RAINURE D'ENTRAÎNEMENT LONGITUDINAL

SHANK FOR MILLS UNI 3810 (DIN 138) WITH LONGITUDINAL KEYWAY

FRÄSERSCHAFT GEMÄSS UNI 3810 (DIN 138) MIT LANGSMITNAHMENUT



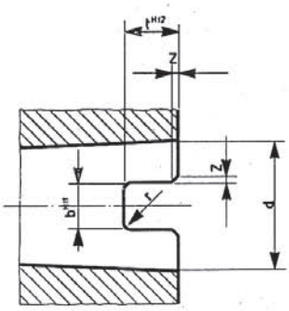
d mm	c mm	Tolleranza su c Tolérance sur C Tolerance on C Toleranz auf C	b mm	r mm
13	14,6	0 + 0,1	3	0,6
16	17,7	0 + 0,1	4	0,6
22	24,1	0 + 0,2	6	1
27	29,8	0 + 0,2	7	1,2
32	34,8	0 + 0,2	8	1,2
40	43,5	0 + 0,2	10	1,6
50	53,5	0 + 0,2	12	1,6
60	64,25	0 + 0,2	14	1,6
70	75	0 + 0,2	16	2
80	85,5	0 + 0,2	18	2
100	107	0 + 0,2	24	2,5

ATTACCO PER ALESATORI UNI 440 (DIN 138) foro conico 1 : 30

QUEUE POUR ALÉSOIR UNI 440 (DIN 138) ALÉSAGE CONIQUE 1 : 30

SHANK FOR REAMERS UNI 440 (DIN 138) TAPER HOLE 1: 30

REIBAHLESCHAFT GEMÄSS UNI 440 (DIN 138) KEGELBOHRUNG 1 : 30



d mm	b mm	t mm
8	3,3	4
10	4,3	5,6
13	4,3	5,6
16	5,4	6,6
19	6,4	8,2
22	7,4	9,2
27	8,4	10,3
32	10,4	11,8
40	12,4	13

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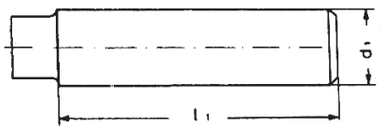
ATTACCHI CILINDRICI PER FRESE

QUEUES CYLINDRIQUES POOR FRAISES

CYLINDRICAL SHANKS FOR MILLING CUTTERS

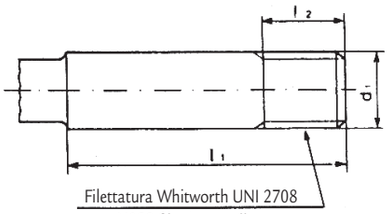
ZYLINDERSCHÄFTE FÜR FRÄSER

UNI 7738 A DIN 1835 A



d1 h8	l1 ±1	d1 h8	l1 ±1	d1 h8	l1 ±1
4	28	10	40	32	60
5	28	12	45	40	70
6	36	16	48	50	80
8	36	20	50	63	90
		25	56		

UNI 7738 B



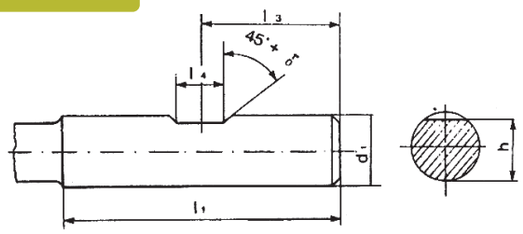
d1 h8	l1 =	l2 ±1	d1 h8	l1 =	l2 ±1
6	36	10	16	48	10
8	36	10	20	50	15
10	40	10	25	56	15
12	45	10	32	60	15

Filétage Whitworth — N° 20 Filéts au pouce

Whitworth thread — N. 20 threads per inch

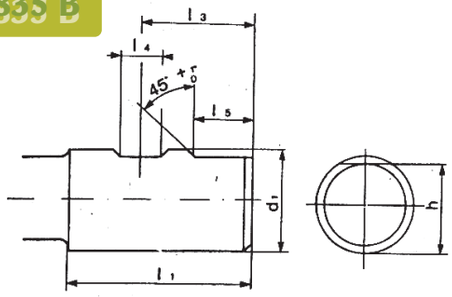
Whitworth-Gewinde — Nr. 20 Gänge auf 1 Zoll

UNI 7738 C DIN 1835 B



d1 h6	l1 ±1	l3 ±0,5	l4 +0,05/0	h 0/-0,4
6	36	18	4,2	4,8
8	36	18	5,5	6,6
10	40	20	7	8,4
12	45	22,5	8	10,4
16	48	24	10	14,2
20	50	25	11	18,2

UNI 7738 D DIN 1835 B



d1 h6	l1 ±1	l3 ±0,5	l4 +0,05/0	l5 +1/0	h 0/-0,4
25	56	32	12	17	23
32	60	36	14	19	30
40	70	40	14	19	38
50	80	45	18	23	47,8
63	90	50	18	23	60,8

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TABELLA DI CONVERSIONE: POLLICI-MILLIMETRI

TABELLA DE CONVERSION: POUCES-MILLIMÉTRES
CONVERSION CHART: INCHES-MILLIMETERS
UMRECHNUNG VON ZOLL IN MILLIMETER

FRAZIONI DI POLLICE Franctions de pouce Inch fractions Zollbruch	DEC. DI POLL. Décimals de pouce Inch decimal Zoldezimal	MILLIMETRI Milimétres Millimerters Milimeter
1/64	.0156	0.3969
1/32	.0312	0.7938
3/64	.0469	1.1906
1/16	.0625	1.5875
5/64	.0781	1.9844
3/32	.0937	2.3813
7/64	.1094	2.7781
1/8	.1250	3.1750
9/64	.1406	3.5719
5/32	.1562	3.9688
11/64	.1719	4.3656
3/16	.1875	4.7625
13/64	.2031	5.1594
7/32	.2187	5.5563
15/64	.2344	5.9531
1/4	.2500	6.3500
17/64	.2656	6.7469
9/32	.2812	7.1438
19/64	.2969	7.5406
5/16	.3125	7.9375
21/64	.3281	8.3344
11/32	.3437	8.7313
23/64	.3594	9.1281
3/8	.3750	9.5250
25/64	.3906	9.9219
13/32	.4062	10.3188
27/64	.4219	10.7156
7/16	.4375	11.1125
29/64	.4531	11.5094
15/32	.4687	11.9063
31/64	.4844	12.3031
1/2	.5000	12.7000

FRAZIONI DI POLLICE Franctions de pouce Inch fractions Zollbruch	DEC. DI POLL. Décimals de pouce Inch decimal Zoldezimal	MILLIMETRI Milimétres Millimerters Milimeter
33/64	.5156	13.0969
17/32	.5312	13.4938
35/64	.5469	13.8906
9/16	.5625	14.2875
37/64	.5781	14.6844
19/32	.5937	15.0813
39/64	.6094	15.4782
5/8	.6250	15.8750
41/64	.6406	16.2719
21/32	.6562	16.6688
43/64	.6719	17.0657
11/16	.6875	17.4625
45/64	.7031	17.8594
23/32	.7187	18.2563
47/64	.7344	18.6532
3/4	.7500	19.0500
49/64	.7645	19.4469
25/32	.7812	19.8438
51/64	.7969	20.2407
13/16	.8125	20.6375
53/64	.8281	21.0344
27/32	.8437	21.4313
55/64	.8594	21.8282
7/8	.8750	22.2250
57/64	.8906	22.6219
29/32	.9062	23.0188
59/64	.9219	23.4157
15/16	.9375	23.8125
61/64	.9531	24.2094
31/32	.9687	24.6063
63/64	.9844	25.0032
1	1.0000	25.4000

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TABELLA COMPARATIVA DELLE DUREZZE

TABELLE COMPARATIVE DES DURETÉS
HARDNESSES COMPATATIVE CHART
VERGLEICHENDE HÄRTETABELLE

B Acciaio Acier - Steel - Stahl Kg./mm²	Vickers HV	Brinell HB	Rockwell HRC	Shore " C "
70	200		19.2	28
74	210		21.2	29
77	220		23.0	30
81	230		24.7	31
84	240		26.1	33
88	250		27.6	34
91	260		29.0	35
95	270		30.3	36
98	280		31.5	37
102	290		32.9	39
105	300		33.8	40
109	310		34.9	41
112	320		36.0	42
115	330		37.0	43
119	340		38.0	44
123	350		38.9	45
126	360	359	39.8	46
130	370	368	40.7	47
133	380	373	41.5	48
137	390	385	42.3	49
140	400	393	43.2	50
144	410	400	44.0	51
147	420	407	44.8	52
151	430	416	45.5	53
154	440	423	46.3	54
158	450	429	47.0	55
161	460	435	47.7	56
165	470	441	48.3	57
168	480	450	49.0	58
172	490	457	49.6	59
175	500	465	50.3	60
179	510	474	50.9	61
182	520	482	51.5	62
186	530	489	52.1	63
189	540	496	52.7	64
193	550	503		65
196	560	511		66
200	570	520		67

B Acciaio Acier - Steel - Stahl Kg./mm²	Vickers HV	Brinell HB	Rockwell HRC	Shore " C "
203	580	527	53.3	68
207	590	533	53.8	69
210	600	533	54.4	70
214	610	543	54.9	71
217	620	549	55.4	72
221	630	555	55.9	73
224	640	561	56.4	74
228	650	568	56.9	75
231	660	574	57.4	75
235	670	581	57.9	76
238	680	588	58.7	77
241	690	595	58.9	78
245	700	602	59.3	79
248	710	609	59.8	80
252	720	616	60.2	81
255	730	622	60.7	82
259	740	627	61.1	83
263	750	633	61.5	83
266	760	639	61.9	84
270	770	644	62.3	85
273	780	650	62.7	86
277	790	656	63.1	86
280	800	661	63.5	87
284	810	666	63.9	87
287	820	670	64.3	88
291	830	677	64.6	89
294	840	682	65.0	89
298	850		65.3	90
301	860		65.7	90
305	870		66.0	91
308	880		66.3	91
312	890		66.6	92
315	900		66.9	92
319	910		67.2	
322	920		67.5	
326	930		67.7	
329	940		68.0	

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EVITATE QUESTI INCONVENIENTI PER LA MIGLIORE RESA DEI NOSTRI UTENSILI

PREVENT THESE PROBLEM TO ACHIEVE AN IMPROVED EFFICIENCY OF OUR TOOLS

RAFFREDDAMENTO

Per evitare una facile incrinatura dei taglienti in metallo duro non bisogna assolutamente versare liquidi su frese surriscaldate.
La refrigerazione deve essere abbondante e continua in modo che l'utensile non raggiunga un calore eccessivo.
è consigliabile, qualora le condizioni lo permettano, di usare sempre nella lavorazione di acciaio in buon refrigerante in modo da aumentare la durata di taglio tra una affilatura e l'altra.
Quanto sopra non è indispensabile nella lavorazione di ghisa ed altri materiali a truciolo corto.

COOLING

To avoid easy crackings of hard-metal cutting edges, never pour any fluids on overheated mills.
There should be a steady and extensive coolin to prevent the tool from reaching too high temperatures.
Whenever possible, it is advisable to use a good-quality coolant when machining steel in order to extend the cutting edge life between one grinding operation and the subsequent one.
The above precautions are not required when machining cast iron or other materials that produce short chips.

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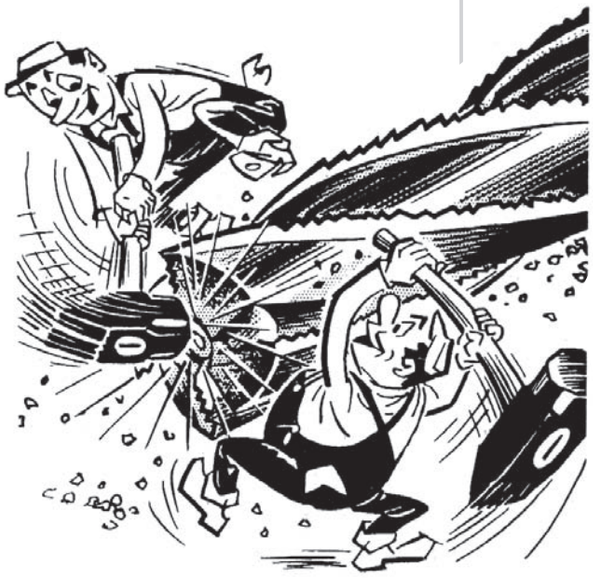
EVITATE QUESTI INCONVENIENTI PER LA MIGLIORE RESA DEI NOSTRI UTENSILI

PREVENT THESE PROBLEM TO ACHIEVE AN IMPROVED EFFICIENCY OF OUR TOOLS



SCHEGGIATURA

Questo inconveniente è in massima parte dovuto a vibrazioni della fresa, oppure a vibrazioni del pezzo che si lavora.

Per eliminare questa causa si deve controllare il mandrino della macchina, lo staffaggio del pezzo sul bancale, ed eventualmente se la fresa o il mandrino non lavorano con eccessivo sbalzo.

Controllare anche l'avanzamento, poichè se fosse troppo forte è causa della scheggiatura.

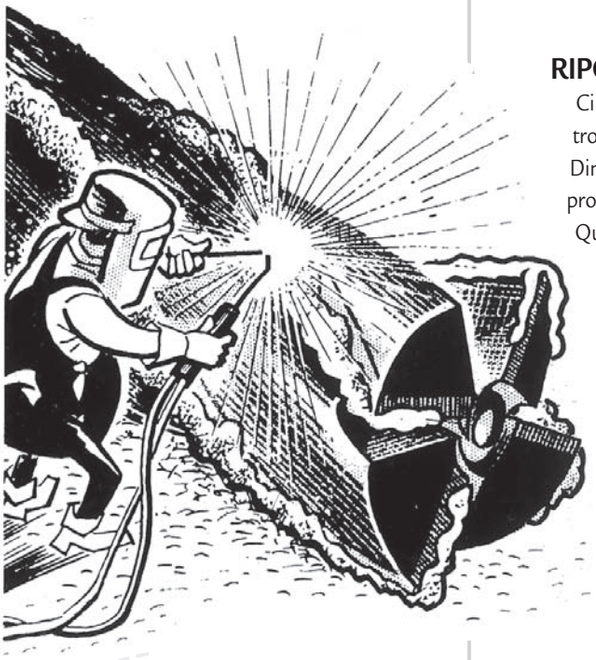
SPLINTERING

This problem is mostly due to vibrations of the mill or of the workpiece.

To remove the causes, inspect the machine spindle and the workpiece clamping on the bench.

If necessary, check if the mill or the spindle move too violently.

The feed should also be checked since if it is excessive it may cause the splintering, too.



RIPORTO DI MATERIALE

Ci si può trovare di fronte a questo inconveniente per velocità della fresa troppo bassa, unito ad un forte avanzamento per dente.

Diminuire quindi l'avanzamento, o aumentare la velocità, e se possibile provvedere con una buona refrigerazione.

Qualora la causa non si elimini devono essere verificati gli angoli di spoglia della fresa, i quali possono essere insufficienti.

BUILT-UP MATERIAL

This problem may be caused by too low speeds of the mill combined with a high feed per tooth.

Consequently, reduce the feed or increase the speed and if possible, perform adequate cooling.

Should the problem continue, check the mill rake angles since these may be too short.

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EVITATE QUESTI INCONVENIENTI PER LA MIGLIORE RESA DEI NOSTRI UTENSILI

PREVENT THESE PROBLEM TO ACHIEVE AN IMPROVED EFFICIENCY OF OUR TOOLS

ABRASIONE

Questo tipo di usura del tagliente della fresa si presenta prevalentemente nella lavorazione di materiali altamente abrasivi, quali ghisa o acciai al silicio.
In questo tipo di lavorazione è quindi indispensabile trovare un giusto rapporto tra avanzamento e velocità di taglio.
Altre cause di una abrasione rapida del tagliente possono essere: un troppo basso valore di avanzamento per dente; una eccessiva velocità di rotazione della fresa.

ABRASION

This type of wear of the mill cutting edge mainly occure when machining highly abrasive materials such as cast iron or silicon steel.
In this kind of machining it is therefore essential to find the right ratio between cutting speed and feed.
Further causes of a rapid abrasion of the cutting edge may be too low feed values per tooth and too high revolving speeda of the mill.

SURRISCALDAMENTO

Si deve fare attenzione a quanto sopra, perché questa causa provoca il rapido deterioramento del filo di taglio della fresa.
Generalmente il surriscaldamento avviene per eccessiva velocità di rotazione dell'utensile.
Occorre provvedere, quindi, alla diminuzione della velocità di taglio.

OVERHEATING

Special attention should be devoted to this problem since overheating causes a rapid deterioration of the mill cutting edge.
This is generally due to an excessive revolving speed of the tool.
The cutting speed should therefore be reduced in order to eliminate the problem.

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EVITATE QUESTI INCONVENIENTI PER LA MIGLIORE RESA DEI NOSTRI UTENSILI

PREVENT THESE PROBLEM TO ACHIEVE AN IMPROVED EFFICIENCY OF OUR TOOLS

CRATERIZZAZIONE

Tale difetto che provoca un sensibile indebolimento del tagliente è generalmente da imputare ad una eccessiva velocità di taglio oppure all'uso di un grado di metallo duro non idoneo al materiale che si lavora.

Modificare quindi le velocità e passare eventualmente ad un grado maggiore di metallo duro.

CRATERING

This defect leads to a considerable weakening of the cutting edge and is usually due to an excessive cutting speed or to the use of a type of hard metal which is not suitable for the material being machined.

The speeds should therefore be modified and if necessary, hard metal of a higher degree should be used.

INTASAMENTO

Problema che si verifica in occasione di eccessivo avanzamento e profondità di passata. Ridurre quindi queste condizioni di lavoro, oppure procedere con frese a basso numero di taglienti.

Può anche essere appropriato un efficiente sistema di aria compressa per l'espulsione dei trucioli, oppure un'abbondante refrigerazione.

CLOGGING

A problem caused by an excessive feed and cutting depth.

Reduce these working conditions or use mills having a low number of cutting edges. An efficient compressed-air system for shavings ejection or extensive cooling can also help to solve this problem.

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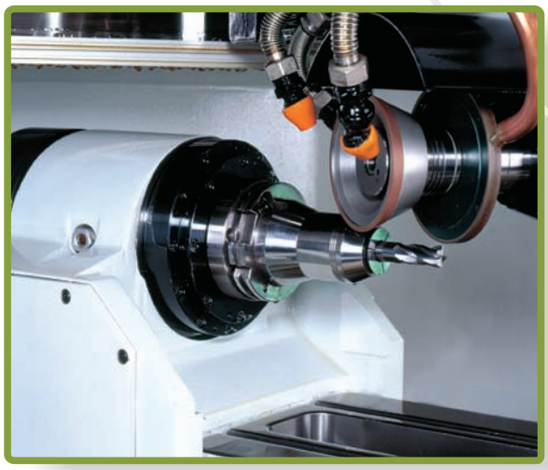
EVITATE QUESTI INCONVENIENTI PER LA MIGLIORE RESA DEI NOSTRI UTENSILI

PREVENT THESE PROBLEM TO ACHIEVE AN IMPROVED EFFICIENCY OF OUR TOOLS

LA PROGETTAZIONE
THE PROJECTING

LA PRODUZIONE
THE PRODUCTION



IL CONTROLLO
THE CONTROL

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CONDIZIONI GENERALI DI VENDITA

1) La (presente) proposta è ferma e irrevocabile da parte nostra, sino alla accettazione o al suo rifiuto da parte della A. Ghezzi & C. S.p.A.
Ove questa ritenga di accettarla, essa potrà a sua scelta, darne comunicazione espilicita mediante conferma d'ordine oppure dare diretta esecuzione alla presente.
In tale secondo caso la consegna della merce al vettore o allo spedizioniere rappresenterà "inizio di esecuzione" (art. 1327 Cod. Civ.) ed il contratto si avrà per concluso fra le parti alle condizioni tutte di cui alla presente.

2) L'eventuale rifiuto della (presente) proposta da parte della A. Ghezzi & C. S.p.A. sarà comunicata per iscritto al proponente, con contemporanea restituzione di somme versate a titolo di acconto, deposito o altro. Nessun indennizzo, compenso o interesse spetterà al proponente in tale eventualità.

3) L'evasione della proposta che sia stata accettata dalla A. Ghezzi & C. S.p.A. seguirà nel tempo consentito dalle condizioni di disponibilità.
Eventuali termini di consegna segnati sulla stessa hanno valore puramente indicativo.
Detta evasione potrà essere effettuata in tempi differiti senza che il proponente possa richiedere indennizzi di qualsiasi tipo, penali od altro.
Nei casi previsti dalla legge la A. Ghezzi & C. S.p.A. ha facoltà di recedere in tutto o in parte dal contratto di vendita.

4) I prezzi convenuti sono relativi al listino A. Ghezzi & C. S.p.A. in vigore, al netto di eventuali sconti e/o aumenti
Resta tuttavia inteso che la merce sarà fatturata, ed il proponente si impegna a pagarla, ai prezzi in vigore presso la A. Ghezzi & C. S.p.A. al momento della sua consegna.

5) Qualora le variazioni di prezzo risultassero superiori al 10% il proponente avrà facoltà, salvo si tratti di merce appositamente allestita per il proponente, di recedere comunicando per iscritto la sua intenzione entro 10 giorni dalla comunicazione delle variazioni dei prezzi.

6) La merce viaggia sempre a rischio e pericolo dell'acquirente anche se spedita franco-destinazione. Eventuali irregolarità o ammanchi di merce, desumibili dalla bolla di accompagnamento dei beni devono essere denunciati, a pena di decadenza, all'atto del ricevimento delle merci.

7) Qualunque reclamo relativo alla qualità dei prodotti forniti dovrà essere comunicato per iscritto alla A. Ghezzi & C. S.p.A. entro 15
giorni dal ricevimento della merce a pena di decadenza. Se il reclamo risulta fondato, A. Ghezzi & C. S.p.A. provvederà alla sostituzione della merce difettosa o difforme oppure all'accredito del relativo importo, escluso il risarcimento dei danni di qualsiasi natura.
La sostituzione del materiale, o l'eventuale accredito, sarà effettuato solo a restituzione avvenuta della merce contestata.
La pendenza di contestazione sulla merce non legittimerà in nessun modo sospensioni di pagamento che, se arbitrariamente effettuate, daranno diritto alla A. Ghezzi & C. S.p.A. di addebitare gli interessi di mora al tasso di svalutazione corrente.

8) Tutti i pagamenti qui previsti dovranno essere effettutati presso la sede amministrativa della A. Ghezzi & C. S.p.A.
20037 Paderno Dugnano (Mi) - Via Privata Gorlich, 1.

9) La competenza a decidere ogni eventuale controversia spetterà in via esclusiva al Foro di Milano.

PREZZI IVA ESCLUSA

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