HARTNER

Precision Cutting Tools

CATALOGO

Edizione 1601

HARTNER

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Edizione 1601

Misure e dati tecnici possono variare a seguito di sviluppo tecnico e modifica delle normative.

Sono valide le nostre condizioni generali di vendita.

Errori di stampa di qualsiasi tipo, anche in dati tecnici, non costituiscono motivo di reclamo.

Sono vietate riproduzioni, anche parziali.

Hartner GmbH · Casella postale 10 04 27 · D-72425 Albstadt · Tele.: +49 74 31 125-0 · Telefax: +49 74 31 125-21 547 · www.hartner.de

Descrizione

Tipo	Applicazioni	Angolo di spoglia superiore	Angolo di affilatura	Affilatura	
N	per materiali a normale truciolabilità (es. acciaio, ghisa acciaiosa, ghisa grigia)	20°-30°	118°	Spoglia sul cono tagliente Affilatura normale	Punte in acciaio HSS
H	per materiali duri a truciolo corto (es. ottone, bronzo, elektron)	12°-16°	118°	Spoglia sul cono tagliente Affilatura normale	
W	per materiali teneri a truciolo lungo (es. leghe di Al, rame)	35°-40°	130°	Spoglia sul cono tagliente Affilatura normale	
FN	per materiali a normale truciolabilità per fori profondi	35°	130°	Spoglia sul cono tagliente Affilatura normale	
FN 500	per materiali aggressivi a truciolo lungo (es. acciai altamente legati, da bonifica e da cementazione)	20°-30°	130°	Spoglia sul cono tagliente Affilatura normale	
FU 500 FU 500 DZ	per uso universale (es. acciai legati e non legati fino a 800 N/mm^2) DZ = attacco cilindrico passante	35°	118°	2 piani Affilatura speciale	
FW	per materiali teneri a truciolo lungo per fori profondi	35°-40°	130°	Spoglia sul cono tagliente Affilatura normale	
S	per materiali a difficile truciolabilità (es. acciai inossidabili e resistenti al calore)	35°	130°	Spoglia sul cono tagliente Affilatura normale	
IS	per acciai aggressivi, inox, resistenti agli acidi e al calore)	40°	130°	Spoglia sul cono tagliente Affilatura normale	
V	per materiali a difficile truciolabilità (es. acciai per molle)	20°-30°	130°	Spoglia sul cono tagliente Affilatura normale	
TS 3 G	per fori precisi dal pieno	28°	150°	Affilatura speciale	Punte in metallo duro
TS 80 U	per uso universale (es. ghisa grigia e acciai fino a 1000 N/mm^2)	20°-30°	140°	Spoglia sul cono tagliente Speciale riuzione tipo U	
TS 100 U	per acciai fino a ca. 1000 N/mm^2, per uso universale	25°-35°	140°	Affilatura su piani	
TS 150 GG	per ghise a truciolo corto, Alluminio e lghe di Al con alto tenore in Si	0° (taglienti diritti)	120°	Affilatura su piani Speciale riuzione tipo GG	
TS 100 R	per nuove ghise GGV e ADI, ghisa sferoidale/ghisa malleabile	30°	–	Affilatura radiale	
TS 100 T	per fori profondi in acciaio e ghisa	30°	135°	Spoglia sul cono tagliente	
TS 100 INOX	per acciai inossidabili	30°	140°	Affilatura su piani	
TS 100 H	per acciai altamente legati e temprati, così come leghe speciali	30°	140°	Spoglia sul cono tagliente	
TS 100 EG	Utensili sbavatori				Sbavatori
TS 100 VR	Sbavatori a 90° ad avanzamento ed estrazione				
TLB E80	Punte a cannone ad 1 tagliente con testa in MD				Punte a cannone
TLB E100	Punte a cannone ad 1 tagliente in MD integrale				
TLB E800	Punte a cannone ad 1 tagliente con placchette intercambiabili				
TLB Z80	Punte a cannone a 2 taglienti con testa in MD				

Codice ISO

P	acciaio, acciaio legato in alta percentuale
M	acciaio inossidabile
K	ghisa grigia, ghisa sferoidale e ghisa malleabile
N	alluminio ed altri metalli non ferrosi
S	leghe speciali, superleghe e leghe di titanio
H	acciaio temprato e ghisa temprata

Nelle pagine successive, contenenti programmai trovate per ciascun utensile consigli sull'idoneità in base ai seguenti gruppi di impiego:
- ● Idoneità ottima
- ○ Idoneità limitata

Pittogrammi

Materiale tagliente	HSS	HSS-E	M42	HSS-E-PM		VHM		HM		
	Acciai super rapidi					Metallo duro integrale		con riporti in MD		
Trattam. di superficie	○	●	◓	●	A	a	A	C	F	
	lucido	trattati a vapore	fasi nitrurate	bruno dorate	TiAlN	AlTiN nano	AlTiN	TiCN	FIRE	
	T	M	Y	Ni	B					
	TiN	MolyGlide	TiAlSiN	nichelato	brunito					
Tipo	FN	FN 500	FU 500	FU 500 DZ	FW	H	IS	N	V	W
	P2000	S	TLB E 80	TLB E 100	TLB E 800	TLB Z 80	Per dettagli sul tipo si veda pagina precedente			
	TS 80 U	TS 100 H	TS 100 INOX	TS 100 R	TS 100 T	TS 100 U	TS 150 GG	TS 3 G	TS 100 EG	TS 100 VR
Forma	R	A	B	C						
Profondità di foro	3xD	5xD	....	~3xD	~5xD	....	45,00 mm	80,00 mm	....	
Norma	DIN 333	DIN 338	DIN 339	DIN 340	DIN 343	DIN 344	DIN 345	DIN 1869	DIN 1897	....
	DIN 8374	DIN 8375	DIN 8376	DIN 8377	DIN 8378	DIN 8379	DIN 6537 K	DIN 6537 L	DIN 6527	secondo DIN
	WN	secondo standard Hartner								
Angolo di affilatura	90°	118°	120°	130°	135°	140°	142°	150°		
Tolleranza del Ø	m7	h5	h6	h7	h8	0/-0,004				
Direzione di taglio	R	L								
	destra	sinistra								
Forma del gambo	HA	HB	HE		Cyl		MK		SK	
	secondo DIN 6535				cilindrico		cono morse		cono ISO	
Assott. del nocc.										
	Assott. del nocc.									
Refrigerazione interna										
	con RI	senza RI								

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Modalità per ordinare

Specificare assieme al vs. nr. d'ordine anche
il nr. articolo e il Ø, es: „Punta elicoidale corta,
per Ø 0,20 mm" **= 81010 0,200**

Articolo nr.

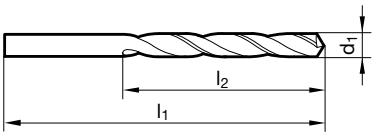
Punte elicoidali, corte

Articolo nr. 81010

P	M	K	N	S	H
●		●	○		

HSS | >Ø 2,36 | N | ~5xD | DIN 338 | 118° | h8 | R | Cyl

Assott. del nocciolo ≥ Ø 1,000 • spoglia sul cono tagliente
acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato e grafite



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
0,200	19,000	2,500	0,640	26,000	8,000
0,220	19,000	2,500	0,650	26,000	8,000
0,230	19,000	2,500	0,660	26,000	8,000
0,240	19,000	2,500	0,670	26,000	8,000
0,250	19,000	3,000	0,680	28,000	9,000
0,260	19,000	3,000	0,690	28,000	9,000
0,270	19,000	3,000	0,700	28,000	9,000

Diametro nominale

Nelle pagine successive, contenenti programma, trovate per ciascun utensile consigli sull'idoneità in base ai seguenti gruppi di impiego:
● Idoneità ottima
○ Idoneità limitata

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Indicazione importanti

Condizioni di fornitura generali
Gli articoli forniti sono soggetti alle nostre condizioni di vendita, disponibili su richiesta.

Quando si ordinano utensili speciali, la quantità ordinata può variare in più o in meno di ca. il 10%, come minimo comunque di 2 pezzi. Sarà fatturata la quantità consegnata.

Condizioni di fornitura per piccoli quantitativi
Ci riserviamo di applicare una maggiorazione di prezzo nel caso di ordini con valore netto inferiore a Euro 100,00.

Gruppi di utensili	Norma	Unità di confezionamento
Punte elicoidali con codolo cilindrico in acciaio super rapido	DIN 338 DIN 1897 e simile norma di fabbrica	≤ Ø 7,50 mm in confezione di 10 pezzi > Ø 7,50 ... Ø 10,60 mm in confezione di 5 pezzi > Ø 10,60 mm in confezione singola
	DIN 339 DIN 340 e simile norma di fabbrica	≤ Ø 6,70 mm in confezione di 10 pezzi > Ø 6,70 ... Ø 10,60 mm in confezione di 5 pezzi > Ø 10,60 mm in confezione singola
	DIN 1869	≤ Ø 7,50 mm in confezione di 10 pezzi > Ø 7,50 ... Ø 10,60 mm in confezione di 5 pezzi > Ø 10,60 mm in confezione singola
Punte elicoidali con codolo conico Morse in acciaio super rapido	tutte le norme DIN e le norme di fabbrica	tutte le misure in confezione singola
Punte elicoidali in metallo duro ed utensili con riporti in MD	tutte le norme DIN e le norme di fabbrica	tutte le misure in confezione singola
Micropunte	DIN 1899	tutte le misure in confezione di 10 pezzi
Punte a centrare	DIN 333 forma A, forma R	≤ Ø 4,00 mm in confezione di 10 pezzi > Ø 4,00 mm in confezione singola
	DIN 333 forma B	≤ Ø 2,50 mm in confezione di 10 pezzi > Ø 2,50 mm in confezione singola

Dati bancari
Deutsche Bank AG
IBAN DE74 6537 0075 0014 6415 00
BIC DEUTDESS653

BW Bank
IBAN DE45 6005 0101 0002 5924 44
BIC SOLADEST600

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Sommario

PUNTE ELICOIDALI CON CODOLO CILINDRICO

in HSS, HSS-E, HSS-E-PM, metallo duro
lucide e ricoperte

PUNTE ELICOIDALI CON CODOLO CONO MORSE

in HSS, HSS-E, metallo duro
lucide e ricoperte

TS-DRILLS

Utensili high-tech in metallo duro
lucide e ricoperte

PUNTE A CANNONE AD 1 TAGLIENTE / A 2 TAGLIENTI

in metallo duro, con testa in MD o con inserti intercambiabili
lucide e ricoperte

MICROPUNTE

in metallo duro e HSS-E-PM
lucide e ricoperte

PUNTE A CENTRARE / PUNTE A GRADINO / SVASATORI

in HSS, HSS-E, metallo duro
lucide e ricoperte

MULTIPLEX / MULTIPLEX HPC

Punte elicoidali con inserti intercambiabili con refrigerazione
Inserti intercambiabili in HSS-E, HSS-E PM, metallo duro
ricoperte

PARTE TECNICA

Misure, Definizioni, Valori indicativi

Articolo nr.	Pagina	Profondità di foro	Norma	Superficie	Descrizione	Materiale tagliente	Tipo
80495	245		Norma di fab.	AlTiN nano	Sbavatori a 90° ad avanzamento ed estrazione	Metallo duro	TS 100 VR
81010	23	~5xD	DIN 338	trattati a vapore	Punte elicoidali, corte	HSS	N
81011	47	~5xD	DIN 338	trattati a vapore	Punte elicoidali, corte	HSS-E	N
81012	65	~5xD	DIN 338	lucido	Punte elicoidali, corte	M42	N
81013	55	~5xD	DIN 338	lucido	Punte elicoidali, corte	HSS-E	IS
81015	27	~5xD	DIN 338	trattati a vapore	Punte elicoidali, corte	HSS	N
81017	29	~5xD	DIN 338	trattati a vapore	Punte elicoidali, corte	HSS	N
81020	32	~5xD	DIN 338	lucido	Punte elicoidali, corte	HSS	H
81025	34	~5xD	DIN 338	lucido	Punte elicoidali, corte	HSS	H
81030	36	~5xD	DIN 338	lucido	Punte elicoidali, corte	HSS	W
81035	38	~5xD	DIN 338	lucido	Punte elicoidali, corte	HSS	W
81040	39	~5xD	DIN 338	fasi nitrurate	Punte elicoidali, corte	HSS	FN
81041	49	~5xD	DIN 338	fasi nitrurate	Punte elicoidali, corte	HSS-E	FN
81045	41	~5xD	DIN 338	fasi nitrurate	Punte elicoidali, corte	HSS	FN
81061	57	~5xD	DIN 338	lucido	Punte elicoidali, corte	HSS-E	S
81062	59	~5xD	DIN 338	bruno dorate	Punte elicoidali, corte	HSS-E	P2000
81063	63	~5xD	DIN 338	MolyGlide	Punte elicoidali, corte	HSS-E	P2000
81110	69	~3xD	DIN 1897	trattati a vapore	Punte elicoidali, extra corte	HSS	N
81115	71	~3xD	DIN 1897	lucido	Punte elicoidali, extra corte	HSS	N
81120	75	~3xD	DIN 1897	lucido	Punte elicoidali, extra corte	HSS	H
81130	76	~3xD	DIN 1897	lucido	Punte elicoidali, extra corte	HSS	W
81140	77	~3xD	DIN 1897	fasi nitrurate	Punte elicoidali, extra corte	HSS	FN
81145	78	~3xD	DIN 1897	fasi nitrurate	Punte elicoidali, extra corte	HSS	FN
81171	81	~3xD	DIN 1897	trattati a vapore	Punte elicoidali, extra corte	HSS-E	V
81173	80	~3xD	DIN 1897	lucido	Punte elicoidali, extra corte	HSS-E	IS
81190	106		Norma di fab.	trattati a vapore	Punte doppie per carrozzeria	HSS	N
81191	104		Norma di fab.	lucido	Punte per centri CN	HSS	N
81192	102		Norma di fab.	lucido	Punte per centri CN	HSS	N
81210	109	~10xD	DIN 339	trattati a vapore	Punte per foratura con bussola di guida	HSS	N
81310	111	~10xD	DIN 340	trattati a vapore	Punte elicoidali, lunghe	HSS	N
81311	126	~10xD	DIN 340	trattati a vapore	Punte elicoidali, lunghe	HSS-E	N
81315	113	~10xD	DIN 340	trattati a vapore	Punte elicoidali, lunghe	HSS	N
81317	114	~10xD	DIN 340	trattati a vapore	Punte elicoidali, lunghe	HSS	N
81320	117	~10xD	DIN 340	lucido	Punte elicoidali, lunghe	HSS	H
81330	118	~10xD	DIN 340	lucido	Punte elicoidali, lunghe	HSS	W
81340	120	~10xD	DIN 340	fasi nitrurate	Punte elicoidali, lunghe	HSS	FN
81341	127	~10xD	DIN 340	fasi nitrurate	Punte elicoidali, lunghe	HSS-E	FN
81350	124	~10xD	DIN 340	lucido	Punte elicoidali, lunghe	HSS	FW
81361	129	~10xD	DIN 340	lucido	Punte elicoidali, lunghe	HSS-E	S
81362	129	~10xD	DIN 340	TiN	Punte elicoidali, lunghe	HSS-E	S
81410	134	~15xD	DIN 1869	trattati a vapore	Punte elicoidali in lunghezze speciali, grandezza 1	HSS	N
81440	135	~15xD	DIN 1869	fasi nitrurate	Punte elicoidali in lunghezze speciali, grandezza 1	HSS	FN
81441	138	~15xD	DIN 1869	fasi nitrurate	Punte elicoidali in lunghezze speciali, grandezza 1	HSS-E	FN
81450	137	~15xD	DIN 1869	lucido	Punte elicoidali in lunghezze speciali, grandezza 1	HSS	FW
81510	139	~20xD	DIN 1869	trattati a vapore	Punte elicoidali in lunghezze speciali, grandezza 2	HSS	N
81540	140	~20xD	DIN 1869	fasi nitrurate	Punte elicoidali in lunghezze speciali, grandezza 2	HSS	FN
81541	142	~20xD	DIN 1869	fasi nitrurate	Punte elicoidali in lunghezze speciali, grandezza 2	HSS-E	FN
81610	143	~25xD	DIN 1869	trattati a vapore	Punte elicoidali in lunghezze speciali, grandezza 3	HSS	N
81640	144	~25xD	DIN 1869	fasi nitrurate	Punte elicoidali in lunghezze speciali, grandezza 3	HSS	FN
81740	145	>25xD	Norma di fab.	fasi nitrurate	Punte elicoidali, extra lunghe	HSS	FN
81750	146	>25xD	Norma di fab.	lucido	Punte elicoidali, extra lunghe	HSS	FN
81760	147	>25xD	Norma di fab.	lucido	Punte elicoidali, extra lunghe	HSS	FN
81810	148		DIN 1898	trattati a vapore	Punte per fori conici	HSS	N
82010	158	~5xD	DIN 345	trattati a vapore	Punte elicoidali	HSS	N
82011	161	~5xD	DIN 345	trattati a vapore	Punte elicoidali	HSS-E	N
82012	162	~5xD	DIN 345	lucido	Punte elicoidali	HSS-E	IS
82030	157	~5xD	DIN 345	lucido	Punte elicoidali	HSS	W
82191	167		Norma di fab.	trattati a vapore	Punte per centri CN	HSS	N
82192	167		Norma di fab.	trattati a vapore	Punte per centri CN	HSS	N
82210	168	~10xD	DIN 341	trattati a vapore	Punte elicoidali, lunghe	HSS	N
82211	169	~10xD	DIN 341	trattati a vapore	Punte elicoidali, lunghe	HSS-E	N
82310	170	~15xD	DIN 1870	trattati a vapore	Punte elicoidali in lunghezze speciali, grandezza 1	HSS	N
82340	171	~15xD	DIN 1870	fasi nitrurate	Punte elicoidali in lunghezze speciali, grandezza 1	HSS	FN
82341	172	~15xD	DIN 1870	fasi nitrurate	Punte elicoidali in lunghezze speciali, grandezza 1	HSS-E	FN
82410	173	~20xD	DIN 1870	trattati a vapore	Punte elicoidali in lunghezze speciali, grandezza 2	HSS	N
82440	174	~20xD	DIN 1870	fasi nitrurate	Punte elicoidali in lunghezze speciali, grandezza 2	HSS	FN

Articolo nr.	Pagina	Profondità di foro	Norma	Superficie	Descrizione	Materiale tagliente	Tipo
82466	175	>20xD	Norma di fab.	fasi nitrurate	Punte elicoidali, extra lunghe	HSS	FN
82467	176	>20xD	Norma di fab.	fasi nitrurate	Punte elicoidali, extra lunghe	HSS	FN
82468	177	>20xD	Norma di fab.	lucido	Punte elicoidali, extra lunghe	HSS	FN
82469	178	>20xD	Norma di fab.	lucido	Punte elicoidali, extra lunghe	HSS	FN
82515	182	~15xD	Norma di fab.	trattati a vapore	Punte con canali di lubrificazione tipo extra-lungo	HSS-E	FN
82521	180	~10xD	Norma di fab.	trattati a vapore	Punte con canali di lubrificazione tipo lungo	HSS	N
82525	181	~10xD	Norma di fab.	trattati a vapore	Punte con canali di lubrificazione tipo lungo	HSS-E	FN
82535	179	~10xD	Norma di fab.	trattati a vapore	Punte con canali di lubrificazione tipo lungo	HSS	FN
82571	369		Norma di fab.	trattati a vapore	Tubi di adduzione		
82578	370		Norma di fab.		Attacco rapido		
82710	107	~10xD	Norma di fab.	lucido	Punte con fori di refrigerazione	HSS	FN
82761	108	~5xD	Norma di fab.	lucido	Punte con fori di refrigerazione	HSS-E	FN
82810	186		DIN 1898	trattati a vapore	Punte per fori conici	HSS	N
82971	166	~3xD	Norma di fab.	trattati a vapore	Punte elicoidali, corte	HSS-E	V
82972	165	~3xD	Norma di fab.	lucido	Punte elicoidali, corte	HSS-E	IS
83000	330		DIN 333	lucido	Punte a centrare senza piano	HSS	N
83005	331		DIN 333	lucido	Punte a centrare senza piano	HSS	N
83100	328		DIN 333	lucido	Punte a centrare senza piano	HSS	N
83101	333		DIN 333	lucido	Punte a centrare senza piano	HSS-E	N
83105	329		DIN 333	lucido	Punte a centrare senza piano	HSS	N
83110	334		Norma di fab.	lucido	Punte a centrare senza piano	HSS	N
83200	335		DIN 333	lucido	Punte a centrare senza piano	HSS	N
83300	332		DIN 333	lucido	Punte a centrare senza piano	HSS	N
83370	336		Norma di fab.	lucido	Punte a centrare senza piano	Metallo duro	N
83500	337		DIN 333	lucido	Punte a centrare con piano	HSS	N
83600	337		DIN 333	lucido	Punte a centrare con piano	HSS	N
83700	338		DIN 333	lucido	Punte a centrare con piano	HSS	N
84100	243		Norma di fab.	lucido	Utensili sbavatori	Metallo duro	TS 100 EG
84101	244		Norma di fab.	lucido	Utensili sbavatori	Metallo duro	TS 100 EG
84400	73	~3xD	DIN 1897	TiN	Punte elicoidali, extra corte	HSS	N
84405	30	~5xD	DIN 338	TiN	Punte elicoidali, corte	HSS	N
84406	43	~5xD	DIN 338	TiN - testa	Punte elicoidali, corte	HSS	N
84415	45	~5xD	DIN 338	TiN	Punte elicoidali, corte	HSS	FN
84418	115	~10xD	DIN 340	TiN	Punte elicoidali, lunghe	HSS	N
84423	122	~10xD	DIN 340	TiN	Punte elicoidali, lunghe	HSS	FN
84425	136	~15xD	DIN 1869	TiN	Punte elicoidali in lunghezze speciali, grandezza 1	HSS	FN
84426	141	~20xD	DIN 1869	TiN	Punte elicoidali in lunghezze speciali, grandezza 2	HSS	FN
84434	104		Norma di fab.	TiN	Punte per centri CN	HSS	N
84435	102		Norma di fab.	TiN	Punte per centri CN	HSS	N
84445	313		Norma di fab.	TiN	Punte a gradino corte, cil.	HSS	N
84448	330		DIN 333	TiN	Punte a centrare senza piano	HSS	N
84450	328		DIN 333	TiN	Punte a centrare senza piano	HSS	N
84460	160	~5xD	DIN 345	TiN	Punte elicoidali	HSS	N
84461	108	~5xD	Norma di fab.	TiN	Punte con fori di refrigerazione	HSS-E	FN
84501	73	~3xD	DIN 1897	nanoFIRE	Punte elicoidali, extra corte	HSS	N
84502	45	~5xD	DIN 338	nanoFIRE	Punte elicoidali, corte	HSS	FN
84503	83	~3xD	DIN 1897	nanoFIRE	Punte elicoidali, extra corte	HSS-E	V
84504	51	~5xD	DIN 338	nanoFIRE	Punte elicoidali, corte	HSS-E	FN
84505	61	~5xD	DIN 338	nanoFIRE	Punte elicoidali, corte	HSS-E	S
84506	122	~10xD	DIN 340	nanoFIRE	Punte elicoidali, lunghe	HSS	FN
84507	96	~5xD	Norma di fab.	nanoFIRE	Punte con codolo rinforzato	HSS-E-PM	FN 500
84511	87	~3xD	DIN 1897	nanoFIRE	Punte elicoidali, extra corte	HSS-E-PM	FN 500
84660	163	~5xD	DIN 345	TiAlN	Punte elicoidali	HSS-E	FN
84800	51	~5xD	DIN 338	TiN	Punte elicoidali, corte	HSS-E	FN
84801	94	~5xD	Norma di fab.	TiN	Punte con codolo rinforzato	HSS-E	FU 500
84802	53	~5xD	DIN 338	TiN	Punte elicoidali, corte	HSS-E	FU 500 DZ
84803	83	~3xD	DIN 1897	TiN	Punte elicoidali, extra corte	HSS-E	V
84804	53	~5xD	DIN 338	lucido	Punte elicoidali, corte	HSS-E	FU 500 DZ
84805	92	~3xD	Norma di fab.	TiN	Punte con codolo rinforzato	HSS-E	FU 500
84806	85	~3xD	DIN 1897	TiN	Punte elicoidali, extra corte	HSS-E	FU 500 DZ
84807	61	~5xD	DIN 338	TiN	Punte elicoidali, corte	HSS-E	S
84808	85	~3xD	DIN 1897	lucido	Punte elicoidali, extra corte	HSS-E	FU 500 DZ
84810	292	~5xD	DIN 1899	TiN	Micropunte senza fori di refrigerazione	HSS-E-PM	N
84811	64	~5xD	DIN 338	TiN	Punte elicoidali, corte	HSS-E-PM	FN 500 DZ
84812	131	~10xD	DIN 340	TiN	Punte elicoidali, lunghe	HSS-E	FU 500 DZ
84814	131	~10xD	DIN 340	lucido	Punte elicoidali, lunghe	HSS-E	FU 500 DZ

Articolo nr.	Pagina	Profondità di foro	Norma	Superficie	Descrizione	Materiale tagliente	Tipo
84859	164	~5xD	DIN 345	TiN	Punte elicoidali	HSS-E	N
85010	315		DIN 8374	trattati a vapore	Punte a gradino ad eliche indipendenti, cil.	HSS	N
85110	316		Norma di fab.	trattati a vapore	Punte a gradino ad eliche indipendenti, cil.	HSS	N
85210	319		DIN 8376	trattati a vapore	Punte a gradino ad eliche indipendenti, cil.	HSS	N
85216	320		Norma di fab.	trattati a vapore	Punte a gradino ad eliche indipendenti, cil.	HSS	N
85218	318		DIN 8374	trattati a vapore	Punte a gradino ad eliche indipendenti, cil.	HSS	N
85310	317		DIN 8378	trattati a vapore	Punte a gradino ad eliche indipendenti, cil.	HSS	N
85510	322		Norma di fab.	trattati a vapore	Punte a gradino ad eliche indipendenti, CM	HSS	N
85610	324		DIN 8377	trattati a vapore	Punte a gradino ad eliche indipendenti, CM	HSS	N
85616	325		Norma di fab.	trattati a vapore	Punte a gradino ad eliche indipendenti, CM	HSS	N
85619	326		DIN 8375	trattati a vapore	Punte a gradino ad eliche indipendenti, CM	HSS	N
85710	323		DIN 8379	trattati a vapore	Punte a gradino ad eliche indipendenti, CM	HSS	N
85910	306		Norma di fab.	trattati a vapore	Punte a gradino per fori centraggio a DIN 332	HSS	N
85911	306		Norma di fab.	trattati a vapore	Punte a gradino per fori centraggio a DIN 332	HSS	N
85912	307		Norma di fab.	trattati a vapore	Punte a gradino per fori centraggio a DIN 332	HSS	N
85914	308		Norma di fab.	trattati a vapore	Punte a gradino per fori centraggio a DIN 332	HSS	N
85916	310		Norma di fab.	lucido	Punte a gradino corte, cil.	HSS	N
85917	311		Norma di fab.	lucido	Punte a gradino corte, cil.	HSS	N
85918	312		Norma di fab.	lucido	Punte a gradino corte, cil.	HSS	N
85920	314		Norma di fab.	lucido	Punte a gradino corte, cil.	HSS	N
86010	151		DIN 344	trattati a vapore	Allargatori cilindrici	HSS	N
86110	184		DIN 343	trattati a vapore	Allargatori con attacco cono morse	HSS	N
86111	185		DIN 343	trattati a vapore	Allargatori con attacco cono morse	HSS-E	N
86400	295	4xD	Norma di fab.	AlTiN	Micropunte senza fori di refrigerazione	Metallo duro	N
86401	296	7xD	Norma di fab.	AlTiN	Micropunte senza fori di refrigerazione	Metallo duro	N
86402	294		Norma di fab.	TiAlN	Micropunte senza fori di refrigerazione	Metallo duro	N
86405	297	5xD	Norma di fab.	TiAlN	Micropunte con fori di refrigerazione	Metallo duro	N
86408	298	8xD	Norma di fab.	TiAlN	Micropunte con fori di refrigerazione	Metallo duro	N
86412	299	15xD	Norma di fab.	TiAlN - testa	Micropunte con fori di refrigerazione	Metallo duro	N
86509	235	15xD	Norma di fab.	TiAlN	Punte TS con canali di lubrificazione	Metallo duro	TS 100 T
86511	236	20xD	Norma di fab.	TiAlN - testa	Punte TS con canali di lubrificazione	Metallo duro	TS 100 T
86512	237	25xD	Norma di fab.	TiAlN - testa	Punte TS con canali di lubrificazione	Metallo duro	TS 100 T
86513	238	30xD	Norma di fab.	TiAlN - testa	Punte TS con canali di lubrificazione	Metallo duro	TS 100 T
86514	239	40xD	Norma di fab.	TiAlN - testa	Punte TS con canali di lubrificazione	Metallo duro	TS 100 T
86602	361		Norma di fab.	TiN	Inserti intercambiabili	HSS-E-PM	
86608	362		Norma di fab.	FIRE	Inserti intercambiabili	HSS-E-PM	
86609	363		Norma di fab.	AlTiN	Inserti intercambiabili	HSS-E-PM	
86612	349	<3xD	Norma di fab.	nichelato	Corpo portaplacchette con attacco cilindrico		
86622	350	<5xD	Norma di fab.	nichelato	Corpo portaplacchette con attacco cilindrico		
86624	351	<7xD	Norma di fab.	nichelato	Corpo portaplacchette con attacco cilindrico		
86628	356		Norma di fab.	nichelato	Corpo portaplacchette speciale con attacco cilindrico		
86630	352		Norma di fab.	nichelato	Corpo portaplacchette con attacco cono morse		
86650	354		Norma di fab.	nichelato	Corpo portaplacchette con attacco cono morse		
86670	353		Norma di fab.	nichelato	Corpo portaplacchette con attacco cono morse		
86678	358		Norma di fab.	nichelato	Corpo portaplacchette speciale con attacco cono morse		
86680	355		Norma di fab.	nichelato	Corpo portaplacchette con attacco cono morse		
86681	378	1xD	Norma di fab.	nichelato	Corpo portaplacchette Multiplex-HPC		HPC
86682	379	1,5xD	Norma di fab.	nichelato	Corpo portaplacchette Multiplex-HPC		HPC
86683	381	3xD	Norma di fab.	nichelato	Corpo portaplacchette Multiplex-HPC		HPC
86684	383	5xD	Norma di fab.	nichelato	Corpo portaplacchette Multiplex-HPC		HPC
86685	385	7xD	Norma di fab.	nichelato	Corpo portaplacchette Multiplex-HPC		HPC
86686	387	10xD	Norma di fab.	nichelato	Corpo portaplacchette Multiplex-HPC		HPC
86690	368		Norma di fab.		Alimentatori per punte con fori di refrigerazione		
86691	372		Norma di fab.	brunito	Mandrino di alimentazione del refrigerante per Multiplex		
86692	373		Norma di fab.	brunito	Mandrino di alimentazione del refrigerante per Multiplex		
86693	374		Norma di fab.	brunito	Mandrino di alimentazione del refrigerante per Multiplex		
86694	375		Norma di fab.	brunito	Mandrino di alimentazione del refrigerante per Multiplex		
86699	376		Norma di fab.	brunito	Bussole di riduzione per attacchi cilindrici		
86701	367		Norma di fab.	FIRE	Inserti intercambiabili	Metallo duro	
86702	365		Norma di fab.	FIRE	Inserti intercambiabili	Metallo duro	
86708	364		Norma di fab.	TiN	Inserti intercambiabili	Metallo duro	
86709	366		Norma di fab.	TiN	Inserti intercambiabili	Metallo duro	
86721	389		Norma di fab.	AlTiN nano	Inserti intercambiabili per Multiplex HPC	Metallo duro	HPC
86722	392		Norma di fab.	nanoFIRE	Inserti intercambiabili per Multiplex HPC	Metallo duro	HPC
86723	395		Norma di fab.	FIRE	Inserti intercambiabili per Multiplex HPC	Metallo duro	HPC
86724	398		Norma di fab.	lucido	Inserti intercambiabili per Multiplex HPC	Metallo duro	HPC

Articolo nr.	Pagina	Profondità di foro	Norma	Superficie	Descrizione	Materiale tagliente	Tipo
86725	401		Norma di fab.	AlTiN nano	Inserti intercambiabili per Multiplex HPC	Metallo duro	HPC
86726	404		Norma di fab.	TiAlN	Inserti a svasare Multiplex HPC	Metallo duro	
86727	404		Norma di fab.	lucido	Inserti a svasare Multiplex HPC	Metallo duro	
86728	405		Norma di fab.	TiN	Inserti a svasare Multiplex HPC	Metallo duro	
86842	371		Norma di fab.		Giravite Torx		
86843	406		Norma di fab.		Viti di serraggio per placchette 1.5-10xD		
86844	407		Norma di fab.		Chiavi dinamometriche		
86845	408		Norma di fab.		Inserti Torx		
86846	409		Norma di fab.		Viti di serraggio per svasatori Multiplex HPC		
87011	289	~5xD	DIN 1899	lucido	Micropunte senza fori di refrigerazione	HSS-E-PM	N
87016	291	~5xD	DIN 1899	lucido	Micropunte senza fori di refrigerazione	HSS-E-PM	N
88013	98	~5xD	DIN 338	trattati a vapore	Serie di punte	HSS	N
88014	98	~5xD	DIN 338	bruno dorate	Serie di punte	HSS-E	P2000
88015	99	~3xD	DIN 1897	MolyGlide	Serie di punte	HSS-E	P2000
88016	99	~5xD	DIN 338	TiN - testa	Serie di punte	HSS	N
88026	100	~5xD	DIN 338	trattati a vapore	Serie di punte	HSS-E	N
88200	327		DIN 335	lucido	Svasatori 90°	HSS	
88303	101		Norma di fab.		Serie di punte		
89235	89	~3xD	DIN 6539	lucido	Punte elicoidali, extra corte	Metallo duro	N
89237	200	3xD	DIN 6539	TiN	Punte TS senza canali di lubrificazione	Metallo duro	TS 100 U
89239	241	5xD	DIN 6539	lucido	Punte TS a 3 taglienti	Metallo duro	TS 3 G
89242	105		Norma di fab.	lucido	Punte per centri CN	Metallo duro	N
89243	103		Norma di fab.	lucido	Punte per centri CN	Metallo duro	N
89244	67	~5xD	Norma di fab.	lucido	Punte elicoidali, corte	Metallo duro	N
89246	91	~3xD	Norma di fab.	lucido	Punte elicoidali, extra corte	Metallo duro	N
89247	240	5xD	DIN 6537L	lucido	Punte TS a 3 taglienti	Metallo duro	TS 3 G
89249	105		Norma di fab.	lucido	Punte per centri CN	Metallo duro	N
89252	321			lucido	Punte a gradino ad eliche indipendenti, cil.	Metallo duro	N
89254	309		Norma di fab.	lucido	Punte a gradino corte, cil.	Metallo duro	N
89264	196	3xD	DIN 6537K	TiN	Punte TS senza canali di lubrificazione	Metallo duro	TS 100 U
89266	207	3xD	DIN 6537K	TiN	Punte TS con canali di lubrificazione	Metallo duro	TS 100 U
89272	214	5xD	DIN 6537L	TiN	Punte TS con canali di lubrificazione	Metallo duro	TS 100 U
89275	204	5xD	Norma di fab.	TiN	Punte TS senza canali di lubrificazione	Metallo duro	TS 100 U
89281	293	~5xD	Norma di fab.	lucido	Micropunte senza fori di refrigerazione	Metallo duro	N
89286	133	~10xD	Norma di fab.	lucido	Punte elicoidali, lunghe	Metallo duro	N
89292	213	4xD	Norma di fab.	lucido	Punte TS con canali di lubrificazione	Metallo duro	TS 150 GG
89293	231	10xD	Norma di fab.	lucido	Punte TS con canali di lubrificazione	Metallo duro	TS 150 GG
89294	230	7xD	Norma di fab.	lucido	Punte TS con canali di lubrificazione	Metallo duro	TS 150 GG
89295	231	10xD	Norma di fab.	lucido	Punte TS con canali di lubrificazione	Metallo duro	TS 150 GG
89301	150		DIN 8037	lucido	Punte speciali, con taglienti in MD	Metallo duro	N
89302	183		DIN 8041	lucido	Punte speciali, con taglienti in MD	Metallo duro	N
89303	149		DIN 8038	lucido	Punte speciali, con taglienti in MD	Metallo duro	N
89306	208	3xD	DIN 6538K	TiN	Punte TS con canali di lubrificazione	Metallo duro	TS 80 U
89307	217	5xD	DIN 6538M	TiN	Punte TS con canali di lubrificazione	Metallo duro	TS 80 U
89308	226	7xD	DIN 6538L	TiN	Punte TS con canali di lubrificazione	Metallo duro	TS 80 U
89401	200	3xD	DIN 6539	nanoFIRE	Punte TS senza canali di lubrificazione	Metallo duro	TS 100 U
89402	194	3xD	DIN 6537K	nanoFIRE	Punte TS senza canali di lubrificazione	Metallo duro	TS 100 U
89408	215	5xD	DIN 6537L	nanoFIRE	Punte TS con canali di lubrificazione	Metallo duro	TS 100 U
89410	205	3xD	DIN 6537K	nanoFIRE	Punte TS con canali di lubrificazione	Metallo duro	TS 100 U
89411	215	5xD	DIN 6537L	nanoFIRE	Punte TS con canali di lubrificazione	Metallo duro	TS 100 U
89412	224	7xD	Norma di fab.	nanoFIRE	Punte TS con canali di lubrificazione	Metallo duro	TS 100 U
89413	194	3xD	DIN 6537K	nanoFIRE	Punte TS senza canali di lubrificazione	Metallo duro	TS 100 U
89414	202	5xD	DIN 6537L	nanoFIRE	Punte TS senza canali di lubrificazione	Metallo duro	TS 100 U
89415	205	3xD	DIN 6537K	nanoFIRE	Punte TS con canali di lubrificazione	Metallo duro	TS 100 U
89416	224	7xD	Norma di fab.	nanoFIRE	Punte TS con canali di lubrificazione	Metallo duro	TS 100 U
89417	202	5xD	DIN 6537L	nanoFIRE	Punte TS senza canali di lubrificazione	Metallo duro	TS 100 U
89418	233	12xD	Norma di fab.	nanoFIRE - testa	Punte TS con canali di lubrificazione	Metallo duro	TS 100 U
89420	222	5xD	DIN 6537L	FIRE	Punte TS con canali di lubrificazione	Metallo duro	TS 100 R
89421	228	7xD	Norma di fab.	FIRE	Punte TS con canali di lubrificazione	Metallo duro	TS 100 R
89422	198	3xD	DIN 6537K	TiAlSiN	Punte TS senza canali di lubrificazione	Metallo duro	TS 100 H
89423	211	3xD	DIN 6537K	TiAlSiN	Punte TS con canali di lubrificazione	Metallo duro	TS 100 H
89424	211	3xD	DIN 6537K	TiAlSiN	Punte TS con canali di lubrificazione	Metallo duro	TS 100 H
89425	220	5xD	DIN 6537L	TiAlSiN	Punte TS con canali di lubrificazione	Metallo duro	TS 100 H
89426	220	5xD	DIN 6537L	TiAlSiN	Punte TS con canali di lubrificazione	Metallo duro	TS 100 H
89427	227	7xD	Norma di fab.	TiAlSiN	Punte TS con canali di lubrificazione	Metallo duro	TS 100 H
89450	209	3xD	DIN 6537K	AlTiN nano	Punte TS con canali di lubrificazione	Metallo duro	TS 100 INOX

Articolo nr.	Pagina	Profondità di foro	Norma	Superficie	Descrizione	Materiale tagliente	Tipo
89451	218	5xD	DIN 6537L	AlTiN nano	Punte TS con canali di lubrificazione	Metallo duro	TS 100 INOX
89501	257	80.000	Norma di fab.	lucido	Punte a cannone ad 1 tagliente E 100	Metallo duro	TLB E 100
89502	259	160.000	Norma di fab.	lucido	Punte a cannone ad 1 tagliente E 100	Metallo duro	TLB E 100
89503	256	45.000	Norma di fab.	lucido	Punte a cannone ad 1 tagliente E 100	Metallo duro	TLB E 100
89504	258	120.000	Norma di fab.	lucido	Punte a cannone ad 1 tagliente E 100	Metallo duro	TLB E 100
89505	260	20xD	Norma di fab.	TiN	Punte a cannone ad 1 tagliente E 80	Metallo duro	TLB E 80
89506	262	40xD	Norma di fab.	TiN	Punte a cannone ad 1 tagliente E 80	Metallo duro	TLB E 80
89507	263	80xD	Norma di fab.	TiN	Punte a cannone ad 1 tagliente E 80	Metallo duro	TLB E 80
89508	267	30xD	Norma di fab.	lucido	Punte a cannone a 2 taglienti Z 80	Metallo duro	TLB Z 80
89509	261	30xD	Norma di fab.	TiN	Punte a cannone ad 1 tagliente E 80	Metallo duro	TLB E 80
89510	256	45.000	Norma di fab.	AlTiN	Punte a cannone ad 1 tagliente E 100	Metallo duro	TLB E 100
89511	257	80.000	Norma di fab.	AlTiN	Punte a cannone ad 1 tagliente E 100	Metallo duro	TLB E 100
89512	258	120.000	Norma di fab.	AlTiN	Punte a cannone ad 1 tagliente E 100	Metallo duro	TLB E 100
89513	259	160.000	Norma di fab.	AlTiN	Punte a cannone ad 1 tagliente E 100	Metallo duro	TLB E 100
89514	260	20xD	Norma di fab.	TiCN	Punte a cannone ad 1 tagliente E 80	Metallo duro	TLB E 80
89515	261	30xD	Norma di fab.	TiCN	Punte a cannone ad 1 tagliente E 80	Metallo duro	TLB E 80
89516	262	40xD	Norma di fab.	TiCN	Punte a cannone ad 1 tagliente E 80	Metallo duro	TLB E 80
89517	263	80xD	Norma di fab.	TiCN	Punte a cannone ad 1 tagliente E 80	Metallo duro	TLB E 80
89518	267	30xD	Norma di fab.	lucido	Punte a cannone a 2 taglienti Z 80	Metallo duro	TLB Z 80
89520	253	25xD	Norma di fab.	AlTiN nano	Punte a cannone ad 1 tagliente E 100	Metallo duro	TLB E 100
89521	254	50xD	Norma di fab.	AlTiN nano	Punte a cannone ad 1 tagliente E 100	Metallo duro	TLB E 100
89522	255	75xD	Norma di fab.	AlTiN nano	Punte a cannone ad 1 tagliente E 100	Metallo duro	TLB E 100
89530	264	30xD	Norma di fab.	TiN	Punte a cannone ad 1 tagliente E 800 con inserti intercambiabili	Metallo duro	TLB E 800
89535	265		Norma di fab.	TiN	Inserti per punte a cannone E 800	Metallo duro	
89536	266		Norma di fab.	TiN	Pattini di guida per punte a cannone E 800	Metallo duro	
89550	209	3xD	DIN 6537K	AlTiN nano	Punte TS con canali di lubrificazione	Metallo duro	TS 100 INOX
89551	218	5xD	DIN 6537L	AlTiN nano	Punte TS con canali di lubrificazione	Metallo duro	TS 100 INOX

HARTNER
SISTEMI DI DISTRIBUZIONE DI UTENSILI

I sistemi Hartner di distribuzione di utensili TM 326, TM 426 e TM 526 ottimizzano il vostro magazzino e la vostra gestione degli utensili. Ottenete maggiore sicurezza sul vostro stock di utensili e otterrete più trasparenza per la loro gestione!

TM 326

Sistema modulare di distribuzione di utensili

TM 426

Il sistema a spirale per lo stoccaggio di grandi quantità di utensili di piccole dimensioni

TM 526

Il sistema a cassetti con il 100% di controllo sul prelievo degli utensili

HARTNER

Precision Cutting Tools

MODERNI SISTEMI DI DISTRIBUZIONE DEGLI UTENSILI

Automatizzazione dei processi di acquisto

Creazione di report

Disponibilità di dati per la loro elaborazione

Scambio di dati

HARTNER

Precision Cutting Tools

AUMENTO DELLE PRESTAZIONI

ATTRAVERSO L'OTTIMIZZAZIONE DEI PROCESSI DI GESTIONE

"I sistemi di distribuzione di utensili Hartner permettono l'aumento dell'efficienza economica e del lavoro in imprese di ogni dimensione."

I NOSTRI CLIENTI CI CONFERMANO:

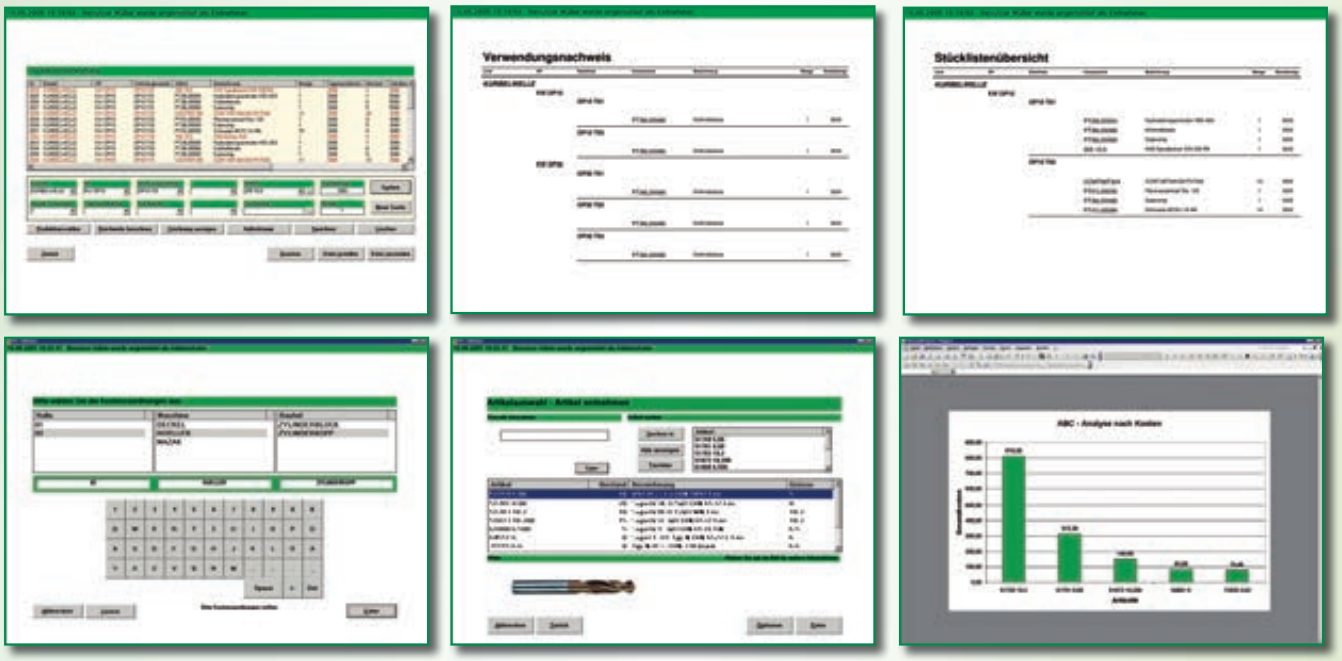
10 % in **meno di costo utensili**

1 ora in **meno di gestione/amministrazione** al giorno

14 % in **meno di fermi macchina**

24 ore di **gestione controllata della distribuzione degli utensili**

INTELLIGENZA INTEGRATA:
IL SOFTWARE PER IL TOOL MANAGEMENT



MODULO ENTRATA MERCI
FORNITORI SOTTO CONTROLLO

MODULO DI GESTIONE ORDINI
PIANIFICATO DALLA A-Z

MODULO DELLO STOCCAGGIO CON GESTIONE DELLA RIAFFILATURA
TUTTI I DATI A PORTATA DI MANO

MODULO DEL RILEVAMENTO DELL'USURA
EFFICIENZA DELL'UTENSILE SOTTO CONTROLLO

DATABASE DEI PRODOTTI
IL CUORE DEL SOFTWARE PER IL TOOL MANAGEMENT

MODULO DEI COMPONENTI DEGLI ARTICOLI
CHIAREZZA E FACILITÀ DI INDIVIDUAZIONE

MODULO PER IL CONTROLLO DEI FERMI MACCHINA
PREVENIRE I FERMI MACCHINA

MODULO DI GESTIONE DEGLI STRUMENTI DI MISURA
CONOSCERE TUTTO CIÒ CHE ACCADE

HARTNER

Precision Cutting Tools

PUNTE ELICOIDALI CON CODOLO CILINDRICO

in HSS, HSS-E, HSS-E-PM, metallo duro
lucide e ricoperte

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina

Punte elicoidali, corte

						DIN 338	N	HSS	>Ø 2,36	destra	cil.	~5xD	0,200 - 20,000	81010	23

						DIN 338	N	HSS	>Ø 6,00	sinistra	cil.	~5xD	0,250 - 17,000	81015	27

						DIN 338	N	HSS		destra	cil.	~5xD	3,000 - 13,000	81017	29

						DIN 338	H	HSS		destra	cil.	~5xD	0,300 - 19,000	81020	32

						DIN 338	H	HSS		sinistra	cil.	~5xD	0,500 - 16,000	81025	34

						DIN 338	W	HSS		destra	cil.	~5xD	0,250 - 16,500	81030	36

						DIN 338	W	HSS		sinistra	cil.	~5xD	0,500 - 15,000	81035	38

						DIN 338	FN	HSS	>Ø 2,36	destra	cil.	~5xD	0,800 - 16,000	81040	39

						DIN 338	FN	HSS	>Ø 2,36	sinistra	cil.	~5xD	1,400 - 16,000	81045	41

						DIN 338	N	HSS	T	destra	cil.	~5xD	0,400 - 19,500	84405	30

						DIN 338	N	HSS	T	destra	cil.	~5xD	1,000 - 16,000	84406	43

						DIN 338	FN	HSS	T	destra	cil.	~5xD	1,000 - 16,000	84415	45

						DIN 338	FN	HSS	F	destra	cil.	~5xD	1,000 - 16,000	84502	45

						DIN 338	N	M42		destra	cil.	~5xD	1,000 - 14,000	81012	65

Punte elicoidali, corte

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina
●	○	●	○			DIN 338	N	HSS-E	>Ø 2,36	destra	cil.	~5xD	0,200 - 20,000	**81011**	47
○	●		○	○		DIN 338	IS	HSS-E	○	destra	cil.	~5xD	1,000 - 13,000	**81013**	55
●	○	●	●			DIN 338	FN	HSS-E	>Ø 2,36	destra	cil.	~5xD	1,000 - 12,700	**81041**	49
○	●			●		DIN 338	S	HSS-E	○	destra	cil.	~5xD	0,200 - 17,500	**81061**	57
●	○	○	○			DIN 338	P2000	HSS-E	●	destra	cil.	~5xD	1,000 - 13,000	**81062**	59
●	○	○	○			DIN 338	P2000	HSS-E	M	destra	cil.	~5xD	3,300 - 12,000	**81063**	63
●	○	●	○			DIN 338	FN	HSS-E	F	destra	cil.	~5xD	1,000 - 13,000	**84504**	51
○	●			●		DIN 338	S	HSS-E	F	destra	cil.	~5xD	0,500 - 13,000	**84505**	61
●	○	●	○			DIN 338	FN	HSS-E	T	destra	cil.	~5xD	1,000 - 13,000	**84800**	51
●	●	●	●			DIN 338	FU 500 DZ	HSS-E	T	destra	cil.	~5xD	1,000 - 14,000	**84802**	53
●	●	●	●			DIN 338	FU 500 DZ	HSS-E	○	destra	cil.	~5xD	1,000 - 14,000	**84804**	53
○	●			●		DIN 338	S	HSS-E	T	destra	cil.	~5xD	0,500 - 13,000	**84807**	61
●	○	●	○	○	○	DIN 338	FN 500 DZ	HSS-E-PM	T	destra	cil.	~5xD	1,000 - 14,000	**84811**	64
○	○	○	●	○		Norma di fab.	N	Metallo duro	○	destra	cil.	~5xD	1,000 - 12,000	**89244**	67

Punte elicoidali, extra corte

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina
●		●	○			DIN 1897	N	HSS	>Ø 2,36	destra	cil.	~3xD	0,500 - 39,500	**81110**	69
●		●	○			DIN 1897	N	HSS	>Ø 5,00	sinistra	cil.	~3xD	0,500 - 36,500	**81115**	71
●			●			DIN 1897	H	HSS	○	destra	cil.	~3xD	1,200 - 15,000	**81120**	75
●			●			DIN 1897	W	HSS	○	destra	cil.	~3xD	1,500 - 16,000	**81130**	76
●	○	○	●			DIN 1897	FN	HSS	<Ø 2,36 >Ø 16,0	destra	cil.	~3xD	1,500 - 15,500	**81140**	77
●	○	○	●			DIN 1897	FN	HSS	<Ø 2,36 >Ø 16,0	sinistra	cil.	~3xD	1,000 - 16,000	**81145**	78
●		●	○			DIN 1897	N	HSS	T	destra	cil.	~3xD	1,000 - 25,000	**84400**	73
●		●	●			DIN 1897	N	HSS	F	destra	cil.	~3xD	1,000 - 25,000	**84501**	73
●	●	●	○	●	○	DIN 1897	V	HSS-E	>Ø 2,36	destra	cil.	~3xD	0,400 - 25,000	**81171**	81
○	●		○	○		DIN 1897	IS	HSS-E	○	destra	cil.	~3xD	1,000 - 12,000	**81173**	80
●	●	●	○	●	○	DIN 1897	V	HSS-E	F	destra	cil.	~3xD	0,500 - 15,000	**84503**	83
●	●	●	○	●	○	DIN 1897	V	HSS-E	T	destra	cil.	~3xD	0,500 - 15,000	**84803**	83
●	●	●	●			DIN 1897	FU 500 DZ	HSS-E	T	destra	cil.	~3xD	1,000 - 14,000	**84806**	85
●	●	●	○			DIN 1897	FU 500 DZ	HSS-E	○	destra	cil.	~3xD	1,000 - 14,000	**84808**	85

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina

Punte elicoidali, extra corte

●	○	●	○	○	○	DIN 1897	FN 500	HSS-E-PM	F	destra	cil.	~3xD	1,000 - 13,500	**84511**	87

○	○	○	●	○		DIN 6539	N	Metallo duro	◯	destra	cil.	~3xD	0,800 - 16,000	**89235**	89

○	○	○	○	○	○	Norma di fab.	N	Metallo duro	◯	destra	cil.	~3xD	0,500 - 6,500	**89246**	91

Punte con codolo rinforzato

●	●	●	●			Norma di fab.	FU 500	HSS-E	T	destra	HA	~3xD	2,000 - 20,000	**84805**	92

●	●	●	●			Norma di fab.	FU 500	HSS-E	T	destra	HA	~5xD	2,000 - 20,000	**84801**	94

●	○	●	○	○	○	Norma di fab.	FN 500	HSS-E-PM	F	destra	HA	~5xD	2,000 - 13,000	**84507**	96

Serie di punte

						Norma di fab.								**88303**	101

●	○	○	○			DIN 1897	P2000	HSS-E	M	destra	cil.	~3xD		**88015**	99

Serie di punte

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina
●		●	○			DIN 338	N	HSS	>Ø 2,36	destra	cil.	~5xD		**88013**	98

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina
●		●	○			DIN 338	N	HSS	T	destra	cil.	~5xD		**88016**	99

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina
●	○	○	○			DIN 338	P2000	HSS-E		destra	cil.	~5xD		**88014**	98

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina
●		●	○			DIN 338	N	HSS-E		destra	cil.	~5xD		**88026**	100

Punte per centri CN

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina
●	○	●	●	○		Norma di fab.	N	HSS	○	destra	cil.		3,000 - 25,000	**81191**	104

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina
●	○	●	●	○		Norma di fab.	N	HSS	○	destra	cil.		3,000 - 25,000	**81192**	102

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina

Punte per centri CN

●	○	●	●	○		Norma di fab.	N	HSS	T	destra	cil.		3,000 - 25,000	**84434**	104

●	○	●	●	○		Norma di fab.	N	HSS	T	destra	cil.		3,000 - 25,000	**84435**	102

○	○	○	○	○	○	Norma di fab.	N	Metallo duro	◯	destra	cil.		4,000 - 20,000	**89242**	105

○	○	○	○	○	○	Norma di fab.	N	Metallo duro	◯	destra	cil.		4,000 - 20,000	**89243**	103

○	○	○	○	○	○	Norma di fab.	N	Metallo duro	◯	destra	HB		4,000 - 20,000	**89249**	105

Punte doppie per carrozzeria

●	○	●	●	○		Norma di fab.	N	HSS	◯ ≥Ø 2,36	destra			2,000 - 10,000	**81190**	106

Punte con fori di refrigerazione

●	●	●	●	●		Norma di fab.	FN	HSS-E	◯	destra	HE	~5xD	5,000 - 20,000	**82761**	108

●	●	●	●	●	○	Norma di fab.	FN	HSS-E	T	destra	HE	~5xD	5,000 - 20,000	**84461**	108

●	○	●	●	○		Norma di fab.	FN	HSS	◯	destra	cil.	~10xD	3,000 - 13,000	**82710**	107

Punte per foratura con bussola di guida

●		●	○			DIN 339	N	HSS	◯ ≥Ø 2,36	destra	cil.	~10xD	0,800 - 19,000	**81210**	109

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina

Punte elicoidali, lunghe

						DIN 340	N	HSS	>Ø 2,36	destra	cil.	~10xD	0,400 - 23,500	**81310**	111

						DIN 340	N	HSS	>Ø 6,00	sinistra	cil.	~10xD	0,900 - 15,000	**81315**	113

						DIN 340	N	HSS		destra	cil.	~10xD	3,100 - 10,000	**81317**	114

						DIN 340	H	HSS		destra	cil.	~10xD	0,600 - 15,000	**81320**	117

						DIN 340	W	HSS		destra	cil.	~10xD	0,500 - 20,000	**81330**	118

						DIN 340	FN	HSS	>Ø 2,36	destra	cil.	~10xD	0,900 - 14,000	**81340**	120

						DIN 340	FW	HSS		destra	cil.	~10xD	1,000 - 14,000	**81350**	124

						DIN 340	N	HSS	T	destra	cil.	~10xD	0,500 - 16,000	**84418**	115

						DIN 340	FN	HSS	T	destra	cil.	~10xD	1,000 - 14,000	**84423**	122

						DIN 340	FN	HSS	F	destra	cil.	~10xD	1,000 - 14,000	**84506**	122

						DIN 340	N	HSS-E	>Ø 2,36	destra	cil.	~10xD	0,500 - 12,500	**81311**	126

						DIN 340	FN	HSS-E	>Ø 2,36	destra	cil.	~10xD	1,000 - 16,000	**81341**	127

						DIN 340	S	HSS-E		destra	cil.	~10xD	1,000 - 13,000	**81361**	129

						DIN 340	S	HSS-E	T	destra	cil.	~10xD	1,000 - 13,000	**81362**	129

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina
Punte elicoidali, lunghe															
●	●	●	●			DIN 340	FU 500 DZ	**HSS-E**	(T)	destra	cil.	~10xD	1,000 - 14,000	**84812**	131
●	●	●	●			DIN 340	FU 500 DZ	**HSS-E**	○	destra	cil.	~10xD	1,000 - 14,000	**84814**	131
○		○			○	Norma di fab.	N	**Metallo duro**	○	destra	cil.	~10xD	0,500 - 1,500	**89286**	133
Punte elicoidali in lunghezze speciali, grandezza 1															
●		●	○			DIN 1869	N	**HSS**	>Ø 2,36	destra	cil.	~15xD	1,600 - 13,000	**81410**	134
●		●	●			DIN 1869	FN	**HSS**	>Ø 2,36	destra	cil.	~15xD	2,000 - 13,000	**81440**	135
○			●			DIN 1869	FW	**HSS**	○	destra	cil.	~15xD	2,000 - 9,500	**81450**	137
●		●	●			DIN 1869	FN	**HSS**	(T)	destra	cil.	~15xD	2,000 - 12,000	**84425**	136
●	●	●	●		○	DIN 1869	FN	**HSS-E**	◓	destra	cil.	~15xD	3,000 - 10,000	**81441**	138
Punte elicoidali in lunghezze speciali, grandezza 2															
●		●	○			DIN 1869	N	**HSS**	●	destra	cil.	~20xD	3,000 - 12,000	**81510**	139
●		●	●			DIN 1869	FN	**HSS**	>Ø 2,36	destra	cil.	~20xD	2,000 - 13,000	**81540**	140
●		●	●	○		DIN 1869	FN	**HSS**	(T)	destra	cil.	~20xD	3,000 - 8,500	**84426**	141
●	●	●	●		○	DIN 1869	FN	**HSS-E**	◓	destra	cil.	~20xD	3,000 - 10,000	**81541**	142

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina
Punte elicoidali in lunghezze speciali, grandezza 3															
●		●	○			DIN 1869	N	**HSS**		destra	cil.	~25xD	4,000 - 12,000	**81610**	143
●		●	●			DIN 1869	FN	**HSS**		destra	cil.	~25xD	3,000 - 13,000	**81640**	144
Punte elicoidali, extra lunghe															
●		●	●			Norma di fab.	FN	**HSS**		destra	cil.	>25xD	6,000 - 12,000	**81740**	145
●		●	●			Norma di fab.	FN	**HSS**		destra	cil.	>25xD	8,000 - 12,000	**81750**	146
●		●	●			Norma di fab.	FN	**HSS**		destra	cil.	>25xD	10,000 - 12,000	**81760**	147
Punte per fori conici															
●	○	●	○			DIN 1898	N	**HSS**		destra	cil.		2,000 - 12,000	**81810**	148
Punte speciali, con taglienti in MD															
○		○			○	DIN 8037	N	**Metallo duro**		destra	cil.		2,600 - 20,000	**89301**	150
○		○			○	DIN 8038	N	**Metallo duro**		destra	cil.		3,100 - 8,000	**89303**	149
Allargatori cilindrici															
●	○	●	○			DIN 344	N	**HSS**		destra	cil.		3,800 - 15,000	**86010**	151

HARTNER

Punte elicoidali, corte

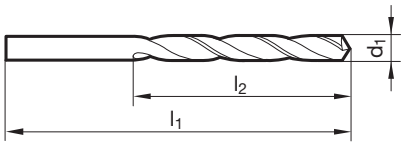
Articolo nr. 81010

P	M	K	N	S	H
•		•	○		

HSS | >Ø 2,36 | N | ~5xD | DIN 338 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente

acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato e grafite



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,200		19,000	2,500	0,640		26,000	8,000
0,220		19,000	2,500	0,650		26,000	8,000
0,230		19,000	2,500	0,660		26,000	8,000
0,240		19,000	2,500	0,670		26,000	8,000
0,250		19,000	3,000	0,680		28,000	9,000
0,260		19,000	3,000	0,690		28,000	9,000
0,270		19,000	3,000	0,700		28,000	9,000
0,280		19,000	3,000	0,710		28,000	9,000
0,290		19,000	3,000	0,720		28,000	9,000
0,300		19,000	3,000	0,730		28,000	9,000
0,310		19,000	4,000	0,740		28,000	9,000
0,320		19,000	4,000	0,750		28,000	9,000
0,330		19,000	4,000	0,760		30,000	10,000
0,350		19,000	4,000	0,770		30,000	10,000
0,360		19,000	4,000	0,780		30,000	10,000
0,370		19,000	4,000	0,790	1/32	30,000	10,000
0,380		19,000	4,000	0,800		30,000	10,000
0,390		20,000	5,000	0,810		30,000	10,000
0,400		20,000	5,000	0,820		30,000	10,000
0,410		20,000	5,000	0,830		30,000	10,000
0,420		20,000	5,000	0,840		30,000	10,000
0,430		20,000	5,000	0,850		30,000	10,000
0,440		20,000	5,000	0,860		32,000	11,000
0,450		20,000	5,000	0,870		32,000	11,000
0,460		20,000	5,000	0,880		32,000	11,000
0,470		20,000	5,000	0,890		32,000	11,000
0,480		20,000	5,000	0,900		32,000	11,000
0,490		22,000	6,000	0,910		32,000	11,000
0,500		22,000	6,000	0,920		32,000	11,000
0,510		22,000	6,000	0,930		32,000	11,000
0,520		22,000	6,000	0,950		32,000	11,000
0,530		22,000	6,000	0,960		34,000	12,000
0,540		24,000	7,000	0,970		34,000	12,000
0,550		24,000	7,000	0,980		34,000	12,000
0,560		24,000	7,000	0,990		34,000	12,000
0,570		24,000	7,000	1,000		34,000	12,000
0,580		24,000	7,000	1,010		34,000	12,000
0,590		24,000	7,000	1,020		34,000	12,000
0,600		24,000	7,000	1,030		34,000	12,000
0,610		26,000	8,000	1,040		34,000	12,000
0,620		26,000	8,000	1,050		34,000	12,000
0,630		26,000	8,000	1,070		36,000	14,000

HARTNER

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,100		36,000	14,000	2,050		49,000	24,000
1,110		36,000	14,000	2,100		49,000	24,000
1,120		36,000	14,000	2,110		49,000	24,000
1,130		36,000	14,000	2,120		49,000	24,000
1,140		36,000	14,000	2,140		53,000	27,000
1,150		36,000	14,000	2,150		53,000	27,000
1,160		36,000	14,000	2,170		53,000	27,000
1,170		36,000	14,000	2,200		53,000	27,000
1,180		36,000	14,000	2,210		53,000	27,000
1,190	3/64	38,000	16,000	2,220		53,000	27,000
1,200		38,000	16,000	2,250		53,000	27,000
1,210		38,000	16,000	2,270		53,000	27,000
1,220		38,000	16,000	2,300		53,000	27,000
1,230		38,000	16,000	2,330		53,000	27,000
1,240		38,000	16,000	2,350		53,000	27,000
1,250		38,000	16,000	2,360		53,000	27,000
1,260		38,000	16,000	2,370		57,000	30,000
1,270		38,000	16,000	2,380	3/32	57,000	30,000
1,280		38,000	16,000	2,400		57,000	30,000
1,300		38,000	16,000	2,420		57,000	30,000
1,310		38,000	16,000	2,440		57,000	30,000
1,350		40,000	18,000	2,450		57,000	30,000
1,360		40,000	18,000	2,460		57,000	30,000
1,390		40,000	18,000	2,500		57,000	30,000
1,400		40,000	18,000	2,510		57,000	30,000
1,410		40,000	18,000	2,520		57,000	30,000
1,420		40,000	18,000	2,530		57,000	30,000
1,430		40,000	18,000	2,550		57,000	30,000
1,440		40,000	18,000	2,570		57,000	30,000
1,450		40,000	18,000	2,600		57,000	30,000
1,460		40,000	18,000	2,640		57,000	30,000
1,480		40,000	18,000	2,650		57,000	30,000
1,490		40,000	18,000	2,700		61,000	33,000
1,500		40,000	18,000	2,710		61,000	33,000
1,510		43,000	20,000	2,750		61,000	33,000
1,520		43,000	20,000	2,780	7/64	61,000	33,000
1,550		43,000	20,000	2,800		61,000	33,000
1,560		43,000	20,000	2,820		61,000	33,000
1,570		43,000	20,000	2,850		61,000	33,000
1,580		43,000	20,000	2,880		61,000	33,000
1,590	1/16	43,000	20,000	2,900		61,000	33,000
1,600		43,000	20,000	2,940		61,000	33,000
1,620		43,000	20,000	2,950		61,000	33,000
1,630		43,000	20,000	2,970		61,000	33,000
1,650		43,000	20,000	3,000		61,000	33,000
1,700		43,000	20,000	3,010		65,000	36,000
1,720		46,000	22,000	3,020		65,000	36,000
1,730		46,000	22,000	3,050		65,000	36,000
1,740		46,000	22,000	3,060		65,000	36,000
1,750		46,000	22,000	3,070		65,000	36,000
1,760		46,000	22,000	3,100		65,000	36,000
1,790		46,000	22,000	3,150		65,000	36,000
1,800		46,000	22,000	3,160		65,000	36,000
1,810		46,000	22,000	3,170	1/8	65,000	36,000
1,820		46,000	22,000	3,180		65,000	36,000
1,830		46,000	22,000	3,200		65,000	36,000
1,840		46,000	22,000	3,250		65,000	36,000
1,850		46,000	22,000	3,260		65,000	36,000
1,890		46,000	22,000	3,300		65,000	36,000
1,900		46,000	22,000	3,320		65,000	36,000
1,910		49,000	24,000	3,350		65,000	36,000
1,920		49,000	24,000	3,400		70,000	39,000
1,930		49,000	24,000	3,450		70,000	39,000
1,940		49,000	24,000	3,500		70,000	39,000
1,950		49,000	24,000	3,550		70,000	39,000
1,980	5/64	49,000	24,000	3,600		70,000	39,000
1,990		49,000	24,000	3,620		70,000	39,000
2,000		49,000	24,000	3,650		70,000	39,000
2,010		49,000	24,000	3,670		70,000	39,000
2,020		49,000	24,000	3,680		70,000	39,000
2,030		49,000	24,000	3,700		70,000	39,000
2,040		49,000	24,000	3,740		70,000	39,000

HARTNER

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
3,750		70,000	39,000	5,900		93,000	57,000
3,800		75,000	43,000	5,950	15/64	93,000	57,000
3,850		75,000	43,000	6,000		93,000	57,000
3,900		75,000	43,000	6,030		101,000	63,000
3,930		75,000	43,000	6,040		101,000	63,000
3,950		75,000	43,000	6,050		101,000	63,000
3,970	5/32	75,000	43,000	6,100		101,000	63,000
3,990		75,000	43,000	6,150		101,000	63,000
4,000		75,000	43,000	6,200		101,000	63,000
4,030		75,000	43,000	6,250		101,000	63,000
4,040		75,000	43,000	6,260		101,000	63,000
4,050		75,000	43,000	6,300		101,000	63,000
4,060		75,000	43,000	6,350	1/4	101,000	63,000
4,100		75,000	43,000	6,400		101,000	63,000
4,150		75,000	43,000	6,450		101,000	63,000
4,200		75,000	43,000	6,500		101,000	63,000
4,220		75,000	43,000	6,550		101,000	63,000
4,250		75,000	43,000	6,600		101,000	63,000
4,300		80,000	47,000	6,650		101,000	63,000
4,320		80,000	47,000	6,700		101,000	63,000
4,350		80,000	47,000	6,750	17/64	109,000	69,000
4,370	11/64	80,000	47,000	6,800		109,000	69,000
4,390		80,000	47,000	6,850		109,000	69,000
4,400		80,000	47,000	6,900		109,000	69,000
4,450		80,000	47,000	6,950		109,000	69,000
4,500		80,000	47,000	7,000		109,000	69,000
4,520		80,000	47,000	7,050		109,000	69,000
4,530		80,000	47,000	7,100		109,000	69,000
4,550		80,000	47,000	7,140	9/32	109,000	69,000
4,570		80,000	47,000	7,200		109,000	69,000
4,600		80,000	47,000	7,250		109,000	69,000
4,650		80,000	47,000	7,300		109,000	69,000
4,700		80,000	47,000	7,350		109,000	69,000
4,750		80,000	47,000	7,400		109,000	69,000
4,760	3/16	86,000	52,000	7,450		109,000	69,000
4,780		86,000	52,000	7,500		109,000	69,000
4,800		86,000	52,000	7,540	19/64	117,000	75,000
4,830		86,000	52,000	7,600		117,000	75,000
4,850		86,000	52,000	7,700		117,000	75,000
4,900		86,000	52,000	7,750		117,000	75,000
4,920		86,000	52,000	7,800		117,000	75,000
4,950		86,000	52,000	7,850		117,000	75,000
5,000		86,000	52,000	7,900		117,000	75,000
5,050		86,000	52,000	7,940	5/16	117,000	75,000
5,060		86,000	52,000	7,950		117,000	75,000
5,100		86,000	52,000	8,000		117,000	75,000
5,110		86,000	52,000	8,050		117,000	75,000
5,150		86,000	52,000	8,100		117,000	75,000
5,160	13/64	86,000	52,000	8,200		117,000	75,000
5,200		86,000	52,000	8,250		117,000	75,000
5,220		86,000	52,000	8,300		117,000	75,000
5,250		86,000	52,000	8,330	21/64	117,000	75,000
5,300		86,000	52,000	8,400		117,000	75,000
5,310		93,000	57,000	8,450		117,000	75,000
5,350		93,000	57,000	8,500		117,000	75,000
5,400		93,000	57,000	8,550		125,000	81,000
5,410		93,000	57,000	8,600		125,000	81,000
5,420		93,000	57,000	8,700		125,000	81,000
5,450		93,000	57,000	8,730	11/32	125,000	81,000
5,500		93,000	57,000	8,750		125,000	81,000
5,530		93,000	57,000	8,800		125,000	81,000
5,550		93,000	57,000	8,850		125,000	81,000
5,560	7/32	93,000	57,000	8,900		125,000	81,000
5,600		93,000	57,000	9,000		125,000	81,000
5,610		93,000	57,000	9,050		125,000	81,000
5,620		93,000	57,000	9,100		125,000	81,000
5,650		93,000	57,000	9,130	23/64	125,000	81,000
5,700		93,000	57,000	9,150		125,000	81,000
5,750		93,000	57,000	9,200		125,000	81,000
5,790		93,000	57,000	9,250		125,000	81,000
5,800		93,000	57,000	9,300		125,000	81,000
5,850		93,000	57,000	9,350		125,000	81,000

HARTNER

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
9,400		125,000	81,000	13,100	33/64	151,000	101,000
9,500		125,000	81,000	13,200		151,000	101,000
9,520	3/8	133,000	87,000	13,250		160,000	108,000
9,550		133,000	87,000	13,300		160,000	108,000
9,600		133,000	87,000	13,400		160,000	108,000
9,650		133,000	87,000	13,490	17/32	160,000	108,000
9,700		133,000	87,000	13,500		160,000	108,000
9,750		133,000	87,000	13,600		160,000	108,000
9,800		133,000	87,000	13,700		160,000	108,000
9,900		133,000	87,000	13,750		160,000	108,000
9,920	25/64	133,000	87,000	13,800		160,000	108,000
9,950		133,000	87,000	13,900		160,000	108,000
10,000		133,000	87,000	14,000		160,000	108,000
10,050		133,000	87,000	14,100		169,000	114,000
10,080		133,000	87,000	14,200		169,000	114,000
10,100		133,000	87,000	14,250		169,000	114,000
10,200		133,000	87,000	14,300		169,000	114,000
10,250		133,000	87,000	14,400		169,000	114,000
10,300		133,000	87,000	14,500		169,000	114,000
10,320	13/32	133,000	87,000	14,600		169,000	114,000
10,400		133,000	87,000	14,680	37/64	169,000	114,000
10,500		133,000	87,000	14,700		169,000	114,000
10,600		133,000	87,000	14,750		169,000	114,000
10,700		142,000	94,000	14,800		169,000	114,000
10,720	27/64	142,000	94,000	14,900		169,000	114,000
10,750		142,000	94,000	15,000		169,000	114,000
10,800		142,000	94,000	15,080	19/32	178,000	120,000
10,900		142,000	94,000	15,100		178,000	120,000
11,000		142,000	94,000	15,200		178,000	120,000
11,100		142,000	94,000	15,250		178,000	120,000
11,110	7/16	142,000	94,000	15,400		178,000	120,000
11,150		142,000	94,000	15,500		178,000	120,000
11,200		142,000	94,000	15,600		178,000	120,000
11,250		142,000	94,000	15,700		178,000	120,000
11,300		142,000	94,000	15,750		178,000	120,000
11,400		142,000	94,000	15,800		178,000	120,000
11,500		142,000	94,000	15,870	5/8	178,000	120,000
11,510	29/64	142,000	94,000	16,000		178,000	120,000
11,600		142,000	94,000	16,100		184,000	125,000
11,700		142,000	94,000	16,200		184,000	125,000
11,750		142,000	94,000	16,250		184,000	125,000
11,800		142,000	94,000	16,270	41/64	184,000	125,000
11,900		151,000	101,000	16,500		184,000	125,000
11,910	15/32	151,000	101,000	16,700		184,000	125,000
12,000		151,000	101,000	16,900		184,000	125,000
12,050		151,000	101,000	17,000		184,000	125,000
12,100		151,000	101,000	17,250		191,000	130,000
12,200		151,000	101,000	17,500		191,000	130,000
12,250		151,000	101,000	17,750		191,000	130,000
12,300	31/64	151,000	101,000	17,800		191,000	130,000
12,400		151,000	101,000	18,000		191,000	130,000
12,500		151,000	101,000	18,500		198,000	135,000
12,600		151,000	101,000	18,750		198,000	135,000
12,650		151,000	101,000	19,000		198,000	135,000
12,700	1/2	151,000	101,000	19,250		205,000	140,000
12,750		151,000	101,000	19,500		205,000	140,000
12,800		151,000	101,000	20,000		205,000	140,000
12,850		151,000	101,000				
12,900		151,000	101,000				
13,000		151,000	101,000				

Punte elicoidali, corte

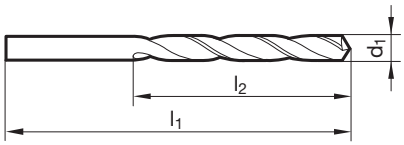
Articolo nr. 81015

P	M	K	N	S	H
•		•	○		

HSS | >Ø 6,00 | N | ~5xD | DIN 338 | 118° | h8 | L | Cyl

Assott. del nocc. ≥ Ø 15,000 • spoglia sul cono tagliente

acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato e grafite



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,250		19,000	3,000	2,600		57,000	30,000
0,300		19,000	3,000	2,700		61,000	33,000
0,370		19,000	4,000	2,750		61,000	33,000
0,400		20,000	5,000	2,800		61,000	33,000
0,500		22,000	6,000	2,900		61,000	33,000
0,550		24,000	7,000	3,000		61,000	33,000
0,600		24,000	7,000	3,050		65,000	36,000
0,650		26,000	8,000	3,100		65,000	36,000
0,700		28,000	9,000	3,150		65,000	36,000
0,800		30,000	10,000	3,200		65,000	36,000
0,900		32,000	11,000	3,250		65,000	36,000
0,950		32,000	11,000	3,300		65,000	36,000
1,000		34,000	12,000	3,350		65,000	36,000
1,050		34,000	12,000	3,400		70,000	39,000
1,100		36,000	14,000	3,450		70,000	39,000
1,150		36,000	14,000	3,500		70,000	39,000
1,170		36,000	14,000	3,550		70,000	39,000
1,190	3/64	38,000	16,000	3,600		70,000	39,000
1,200		38,000	16,000	3,650		70,000	39,000
1,250		38,000	16,000	3,700		70,000	39,000
1,300		38,000	16,000	3,750		70,000	39,000
1,350		40,000	18,000	3,800		75,000	43,000
1,400		40,000	18,000	3,850		75,000	43,000
1,450		40,000	18,000	3,900		75,000	43,000
1,500		40,000	18,000	3,950		75,000	43,000
1,550		43,000	20,000	4,000		75,000	43,000
1,560		43,000	20,000	4,100		75,000	43,000
1,600		43,000	20,000	4,150		75,000	43,000
1,700		43,000	20,000	4,200		75,000	43,000
1,800		46,000	22,000	4,250		75,000	43,000
1,850		46,000	22,000	4,300		80,000	47,000
1,900		46,000	22,000	4,350		80,000	47,000
2,000		49,000	24,000	4,400		80,000	47,000
2,050		49,000	24,000	4,450		80,000	47,000
2,100		49,000	24,000	4,500		80,000	47,000
2,150		53,000	27,000	4,550		80,000	47,000
2,200		53,000	27,000	4,600		80,000	47,000
2,250		53,000	27,000	4,650		80,000	47,000
2,300		53,000	27,000	4,700		80,000	47,000
2,400		57,000	30,000	4,750		80,000	47,000
2,500		57,000	30,000	4,800		86,000	52,000
2,550		57,000	30,000	4,850		86,000	52,000

HARTNER

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
4,900		86,000	52,000	8,700		125,000	81,000
4,950		86,000	52,000	8,800		125,000	81,000
5,000		86,000	52,000	8,900		125,000	81,000
5,100		86,000	52,000	9,000		125,000	81,000
5,200		86,000	52,000	9,100		125,000	81,000
5,250		86,000	52,000	9,200		125,000	81,000
5,300		86,000	52,000	9,300		125,000	81,000
5,400		93,000	57,000	9,400		125,000	81,000
5,450		93,000	57,000	9,500		125,000	81,000
5,500		93,000	57,000	9,600		133,000	87,000
5,600		93,000	57,000	9,700		133,000	87,000
5,650		93,000	57,000	9,750		133,000	87,000
5,700		93,000	57,000	9,800		133,000	87,000
5,750		93,000	57,000	9,900		133,000	87,000
5,800		93,000	57,000	10,000		133,000	87,000
5,850		93,000	57,000	10,100		133,000	87,000
5,900		93,000	57,000	10,200		133,000	87,000
5,950	15/64	93,000	57,000	10,300		133,000	87,000
6,000		93,000	57,000	10,500		133,000	87,000
6,100		101,000	63,000	10,750		142,000	94,000
6,200		101,000	63,000	10,900		142,000	94,000
6,250		101,000	63,000	11,000		142,000	94,000
6,300		101,000	63,000	11,100		142,000	94,000
6,400		101,000	63,000	11,250		142,000	94,000
6,500		101,000	63,000	11,500		142,000	94,000
6,600		101,000	63,000	11,750		142,000	94,000
6,650		101,000	63,000	11,800		142,000	94,000
6,700		101,000	63,000	12,000		151,000	101,000
6,750	17/64	109,000	69,000	12,250		151,000	101,000
6,800		109,000	69,000	12,500		151,000	101,000
6,900		109,000	69,000	12,700	1/2	151,000	101,000
7,000		109,000	69,000	12,750		151,000	101,000
7,100		109,000	69,000	12,800		151,000	101,000
7,200		109,000	69,000	13,000		151,000	101,000
7,250		109,000	69,000	13,800		160,000	108,000
7,300		109,000	69,000	14,000		160,000	108,000
7,400		109,000	69,000	15,000		169,000	114,000
7,500		109,000	69,000	15,500		178,000	120,000
7,600		117,000	75,000	16,000		178,000	120,000
7,700		117,000	75,000	17,000		184,000	125,000
7,800		117,000	75,000				
7,900		117,000	75,000				
8,000		117,000	75,000				
8,100		117,000	75,000				
8,200		117,000	75,000				
8,400		117,000	75,000				
8,500		117,000	75,000				
8,600		125,000	81,000				

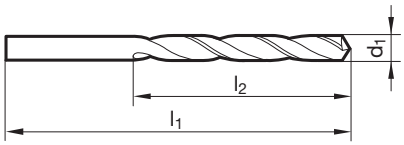
Punte elicoidali, corte

Articolo nr. 81017

P	M	K	N	S	H
●		●	○		

HSS | N | ~5xD | DIN 338 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • con dente di trascinamento secondo DIN 1809
acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato e grafite



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
3,000		61,000	33,000	6,750	17/64	109,000	69,000
3,100		65,000	36,000	6,800		109,000	69,000
3,200		65,000	36,000	7,000		109,000	69,000
3,300		65,000	36,000	7,200		109,000	69,000
3,400		70,000	39,000	7,500		109,000	69,000
3,500		70,000	39,000	7,700		117,000	75,000
3,600		70,000	39,000	7,750		117,000	75,000
3,700		70,000	39,000	7,800		117,000	75,000
3,800		75,000	43,000	7,900		117,000	75,000
4,000		75,000	43,000	8,000		117,000	75,000
4,100		75,000	43,000	8,100		117,000	75,000
4,200		75,000	43,000	8,250		117,000	75,000
4,300		80,000	47,000	8,400		117,000	75,000
4,400		80,000	47,000	8,500		117,000	75,000
4,500		80,000	47,000	8,600		125,000	81,000
4,600		80,000	47,000	8,700		125,000	81,000
4,700		80,000	47,000	8,800		125,000	81,000
4,800		86,000	52,000	8,900		125,000	81,000
4,900		86,000	52,000	9,000		125,000	81,000
5,000		86,000	52,000	9,100		125,000	81,000
5,100		86,000	52,000	9,500		125,000	81,000
5,200		86,000	52,000	9,800		133,000	87,000
5,400		93,000	57,000	9,900		133,000	87,000
5,500		93,000	57,000	10,000		133,000	87,000
5,600		93,000	57,000	10,200		133,000	87,000
5,700		93,000	57,000	10,500		133,000	87,000
5,750		93,000	57,000	12,000		151,000	101,000
5,800		93,000	57,000	13,000		151,000	101,000
5,900		93,000	57,000				
6,000		93,000	57,000				
6,100		101,000	63,000				
6,200		101,000	63,000				
6,300		101,000	63,000				
6,400		101,000	63,000				
6,500		101,000	63,000				
6,700		101,000	63,000				

HARTNER

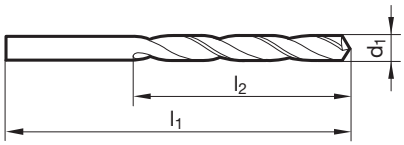
Punte elicoidali, corte

Articolo nr. 84405

P	M	K	N	S	H
●		●	○		

HSS | T | N | ~5xD | DIN 338 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente
acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato e grafite



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,400		20,000	5,000	2,700		61,000	33,000
0,500		22,000	6,000	2,750		61,000	33,000
0,600		24,000	7,000	2,800		61,000	33,000
0,610		26,000	8,000	2,850		61,000	33,000
0,700		28,000	9,000	2,900		61,000	33,000
0,800		30,000	10,000	2,950		61,000	33,000
0,820		30,000	10,000	3,000		61,000	33,000
0,900		32,000	11,000	3,050		65,000	36,000
1,000		34,000	12,000	3,100		65,000	36,000
1,020		34,000	12,000	3,150		65,000	36,000
1,100		36,000	14,000	3,200		65,000	36,000
1,150		36,000	14,000	3,250		65,000	36,000
1,200		38,000	16,000	3,300		65,000	36,000
1,250		38,000	16,000	3,400		70,000	39,000
1,300		38,000	16,000	3,450		70,000	39,000
1,350		40,000	18,000	3,500		70,000	39,000
1,400		40,000	18,000	3,550		70,000	39,000
1,450		40,000	18,000	3,600		70,000	39,000
1,500		40,000	18,000	3,650		70,000	39,000
1,550		43,000	20,000	3,700		70,000	39,000
1,600		43,000	20,000	3,750		70,000	39,000
1,650		43,000	20,000	3,800		75,000	43,000
1,700		43,000	20,000	3,900		75,000	43,000
1,750		46,000	22,000	3,950		75,000	43,000
1,800		46,000	22,000	4,000		75,000	43,000
1,820		46,000	22,000	4,100		75,000	43,000
1,900		46,000	22,000	4,150		75,000	43,000
2,000		49,000	24,000	4,200		75,000	43,000
2,050		49,000	24,000	4,250		75,000	43,000
2,100		49,000	24,000	4,300		80,000	47,000
2,150		53,000	27,000	4,400		80,000	47,000
2,200		53,000	27,000	4,500		80,000	47,000
2,250		53,000	27,000	4,600		80,000	47,000
2,300		53,000	27,000	4,700		80,000	47,000
2,400		57,000	30,000	4,800		86,000	52,000
2,450		57,000	30,000	4,900		86,000	52,000
2,500		57,000	30,000	5,000		86,000	52,000
2,520		57,000	30,000	5,100		86,000	52,000
2,530		57,000	30,000	5,200		86,000	52,000
2,550		57,000	30,000	5,250		86,000	52,000
2,600		57,000	30,000	5,300		86,000	52,000
2,650		57,000	30,000	5,400		93,000	57,000

HARTNER

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm
5,500		93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
6,000		93,000	57,000
6,040		101,000	63,000
6,100		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,550		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,600		117,000	75,000
7,700		117,000	75,000
7,750		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,750		125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
9,750		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,500		133,000	87,000
10,600		133,000	87,000
10,700		142,000	94,000
10,750		142,000	94,000
10,800		142,000	94,000
11,000		142,000	94,000
11,100		142,000	94,000
11,200		142,000	94,000
11,250		142,000	94,000
11,300		142,000	94,000
11,400		142,000	94,000
11,500		142,000	94,000
11,600		142,000	94,000
11,700		142,000	94,000
11,750		142,000	94,000
11,800		142,000	94,000
11,900		151,000	101,000
12,000		151,000	101,000
12,100		151,000	101,000
12,200		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
12,800		151,000	101,000
12,900		151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,250		160,000	108,000
13,500		160,000	108,000
13,750		160,000	108,000
14,000		160,000	108,000
14,200		169,000	114,000
14,250		169,000	114,000
14,500		169,000	114,000
14,750		169,000	114,000
15,000		169,000	114,000
15,250		178,000	120,000
15,500		178,000	120,000
15,750		178,000	120,000
15,800		178,000	120,000
16,000		178,000	120,000
16,500		184,000	125,000
17,000		184,000	125,000
17,500		191,000	130,000
18,000		191,000	130,000
18,500		198,000	135,000
19,000		198,000	135,000
19,500		205,000	140,000

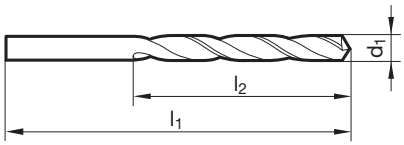
Punte elicoidali, corte

Articolo nr. 81020

P	M	K	N	S	H
			•		

HSS | H | ~5xD | DIN 338 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 14,500 • spoglia sul cono tagliente
materiali duri e secchi • ottone, leghe di magnesio • bronze, bronzo fosforoso • ardesia, mica, pertinax



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,300		19,000	3,000	2,120		49,000	24,000
0,320		19,000	4,000	2,200		53,000	27,000
0,400		20,000	5,000	2,250		53,000	27,000
0,440		20,000	5,000	2,300		53,000	27,000
0,450		20,000	5,000	2,400		57,000	30,000
0,480		20,000	5,000	2,450		57,000	30,000
0,500		22,000	6,000	2,500		57,000	30,000
0,560		24,000	7,000	2,550		57,000	30,000
0,600		24,000	7,000	2,600		57,000	30,000
0,650		26,000	8,000	2,700		61,000	33,000
0,700		28,000	9,000	2,780	7/64	61,000	33,000
0,750		28,000	9,000	2,800		61,000	33,000
0,800		30,000	10,000	2,900		61,000	33,000
0,810		30,000	10,000	2,950		61,000	33,000
0,840		30,000	10,000	3,000		61,000	33,000
0,900		32,000	11,000	3,020		65,000	36,000
0,910		32,000	11,000	3,050		65,000	36,000
0,950		32,000	11,000	3,070		65,000	36,000
1,000		34,000	12,000	3,100		65,000	36,000
1,050		34,000	12,000	3,150		65,000	36,000
1,100		36,000	14,000	3,200		65,000	36,000
1,150		36,000	14,000	3,250		65,000	36,000
1,200		38,000	16,000	3,300		65,000	36,000
1,250		38,000	16,000	3,350		65,000	36,000
1,280		38,000	16,000	3,400		70,000	39,000
1,300		38,000	16,000	3,500		70,000	39,000
1,310		38,000	16,000	3,550		70,000	39,000
1,400		40,000	18,000	3,600		70,000	39,000
1,420		40,000	18,000	3,700		70,000	39,000
1,450		40,000	18,000	3,750		70,000	39,000
1,500		40,000	18,000	3,800		75,000	43,000
1,510		43,000	20,000	3,850		75,000	43,000
1,550		43,000	20,000	3,900		75,000	43,000
1,600		43,000	20,000	4,000		75,000	43,000
1,700		43,000	20,000	4,050		75,000	43,000
1,800		46,000	22,000	4,100		75,000	43,000
1,850		46,000	22,000	4,200		75,000	43,000
1,900		46,000	22,000	4,250		75,000	43,000
1,950		49,000	24,000	4,300		80,000	47,000
2,000		49,000	24,000	4,400		80,000	47,000
2,050		49,000	24,000	4,500		80,000	47,000
2,100		49,000	24,000	4,600		80,000	47,000

HARTNER

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm
4,700		80,000	47,000
4,750		80,000	47,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000
5,200		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,050		109,000	69,000
7,100		109,000	69,000
7,200		109,000	69,000
7,250		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
8,000		117,000	75,000
8,050		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,200		125,000	81,000
9,250		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
9,750		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
10,000		133,000	87,000
10,050		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,500		133,000	87,000
10,600		133,000	87,000
10,800		142,000	94,000
11,000		142,000	94,000
11,200		142,000	94,000
11,500		142,000	94,000
12,000		151,000	101,000
12,100		151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
13,000		151,000	101,000
14,000		160,000	108,000
14,500		169,000	114,000
15,000		169,000	114,000
15,100		178,000	120,000
15,250		178,000	120,000
15,500		178,000	120,000
16,000		178,000	120,000
18,000		191,000	130,000
19,000		198,000	135,000

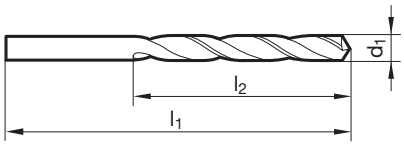
Punte elicoidali, corte

Articolo nr. 81025

P	M	K	N	S	H
			•		

HSS | H | ~5xD | DIN 338 | 118° | h8 | L | Cyl

Assott. del nocc. ≥ Ø 14,500 • spoglia sul cono tagliente
materiali duri e secchi • ottone, leghe di magnesio • bronze, bronzo fosforoso • ardesia, mica, pertinax



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,500		22,000	6,000	2,250		53,000	27,000
0,580		24,000	7,000	2,300		53,000	27,000
0,670		26,000	8,000	2,350		53,000	27,000
0,690		28,000	9,000	2,400		57,000	30,000
0,700		28,000	9,000	2,430		57,000	30,000
0,750		28,000	9,000	2,500		57,000	30,000
0,800		30,000	10,000	2,600		57,000	30,000
0,900		32,000	11,000	2,700		61,000	33,000
0,950		32,000	11,000	2,750		61,000	33,000
1,000		34,000	12,000	2,800		61,000	33,000
1,040		34,000	12,000	2,900		61,000	33,000
1,050		34,000	12,000	3,000		61,000	33,000
1,100		36,000	14,000	3,100		65,000	36,000
1,150		36,000	14,000	3,150		65,000	36,000
1,180		36,000	14,000	3,200		65,000	36,000
1,200		38,000	16,000	3,250		65,000	36,000
1,240		38,000	16,000	3,300		65,000	36,000
1,290		38,000	16,000	3,400		70,000	39,000
1,300		38,000	16,000	3,500		70,000	39,000
1,310		38,000	16,000	3,700		70,000	39,000
1,330		40,000	18,000	3,750		70,000	39,000
1,350		40,000	18,000	3,800		75,000	43,000
1,400		40,000	18,000	3,850		75,000	43,000
1,460		40,000	18,000	3,900		75,000	43,000
1,470		40,000	18,000	4,000		75,000	43,000
1,480		40,000	18,000	4,100		75,000	43,000
1,500		40,000	18,000	4,200		75,000	43,000
1,600		43,000	20,000	4,250		75,000	43,000
1,700		43,000	20,000	4,300		80,000	47,000
1,710		46,000	22,000	4,350		80,000	47,000
1,730		46,000	22,000	4,400		80,000	47,000
1,800		46,000	22,000	4,500		80,000	47,000
1,900		46,000	22,000	4,600		80,000	47,000
1,920		49,000	24,000	4,700		80,000	47,000
1,950		49,000	24,000	4,750		80,000	47,000
2,000		49,000	24,000	4,800		86,000	52,000
2,030		49,000	24,000	4,850		86,000	52,000
2,050		49,000	24,000	4,950		86,000	52,000
2,060		49,000	24,000	5,000		86,000	52,000
2,100		49,000	24,000	5,100		86,000	52,000
2,150		53,000	27,000	5,200		86,000	52,000
2,200		53,000	27,000	5,300		86,000	52,000

HARTNER

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
5,400		93,000	57,000	8,200		117,000	75,000
5,500		93,000	57,000	8,300		117,000	75,000
5,750		93,000	57,000	8,500		117,000	75,000
5,800		93,000	57,000	8,600		125,000	81,000
5,900		93,000	57,000	8,700		125,000	81,000
6,000		93,000	57,000	9,000		125,000	81,000
6,100		101,000	63,000	9,200		125,000	81,000
6,200		101,000	63,000	9,400		125,000	81,000
6,250		101,000	63,000	9,500		125,000	81,000
6,350	1/4	101,000	63,000	9,800		133,000	87,000
6,400		101,000	63,000	10,000		133,000	87,000
6,500		101,000	63,000	10,200		133,000	87,000
6,600		101,000	63,000	11,500		142,000	94,000
6,900		109,000	69,000	12,000		151,000	101,000
7,000		109,000	69,000	13,500		160,000	108,000
7,100		109,000	69,000	14,500		169,000	114,000
7,200		109,000	69,000	15,500		178,000	120,000
7,300		109,000	69,000	16,000		178,000	120,000
7,700		117,000	75,000				
7,750		117,000	75,000				
7,800		117,000	75,000				
7,900		117,000	75,000				
8,000		117,000	75,000				
8,100		117,000	75,000				

Punte elicoidali, corte

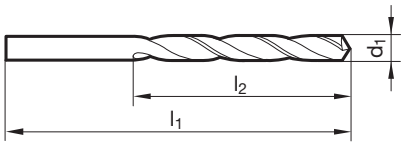
Articolo nr. 81030

P	M	K	N	S	H
			•		

HSS | W | ~5xD | DIN 338 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 14,500 • spoglia sul cono tagliente

materiali teneri a truciolo lungo • alluminio, leghe di alluminio (a truciolo lungo) • zinco, rame affinato, silumin, elektron • materie sintetiche (tenere) • legno



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,250		19,000	3,000	2,300		53,000	27,000
0,400		20,000	5,000	2,350		53,000	27,000
0,500		22,000	6,000	2,400		57,000	30,000
0,550		24,000	7,000	2,450		57,000	30,000
0,600		24,000	7,000	2,500		57,000	30,000
0,650		26,000	8,000	2,550		57,000	30,000
0,700		28,000	9,000	2,600		57,000	30,000
0,800		30,000	10,000	2,700		61,000	33,000
0,850		30,000	10,000	2,750		61,000	33,000
0,900		32,000	11,000	2,800		61,000	33,000
0,950		32,000	11,000	2,850		61,000	33,000
0,970		34,000	12,000	2,900		61,000	33,000
1,000		34,000	12,000	2,950		61,000	33,000
1,050		34,000	12,000	3,000		61,000	33,000
1,060		34,000	12,000	3,050		65,000	36,000
1,070		36,000	14,000	3,100		65,000	36,000
1,100		36,000	14,000	3,150		65,000	36,000
1,150		36,000	14,000	3,200		65,000	36,000
1,200		38,000	16,000	3,250		65,000	36,000
1,210		38,000	16,000	3,300		65,000	36,000
1,240		38,000	16,000	3,400		70,000	39,000
1,250		38,000	16,000	3,450		70,000	39,000
1,280		38,000	16,000	3,500		70,000	39,000
1,300		38,000	16,000	3,600		70,000	39,000
1,400		40,000	18,000	3,650		70,000	39,000
1,450		40,000	18,000	3,700		70,000	39,000
1,500		40,000	18,000	3,750		70,000	39,000
1,530		43,000	20,000	3,800		75,000	43,000
1,550		43,000	20,000	3,850		75,000	43,000
1,600		43,000	20,000	3,900		75,000	43,000
1,650		43,000	20,000	3,950		75,000	43,000
1,700		43,000	20,000	4,000		75,000	43,000
1,750		46,000	22,000	4,040		75,000	43,000
1,800		46,000	22,000	4,100		75,000	43,000
1,900		46,000	22,000	4,150		75,000	43,000
1,950		49,000	24,000	4,200		75,000	43,000
2,000		49,000	24,000	4,250		75,000	43,000
2,050		49,000	24,000	4,300		80,000	47,000
2,100		49,000	24,000	4,400		80,000	47,000
2,150		53,000	27,000	4,500		80,000	47,000
2,200		53,000	27,000	4,600		80,000	47,000
2,250		53,000	27,000	4,700		80,000	47,000

HARTNER

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm
4,750		80,000	47,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,950		86,000	52,000
5,000		86,000	52,000
5,050		86,000	52,000
5,100		86,000	52,000
5,200		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,550		93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,200		109,000	69,000
7,250		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,600		117,000	75,000
7,700		117,000	75,000
7,750		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,750		125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,200		125,000	81,000
9,250		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,250		133,000	87,000
10,400		133,000	87,000
10,500		133,000	87,000
10,800		142,000	94,000
10,900		142,000	94,000
10,950		142,000	94,000
11,000		142,000	94,000
11,200		142,000	94,000
11,500		142,000	94,000
11,600		142,000	94,000
11,700		142,000	94,000
11,800		142,000	94,000
12,000		151,000	101,000
12,100		151,000	101,000
12,200		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,600		151,000	101,000
12,700	1/2	151,000	101,000
12,800		151,000	101,000
13,000		151,000	101,000
13,200		151,000	101,000
13,500		160,000	108,000
14,000		160,000	108,000
14,500		169,000	114,000
15,000		169,000	114,000
16,000		178,000	120,000
16,500		184,000	125,000

Punte elicoidali, corte

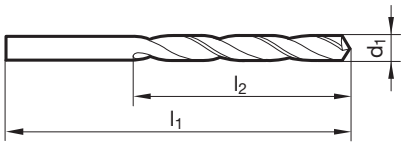
Articolo nr. 81035

P	M	K	N	S	H
			•		

HSS | W | ~5xD | DIN 338 | 130° | h8 | L | Cyl

Assott. del nocc. ≥ Ø 15,000 • spoglia sul cono tagliente

materiali teneri a truciolo lungo • alluminio, leghe di alluminio (a truciolo lungo) • zinco, rame affinato, silumin, elektron • materie sintetiche (tenere) • legno



d1 mm	inch	l1 mm	l2 mm
0,500		22,000	6,000
0,600		24,000	7,000
0,750		28,000	9,000
1,000		34,000	12,000
1,050		34,000	12,000
1,100		36,000	14,000
1,200		38,000	16,000
1,550		43,000	20,000
1,750		46,000	22,000
1,800		46,000	22,000
1,850		46,000	22,000
1,900		46,000	22,000
2,000		49,000	24,000
2,300		53,000	27,000
2,350		53,000	27,000
2,400		57,000	30,000
2,500		57,000	30,000
2,600		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,800		61,000	33,000
2,900		61,000	33,000
3,000		61,000	33,000
3,100		65,000	36,000
3,200		65,000	36,000
3,500		70,000	39,000
3,600		70,000	39,000
3,700		70,000	39,000
3,800		75,000	43,000
3,850		75,000	43,000
3,900		75,000	43,000
3,950		75,000	43,000
4,000		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,600		80,000	47,000
4,700		80,000	47,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000

d1 mm	inch	l1 mm	l2 mm
5,100		86,000	52,000
5,200		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,600		93,000	57,000
5,800		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,200		101,000	63,000
6,300		101,000	63,000
6,400		101,000	63,000
6,700		101,000	63,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,600		117,000	75,000
7,700		117,000	75,000
7,900		117,000	75,000
8,000		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
9,100		125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,800		133,000	87,000
10,000		133,000	87,000
10,500		133,000	87,000
11,500		142,000	94,000
12,000		151,000	101,000
12,500		151,000	101,000
13,000		151,000	101,000
13,500		160,000	108,000
14,000		160,000	108,000
15,000		169,000	114,000

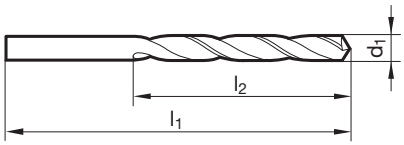
Punte elicoidali, corte

Articolo nr. 81040

P	M	K	N	S	H
•		•	•		

HSS | >Ø 2,36 | FN | ~5xD | DIN 338 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • scanalature larghe • specifiche per prof. di foro oltre 3xD
ghisa grigia • acciai con R fino a 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,800		30,000	10,000	3,300		65,000	36,000
1,000		34,000	12,000	3,350		65,000	36,000
1,100		36,000	14,000	3,400		70,000	39,000
1,200		38,000	16,000	3,450		70,000	39,000
1,300		38,000	16,000	3,500		70,000	39,000
1,350		40,000	18,000	3,550		70,000	39,000
1,400		40,000	18,000	3,600		70,000	39,000
1,450		40,000	18,000	3,700		70,000	39,000
1,500		40,000	18,000	3,800		75,000	43,000
1,550		43,000	20,000	3,900		75,000	43,000
1,570		43,000	20,000	3,950		75,000	43,000
1,600		43,000	20,000	4,000		75,000	43,000
1,650		43,000	20,000	4,050		75,000	43,000
1,700		43,000	20,000	4,090		75,000	43,000
1,800		46,000	22,000	4,100		75,000	43,000
1,850		46,000	22,000	4,200		75,000	43,000
1,900		46,000	22,000	4,250		75,000	43,000
1,950		49,000	24,000	4,300		80,000	47,000
2,000		49,000	24,000	4,400		80,000	47,000
2,050		49,000	24,000	4,500		80,000	47,000
2,100		49,000	24,000	4,550		80,000	47,000
2,150		53,000	27,000	4,600		80,000	47,000
2,200		53,000	27,000	4,650		80,000	47,000
2,300		53,000	27,000	4,700		80,000	47,000
2,350		53,000	27,000	4,800		86,000	52,000
2,400		57,000	30,000	4,900		86,000	52,000
2,490		57,000	30,000	4,920		86,000	52,000
2,500		57,000	30,000	5,000		86,000	52,000
2,550		57,000	30,000	5,030		86,000	52,000
2,600		57,000	30,000	5,100		86,000	52,000
2,700		61,000	33,000	5,200		86,000	52,000
2,750		61,000	33,000	5,250		86,000	52,000
2,800		61,000	33,000	5,300		86,000	52,000
2,850		61,000	33,000	5,400		93,000	57,000
2,900		61,000	33,000	5,500		93,000	57,000
3,000		61,000	33,000	5,600		93,000	57,000
3,050		65,000	36,000	5,700		93,000	57,000
3,100		65,000	36,000	5,800		93,000	57,000
3,150		65,000	36,000	5,850		93,000	57,000
3,200		65,000	36,000	5,900		93,000	57,000
3,250		65,000	36,000	5,950	15/64	93,000	57,000
3,260		65,000	36,000	6,000		93,000	57,000

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
6,050		101,000	63,000	9,800		133,000	87,000
6,100		101,000	63,000	9,900		133,000	87,000
6,200		101,000	63,000	10,000		133,000	87,000
6,300		101,000	63,000	10,200		133,000	87,000
6,400		101,000	63,000	10,300		133,000	87,000
6,450		101,000	63,000	10,400		133,000	87,000
6,500		101,000	63,000	10,500		133,000	87,000
6,600		101,000	63,000	10,600		133,000	87,000
6,700		101,000	63,000	10,700		142,000	94,000
6,750	17/64	109,000	69,000	10,800		142,000	94,000
6,800		109,000	69,000	10,900		142,000	94,000
6,900		109,000	69,000	11,000		142,000	94,000
7,000		109,000	69,000	11,100		142,000	94,000
7,100		109,000	69,000	11,200		142,000	94,000
7,200		109,000	69,000	11,300		142,000	94,000
7,300		109,000	69,000	11,400		142,000	94,000
7,400		109,000	69,000	11,500		142,000	94,000
7,500		109,000	69,000	11,600		142,000	94,000
7,600		117,000	75,000	11,700		142,000	94,000
7,700		117,000	75,000	11,800		142,000	94,000
7,750		117,000	75,000	12,000		151,000	101,000
7,800		117,000	75,000	12,200		151,000	101,000
7,900		117,000	75,000	12,300	31/64	151,000	101,000
8,000		117,000	75,000	12,400		151,000	101,000
8,100		117,000	75,000	12,500		151,000	101,000
8,200		117,000	75,000	12,800		151,000	101,000
8,250		117,000	75,000	13,000		151,000	101,000
8,300		117,000	75,000	13,500		160,000	108,000
8,400		117,000	75,000	14,000		160,000	108,000
8,500		117,000	75,000	14,500		169,000	114,000
8,600		125,000	81,000	15,000		169,000	114,000
8,700		125,000	81,000	15,400		178,000	120,000
8,800		125,000	81,000	15,500		178,000	120,000
8,900		125,000	81,000	16,000		178,000	120,000
9,000		125,000	81,000				
9,100		125,000	81,000				
9,200		125,000	81,000				
9,300		125,000	81,000				
9,400		125,000	81,000				
9,500		125,000	81,000				
9,600		133,000	87,000				
9,700		133,000	87,000				

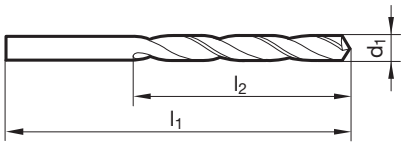
Punte elicoidali, corte

Articolo nr. 81045

P	M	K	N	S	H
•		•	•		

HSS | >Ø 2,36 | FN | ~5xD | DIN 338 | 130° | h8 | L | Cyl

Assott. del nocc. ≥ Ø 1,400 • spoglia sul cono tagliente • scanalature larghe • specifiche per prof. di foro oltre 3xD
ghisa grigia • acciai con R fino a 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,400		40,000	18,000	5,000		86,000	52,000
1,500		40,000	18,000	5,100		86,000	52,000
1,600		43,000	20,000	5,200		86,000	52,000
1,700		43,000	20,000	5,300		86,000	52,000
1,800		46,000	22,000	5,400		93,000	57,000
1,900		46,000	22,000	5,500		93,000	57,000
2,000		49,000	24,000	5,600		93,000	57,000
2,100		49,000	24,000	5,700		93,000	57,000
2,200		53,000	27,000	5,800		93,000	57,000
2,300		53,000	27,000	5,900		93,000	57,000
2,400		57,000	30,000	6,000		93,000	57,000
2,500		57,000	30,000	6,100		101,000	63,000
2,550		57,000	30,000	6,200		101,000	63,000
2,600		57,000	30,000	6,500		101,000	63,000
2,700		61,000	33,000	6,600		101,000	63,000
2,750		61,000	33,000	6,700		101,000	63,000
2,780	7/64	61,000	33,000	6,800		109,000	69,000
2,800		61,000	33,000	6,900		109,000	69,000
2,900		61,000	33,000	7,000		109,000	69,000
3,000		61,000	33,000	7,100		109,000	69,000
3,100		65,000	36,000	7,200		109,000	69,000
3,150		65,000	36,000	7,300		109,000	69,000
3,170	1/8	65,000	36,000	7,400		109,000	69,000
3,200		65,000	36,000	7,500		109,000	69,000
3,250		65,000	36,000	7,700		117,000	75,000
3,300		65,000	36,000	7,800		117,000	75,000
3,400		70,000	39,000	7,900		117,000	75,000
3,500		70,000	39,000	8,000		117,000	75,000
3,600		70,000	39,000	8,400		117,000	75,000
3,650		70,000	39,000	8,500		117,000	75,000
3,700		70,000	39,000	8,600		125,000	81,000
3,800		75,000	43,000	8,700		125,000	81,000
3,900		75,000	43,000	8,800		125,000	81,000
4,000		75,000	43,000	8,900		125,000	81,000
4,100		75,000	43,000	9,000		125,000	81,000
4,200		75,000	43,000	9,200		125,000	81,000
4,300		80,000	47,000	9,300		125,000	81,000
4,500		80,000	47,000	9,500		125,000	81,000
4,600		80,000	47,000	9,600		133,000	87,000
4,700		80,000	47,000	9,700		133,000	87,000
4,800		86,000	52,000	9,900		133,000	87,000
4,900		86,000	52,000	10,000		133,000	87,000

HARTNER

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
10,100		133,000	87,000	11,900		151,000	101,000
10,300		133,000	87,000	13,500		160,000	108,000
10,400		133,000	87,000	14,500		169,000	114,000
10,500		133,000	87,000	15,000		169,000	114,000
10,600		133,000	87,000	15,500		178,000	120,000
10,700		142,000	94,000	16,000		178,000	120,000
10,800		142,000	94,000				
11,000		142,000	94,000				
11,100		142,000	94,000				
11,300		142,000	94,000				
11,500		142,000	94,000				
11,700		142,000	94,000				

HARTNER

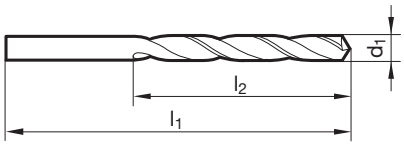
Punte elicoidali, corte

Articolo nr. 84406

P	M	K	N	S	H
●		●	○		

HSS | T | N | ~5xD | DIN 338 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • rivestimento in testa
acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato e grafite



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	4,300		80,000	47,000
1,100		36,000	14,000	4,370	11/64	80,000	47,000
1,190	3/64	38,000	16,000	4,400		80,000	47,000
1,200		38,000	16,000	4,500		80,000	47,000
1,300		38,000	16,000	4,600		80,000	47,000
1,400		40,000	18,000	4,700		80,000	47,000
1,500		40,000	18,000	4,760	3/16	86,000	52,000
1,590	1/16	43,000	20,000	4,800		86,000	52,000
1,600		43,000	20,000	4,900		86,000	52,000
1,700		43,000	20,000	5,000		86,000	52,000
1,800		46,000	22,000	5,100		86,000	52,000
1,900		46,000	22,000	5,160	13/64	86,000	52,000
1,980	5/64	49,000	24,000	5,200		86,000	52,000
2,000		49,000	24,000	5,300		86,000	52,000
2,100		49,000	24,000	5,400		93,000	57,000
2,200		53,000	27,000	5,500		93,000	57,000
2,300		53,000	27,000	5,560	7/32	93,000	57,000
2,380	3/32	57,000	30,000	5,600		93,000	57,000
2,400		57,000	30,000	5,700		93,000	57,000
2,440		57,000	30,000	5,800		93,000	57,000
2,500		57,000	30,000	5,900		93,000	57,000
2,600		57,000	30,000	5,950	15/64	93,000	57,000
2,700		61,000	33,000	6,000		93,000	57,000
2,780	7/64	61,000	33,000	6,100		101,000	63,000
2,800		61,000	33,000	6,200		101,000	63,000
2,900		61,000	33,000	6,300		101,000	63,000
3,000		61,000	33,000	6,350	1/4	101,000	63,000
3,100		65,000	36,000	6,400		101,000	63,000
3,170	1/8	65,000	36,000	6,500		101,000	63,000
3,200		65,000	36,000	6,600		101,000	63,000
3,300		65,000	36,000	6,700		101,000	63,000
3,400		70,000	39,000	6,750	17/64	109,000	69,000
3,500		70,000	39,000	6,800		109,000	69,000
3,570	9/64	70,000	39,000	6,900		109,000	69,000
3,600		70,000	39,000	7,000		109,000	69,000
3,700		70,000	39,000	7,100		109,000	69,000
3,800		75,000	43,000	7,140	9/32	109,000	69,000
3,900		75,000	43,000	7,200		109,000	69,000
3,970	5/32	75,000	43,000	7,300		109,000	69,000
4,000		75,000	43,000	7,400		109,000	69,000
4,100		75,000	43,000	7,500		109,000	69,000
4,200		75,000	43,000	7,540	19/64	117,000	75,000

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
7,600		117,000	75,000	11,500		142,000	94,000
7,700		117,000	75,000	11,510	29/64	142,000	94,000
7,800		117,000	75,000	11,600		142,000	94,000
7,900		117,000	75,000	11,700		142,000	94,000
7,940	5/16	117,000	75,000	11,800		142,000	94,000
8,000		117,000	75,000	11,900		151,000	101,000
8,100		117,000	75,000	11,910	15/32	151,000	101,000
8,200		117,000	75,000	12,000		151,000	101,000
8,300		117,000	75,000	12,100		151,000	101,000
8,330	21/64	117,000	75,000	12,200		151,000	101,000
8,400		117,000	75,000	12,300	31/64	151,000	101,000
8,500		117,000	75,000	12,400		151,000	101,000
8,600		125,000	81,000	12,500		151,000	101,000
8,700		125,000	81,000	12,600		151,000	101,000
8,730	11/32	125,000	81,000	12,700	1/2	151,000	101,000
8,800		125,000	81,000	12,800		151,000	101,000
8,900		125,000	81,000	12,900		151,000	101,000
9,000		125,000	81,000	13,000		151,000	101,000
9,100		125,000	81,000	13,100	33/64	151,000	101,000
9,130	23/64	125,000	81,000	13,200		151,000	101,000
9,200		125,000	81,000	13,250		160,000	108,000
9,300		125,000	81,000	13,300		160,000	108,000
9,400		125,000	81,000	13,400		160,000	108,000
9,500		125,000	81,000	13,490	17/32	160,000	108,000
9,520	3/8	133,000	87,000	13,500		160,000	108,000
9,600		133,000	87,000	13,600		160,000	108,000
9,700		133,000	87,000	13,700		160,000	108,000
9,800		133,000	87,000	13,750		160,000	108,000
9,900		133,000	87,000	13,800		160,000	108,000
9,920	25/64	133,000	87,000	13,890	35/64	160,000	108,000
10,000		133,000	87,000	13,900		160,000	108,000
10,100		133,000	87,000	14,000		160,000	108,000
10,200		133,000	87,000	14,250		169,000	114,000
10,300		133,000	87,000	14,290	9/16	169,000	114,000
10,320	13/32	133,000	87,000	14,500		169,000	114,000
10,400		133,000	87,000	14,680	37/64	169,000	114,000
10,500		133,000	87,000	14,750		169,000	114,000
10,600		133,000	87,000	15,000		169,000	114,000
10,700		142,000	94,000	15,080	19/32	178,000	120,000
10,720	27/64	142,000	94,000	15,250		178,000	120,000
10,800		142,000	94,000	15,480	39/64	178,000	120,000
10,900		142,000	94,000	15,500		178,000	120,000
11,000		142,000	94,000	15,750		178,000	120,000
11,100		142,000	94,000	16,000		178,000	120,000
11,110	7/16	142,000	94,000				
11,200		142,000	94,000				
11,300		142,000	94,000				
11,400		142,000	94,000				

Punte elicoidali, corte

Articolo nr. 84415

P	M	K	N	S	H
•		•	•		

HSS | T | FN | ~5xD | DIN 338 | 130° | h8 | R | Cyl

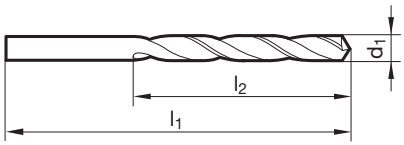
Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • scanalature larghe • specifiche per prof. di foro oltre 3xD ghisa grigia • acciai con R fino a 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili

Articolo nr. 84502

P	M	K	N	S	H
•		•	•		

HSS | F | FN | ~5xD | DIN 338 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • scanalature larghe • specifiche per prof. di foro oltre 3xD ghisa grigia • acciai con R fino a 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	3,900		75,000	43,000
1,100		36,000	14,000	4,000		75,000	43,000
1,200		38,000	16,000	4,100		75,000	43,000
1,300		38,000	16,000	4,200		75,000	43,000
1,400		40,000	18,000	4,300		80,000	47,000
1,500		40,000	18,000	4,400		80,000	47,000
1,600		43,000	20,000	4,500		80,000	47,000
1,700		43,000	20,000	4,600		80,000	47,000
1,800		46,000	22,000	4,700		80,000	47,000
1,900		46,000	22,000	4,800		86,000	52,000
2,000		49,000	24,000	4,900		86,000	52,000
2,100		49,000	24,000	5,000		86,000	52,000
2,200		53,000	27,000	5,100		86,000	52,000
2,300		53,000	27,000	5,200		86,000	52,000
2,400		57,000	30,000	5,300		86,000	52,000
2,500		57,000	30,000	5,400		93,000	57,000
2,600		57,000	30,000	5,500		93,000	57,000
2,700		61,000	33,000	5,600		93,000	57,000
2,800		61,000	33,000	5,700		93,000	57,000
2,900		61,000	33,000	5,800		93,000	57,000
3,000		61,000	33,000	5,900		93,000	57,000
3,100		65,000	36,000	6,000		93,000	57,000
3,170	1/8	65,000	36,000	6,100		101,000	63,000
3,200		65,000	36,000	6,200		101,000	63,000
3,300		65,000	36,000	6,300		101,000	63,000
3,400		70,000	39,000	6,400		101,000	63,000
3,500		70,000	39,000	6,500		101,000	63,000
3,600		70,000	39,000	6,600		101,000	63,000
3,700		70,000	39,000	6,700		101,000	63,000
3,800		75,000	43,000	6,800		109,000	69,000

HARTNER

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
6,900		109,000	69,000	9,900		133,000	87,000
7,000		109,000	69,000	10,000		133,000	87,000
7,100		109,000	69,000	10,100		133,000	87,000
7,200		109,000	69,000	10,200		133,000	87,000
7,300		109,000	69,000	10,300		133,000	87,000
7,400		109,000	69,000	10,400		133,000	87,000
7,500		109,000	69,000	10,500		133,000	87,000
7,600		117,000	75,000	10,700		142,000	94,000
7,700		117,000	75,000	10,800		142,000	94,000
7,800		117,000	75,000	11,000		142,000	94,000
7,900		117,000	75,000	11,400		142,000	94,000
8,000		117,000	75,000	11,500		142,000	94,000
8,100		117,000	75,000	11,600		142,000	94,000
8,200		117,000	75,000	11,700		142,000	94,000
8,300		117,000	75,000	11,800		142,000	94,000
8,400		117,000	75,000	12,000		151,000	101,000
8,500		117,000	75,000	12,100		151,000	101,000
8,600		125,000	81,000	12,200		151,000	101,000
8,700		125,000	81,000	12,300	31/64	151,000	101,000
8,800		125,000	81,000	12,500		151,000	101,000
8,900		125,000	81,000	12,700	1/2	151,000	101,000
9,000		125,000	81,000	12,800		151,000	101,000
9,100		125,000	81,000	13,000		151,000	101,000
9,200		125,000	81,000	13,500		160,000	108,000
9,300		125,000	81,000	14,000		160,000	108,000
9,400		125,000	81,000	15,000		169,000	114,000
9,500		125,000	81,000	16,000		178,000	120,000
9,600		133,000	87,000				
9,700		133,000	87,000				
9,800		133,000	87,000				

HARTNER

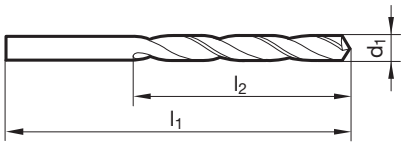
Punte elicoidali, corte

Articolo nr. 81011

P	M	K	N	S	H
●	○	●	○		

HSS-E | >Ø 2,36 | N | ~5xD | DIN 338 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura acciaio e ghisa acciaiosa (legati e non legati) • ghise con R superiore a 800 N/mm² • acciai per lavorazioni a caldo e a freddo • acciai per cuscinetti • acciai legati in alta percentuale • acciai da bonifica e da cementazione



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,200		19,000	2,500	1,850		46,000	22,000
0,250		19,000	3,000	1,860		46,000	22,000
0,300		19,000	3,000	1,900		46,000	22,000
0,350		19,000	4,000	1,950		49,000	24,000
0,400		20,000	5,000	2,000		49,000	24,000
0,430		20,000	5,000	2,030		49,000	24,000
0,450		20,000	5,000	2,050		49,000	24,000
0,500		22,000	6,000	2,100		49,000	24,000
0,550		24,000	7,000	2,150		53,000	27,000
0,600		24,000	7,000	2,200		53,000	27,000
0,650		26,000	8,000	2,250		53,000	27,000
0,680		28,000	9,000	2,300		53,000	27,000
0,700		28,000	9,000	2,400		57,000	30,000
0,750		28,000	9,000	2,450		57,000	30,000
0,800		30,000	10,000	2,500		57,000	30,000
0,850		30,000	10,000	2,550		57,000	30,000
0,860		32,000	11,000	2,600		57,000	30,000
0,870		32,000	11,000	2,650		57,000	30,000
0,900		32,000	11,000	2,700		61,000	33,000
0,950		32,000	11,000	2,750		61,000	33,000
0,980		34,000	12,000	2,800		61,000	33,000
1,000		34,000	12,000	2,850		61,000	33,000
1,050		34,000	12,000	2,900		61,000	33,000
1,100		36,000	14,000	2,950		61,000	33,000
1,150		36,000	14,000	3,000		61,000	33,000
1,170		36,000	14,000	3,050		65,000	36,000
1,200		38,000	16,000	3,100		65,000	36,000
1,230		38,000	16,000	3,150		65,000	36,000
1,250		38,000	16,000	3,200		65,000	36,000
1,300		38,000	16,000	3,250		65,000	36,000
1,350		40,000	18,000	3,300		65,000	36,000
1,370		40,000	18,000	3,400		70,000	39,000
1,400		40,000	18,000	3,500		70,000	39,000
1,450		40,000	18,000	3,600		70,000	39,000
1,500		40,000	18,000	3,700		70,000	39,000
1,550		43,000	20,000	3,750		70,000	39,000
1,600		43,000	20,000	3,800		75,000	43,000
1,650		43,000	20,000	3,900		75,000	43,000
1,700		43,000	20,000	4,000		75,000	43,000
1,750		46,000	22,000	4,050		75,000	43,000
1,800		46,000	22,000	4,100		75,000	43,000
1,820		46,000	22,000	4,200		75,000	43,000

HARTNER

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
4,250		75,000	43,000	9,400		125,000	81,000
4,300		80,000	47,000	9,500		125,000	81,000
4,400		80,000	47,000	9,520	3/8	133,000	87,000
4,500		80,000	47,000	9,600		133,000	87,000
4,550		80,000	47,000	9,700		133,000	87,000
4,600		80,000	47,000	9,800		133,000	87,000
4,700		80,000	47,000	9,900		133,000	87,000
4,800		86,000	52,000	10,000		133,000	87,000
4,850		86,000	52,000	10,050		133,000	87,000
4,900		86,000	52,000	10,100		133,000	87,000
5,000		86,000	52,000	10,200		133,000	87,000
5,020		86,000	52,000	10,250		133,000	87,000
5,050		86,000	52,000	10,300		133,000	87,000
5,100		86,000	52,000	10,400		133,000	87,000
5,150		86,000	52,000	10,500		133,000	87,000
5,200		86,000	52,000	10,600		133,000	87,000
5,250		86,000	52,000	10,720	27/64	142,000	94,000
5,300		86,000	52,000	10,800		142,000	94,000
5,400		93,000	57,000	10,900		142,000	94,000
5,500		93,000	57,000	11,000		142,000	94,000
5,600		93,000	57,000	11,100		142,000	94,000
5,700		93,000	57,000	11,200		142,000	94,000
5,800		93,000	57,000	11,250		142,000	94,000
5,900		93,000	57,000	11,300		142,000	94,000
6,000		93,000	57,000	11,500		142,000	94,000
6,050		101,000	63,000	11,700		142,000	94,000
6,100		101,000	63,000	11,750		142,000	94,000
6,150		101,000	63,000	11,800		142,000	94,000
6,200		101,000	63,000	12,000		151,000	101,000
6,300		101,000	63,000	12,200		151,000	101,000
6,350	1/4	101,000	63,000	12,400		151,000	101,000
6,400		101,000	63,000	12,500		151,000	101,000
6,500		101,000	63,000	12,600		151,000	101,000
6,600		101,000	63,000	12,700	1/2	151,000	101,000
6,700		101,000	63,000	12,800		151,000	101,000
6,750	17/64	109,000	69,000	12,900		151,000	101,000
6,800		109,000	69,000	13,000		151,000	101,000
6,900		109,000	69,000	13,200		151,000	101,000
7,000		109,000	69,000	13,300		160,000	108,000
7,100		109,000	69,000	13,400		160,000	108,000
7,140	9/32	109,000	69,000	13,500		160,000	108,000
7,200		109,000	69,000	13,600		160,000	108,000
7,300		109,000	69,000	13,700		160,000	108,000
7,400		109,000	69,000	13,800		160,000	108,000
7,500		109,000	69,000	14,000		160,000	108,000
7,600		117,000	75,000	14,200		169,000	114,000
7,700		117,000	75,000	14,500		169,000	114,000
7,800		117,000	75,000	15,000		169,000	114,000
7,900		117,000	75,000	15,250		178,000	120,000
8,000		117,000	75,000	15,500		178,000	120,000
8,100		117,000	75,000	15,870	5/8	178,000	120,000
8,200		117,000	75,000	16,000		178,000	120,000
8,300		117,000	75,000	16,500		184,000	125,000
8,400		117,000	75,000	17,000		184,000	125,000
8,500		117,000	75,000	17,500		191,000	130,000
8,600		125,000	81,000	19,000		198,000	135,000
8,700		125,000	81,000	20,000		205,000	140,000
8,730	11/32	125,000	81,000				
8,750		125,000	81,000				
8,800		125,000	81,000				
8,900		125,000	81,000				
9,000		125,000	81,000				
9,100		125,000	81,000				
9,200		125,000	81,000				
9,250		125,000	81,000				
9,300		125,000	81,000				

Punte elicoidali, corte

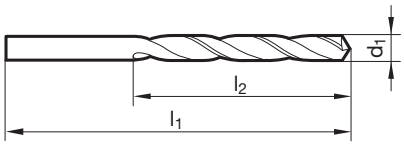
Articolo nr. 81041

P	M	K	N	S	H
●	○	●	●		

HSS-E | >Ø 2,36 | FN | ~5xD | DIN 338 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura • scanalature larghe • specifiche per prof. di foro oltre 3xD

ghisa grigia e acciai oltre gli 800 N/mm² • acciai per lavorazioni a caldo e a freddo • acciai per cuscinetti • acciai legati in alta percentuale • acciai da bonifica e da cementazione



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	3,650		70,000	39,000
1,100		36,000	14,000	3,700		70,000	39,000
1,200		38,000	16,000	3,800		75,000	43,000
1,250		38,000	16,000	3,900		75,000	43,000
1,300		38,000	16,000	4,000		75,000	43,000
1,400		40,000	18,000	4,050		75,000	43,000
1,500		40,000	18,000	4,100		75,000	43,000
1,550		43,000	20,000	4,200		75,000	43,000
1,600		43,000	20,000	4,300		80,000	47,000
1,650		43,000	20,000	4,400		80,000	47,000
1,700		43,000	20,000	4,500		80,000	47,000
1,800		46,000	22,000	4,600		80,000	47,000
1,850		46,000	22,000	4,700		80,000	47,000
1,900		46,000	22,000	4,800		86,000	52,000
1,950		49,000	24,000	4,900		86,000	52,000
2,000		49,000	24,000	5,000		86,000	52,000
2,050		49,000	24,000	5,100		86,000	52,000
2,100		49,000	24,000	5,200		86,000	52,000
2,200		53,000	27,000	5,300		86,000	52,000
2,300		53,000	27,000	5,400		93,000	57,000
2,350		53,000	27,000	5,500		93,000	57,000
2,400		57,000	30,000	5,600		93,000	57,000
2,500		57,000	30,000	5,700		93,000	57,000
2,550		57,000	30,000	5,800		93,000	57,000
2,600		57,000	30,000	5,900		93,000	57,000
2,650		57,000	30,000	6,000		93,000	57,000
2,700		61,000	33,000	6,100		101,000	63,000
2,750		61,000	33,000	6,200		101,000	63,000
2,780	7/64	61,000	33,000	6,300		101,000	63,000
2,800		61,000	33,000	6,400		101,000	63,000
2,900		61,000	33,000	6,500		101,000	63,000
3,000		61,000	33,000	6,600		101,000	63,000
3,050		65,000	36,000	6,700		101,000	63,000
3,100		65,000	36,000	6,750	17/64	109,000	69,000
3,150		65,000	36,000	6,800		109,000	69,000
3,200		65,000	36,000	6,900		109,000	69,000
3,250		65,000	36,000	7,000		109,000	69,000
3,300		65,000	36,000	7,100		109,000	69,000
3,400		70,000	39,000	7,200		109,000	69,000
3,450		70,000	39,000	7,300		109,000	69,000
3,500		70,000	39,000	7,400		109,000	69,000
3,600		70,000	39,000	7,500		109,000	69,000

HARTNER

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
7,600		117,000	75,000	10,200		133,000	87,000
7,700		117,000	75,000	10,300		133,000	87,000
7,800		117,000	75,000	10,700		142,000	94,000
7,900		117,000	75,000	10,800		142,000	94,000
8,000		117,000	75,000	10,900		142,000	94,000
8,100		117,000	75,000	11,000		142,000	94,000
8,200		117,000	75,000	11,100		142,000	94,000
8,300		117,000	75,000	11,200		142,000	94,000
8,400		117,000	75,000	11,400		142,000	94,000
8,500		117,000	75,000	11,600		142,000	94,000
8,600		125,000	81,000	11,700		142,000	94,000
8,700		125,000	81,000	11,800		142,000	94,000
8,800		125,000	81,000	12,000		151,000	101,000
8,900		125,000	81,000	12,500		151,000	101,000
9,000		125,000	81,000	12,700	1/2	151,000	101,000
9,100		125,000	81,000				
9,200		125,000	81,000				
9,300		125,000	81,000				
9,400		125,000	81,000				
9,500		125,000	81,000				
9,700		133,000	87,000				
9,800		133,000	87,000				
9,900		133,000	87,000				
10,000		133,000	87,000				

Punte elicoidali, corte

Articolo nr. 84800

P	M	K	N	S	H
●	○	●	○		

HSS-E | T | FN | ~5xD | DIN 338 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura • scanalature larghe • specifiche per prof. di foro oltre 3xD

ghisa grigia e acciai oltre gli 800 N/mm² • acciai per lavorazioni a caldo e a freddo • acciai per cuscinetti • acciai legati in alta percentuale • acciai da bonifica e da cementazione

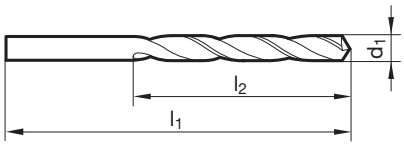
Articolo nr. 84504

P	M	K	N	S	H
●	○	●	○		

HSS-E | F | FN | ~5xD | DIN 338 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • scanalature larghe • massima resistenza all'usura • specifiche per prof. di foro oltre 3xD

ghisa grigia e acciai oltre gli 800 N/mm² • acciai per lavorazioni a caldo e a freddo • acciai per cuscinetti • acciai legati in alta percentuale • acciai da bonifica e da cementazione



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	3,500		70,000	39,000
1,100		36,000	14,000	3,600		70,000	39,000
1,200		38,000	16,000	3,700		70,000	39,000
1,300		38,000	16,000	3,800		75,000	43,000
1,400		40,000	18,000	3,900		75,000	43,000
1,500		40,000	18,000	4,000		75,000	43,000
1,600		43,000	20,000	4,100		75,000	43,000
1,700		43,000	20,000	4,200		75,000	43,000
1,800		46,000	22,000	4,300		80,000	47,000
1,900		46,000	22,000	4,400		80,000	47,000
1,930		49,000	24,000	4,500		80,000	47,000
2,000		49,000	24,000	4,600		80,000	47,000
2,100		49,000	24,000	4,700		80,000	47,000
2,200		53,000	27,000	4,800		86,000	52,000
2,250		53,000	27,000	4,900		86,000	52,000
2,300		53,000	27,000	5,000		86,000	52,000
2,400		57,000	30,000	5,100		86,000	52,000
2,450		57,000	30,000	5,200		86,000	52,000
2,500		57,000	30,000	5,300		86,000	52,000
2,600		57,000	30,000	5,400		93,000	57,000
2,700		61,000	33,000	5,500		93,000	57,000
2,800		61,000	33,000	5,560	7/32	93,000	57,000
2,900		61,000	33,000	5,600		93,000	57,000
2,950		61,000	33,000	5,700		93,000	57,000
3,000		61,000	33,000	5,800		93,000	57,000
3,100		65,000	36,000	5,900		93,000	57,000
3,200		65,000	36,000	6,000		93,000	57,000
3,250		65,000	36,000	6,100		101,000	63,000
3,300		65,000	36,000	6,200		101,000	63,000
3,400		70,000	39,000	6,300		101,000	63,000

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
6,400		101,000	63,000	9,400		125,000	81,000
6,500		101,000	63,000	9,500		125,000	81,000
6,600		101,000	63,000	9,600		133,000	87,000
6,700		101,000	63,000	9,700		133,000	87,000
6,800		109,000	69,000	9,800		133,000	87,000
6,900		109,000	69,000	9,900		133,000	87,000
7,000		109,000	69,000	10,000		133,000	87,000
7,100		109,000	69,000	10,100		133,000	87,000
7,200		109,000	69,000	10,200		133,000	87,000
7,300		109,000	69,000	10,300		133,000	87,000
7,400		109,000	69,000	10,400		133,000	87,000
7,500		109,000	69,000	10,500		133,000	87,000
7,600		117,000	75,000	10,700		142,000	94,000
7,700		117,000	75,000	10,800		142,000	94,000
7,800		117,000	75,000	11,000		142,000	94,000
7,900		117,000	75,000	11,200		142,000	94,000
8,000		117,000	75,000	11,500		142,000	94,000
8,100		117,000	75,000	11,700		142,000	94,000
8,200		117,000	75,000	11,800		142,000	94,000
8,300		117,000	75,000	12,000		151,000	101,000
8,400		117,000	75,000	12,500		151,000	101,000
8,500		117,000	75,000	13,000		151,000	101,000
8,600		125,000	81,000				
8,700		125,000	81,000				
8,800		125,000	81,000				
8,900		125,000	81,000				
9,000		125,000	81,000				
9,100		125,000	81,000				
9,200		125,000	81,000				
9,300		125,000	81,000				

Punte elicoidali, corte

Articolo nr. 84804

P	M	K	N	S	H
•	•	•	•		

HSS-E | FU 500 DZ | ~5xD | DIN 338 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • affilatura su piani • acciaio HSS legato al Co • è necess. una limitata forza di avanz. • è necess. un limitato momento torcente • uso universale

acciai legati e non legati con R fino a 800 N/mm² • acciai per lav. a caldo e a freddo • acciai per cuscinetti • metalli non ferrosi • ghise • acciai inossidabili • plastica

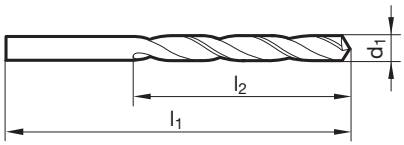
Articolo nr. 84802

P	M	K	N	S	H
•	•	•	•		

HSS-E | T | FU 500 DZ | ~5xD | DIN 338 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • affilatura su piani • acciaio HSS legato al Co • è necess. una limitata forza di avanz. • è necess. un limitato momento torcente • massima resistenza all'usura • uso universale

acciai legati e non legati con R fino a 800 N/mm² • acciai per lav. a caldo e a freddo • acciai per cuscinetti • metalli non ferrosi • ghise • acciai inossidabili • plastica



d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000
1,100		36,000	14,000
1,200		38,000	16,000
1,300		38,000	16,000
1,400		40,000	18,000
1,500		40,000	18,000
1,600		43,000	20,000
1,700		43,000	20,000
1,800		46,000	22,000
1,900		46,000	22,000
2,000		49,000	24,000
2,100		49,000	24,000
2,200		53,000	27,000
2,300		53,000	27,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,500		57,000	30,000
2,600		57,000	30,000
2,700		61,000	33,000
2,780	7/64	61,000	33,000
2,800		61,000	33,000
2,900		61,000	33,000
3,000		61,000	33,000
3,100		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,570	9/64	70,000	39,000

d1 mm	inch	l1 mm	l2 mm
3,600		70,000	39,000
3,700		70,000	39,000
3,800		75,000	43,000
3,900		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,600		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,550		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
5,900		93,000	57,000	9,000		125,000	81,000
5,950	15/64	93,000	57,000	9,100		125,000	81,000
6,000		93,000	57,000	9,200		125,000	81,000
6,100		101,000	63,000	9,250		125,000	81,000
6,200		101,000	63,000	9,300		125,000	81,000
6,300		101,000	63,000	9,400		125,000	81,000
6,350	1/4	101,000	63,000	9,500		125,000	81,000
6,400		101,000	63,000	9,600		133,000	87,000
6,500		101,000	63,000	9,700		133,000	87,000
6,600		101,000	63,000	9,800		133,000	87,000
6,700		101,000	63,000	9,900		133,000	87,000
6,800		109,000	69,000	10,000		133,000	87,000
6,900		109,000	69,000	10,100		133,000	87,000
7,000		109,000	69,000	10,200		133,000	87,000
7,100		109,000	69,000	10,300		133,000	87,000
7,140	9/32	109,000	69,000	10,500		133,000	87,000
7,200		109,000	69,000	11,000		142,000	94,000
7,300		109,000	69,000	11,110	7/16	142,000	94,000
7,400		109,000	69,000	11,200		142,000	94,000
7,500		109,000	69,000	11,500		142,000	94,000
7,600		117,000	75,000	12,000		151,000	101,000
7,700		117,000	75,000	12,500		151,000	101,000
7,800		117,000	75,000	13,000		151,000	101,000
7,900		117,000	75,000	13,500		160,000	108,000
7,940	5/16	117,000	75,000	14,000		160,000	108,000
8,000		117,000	75,000				
8,100		117,000	75,000				
8,200		117,000	75,000				
8,300		117,000	75,000				
8,400		117,000	75,000				
8,500		117,000	75,000				
8,600		125,000	81,000				
8,700		125,000	81,000				
8,730	11/32	125,000	81,000				
8,800		125,000	81,000				
8,900		125,000	81,000				

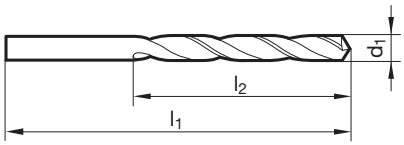
Punte elicoidali, corte

Articolo nr. 81013

P	M	K	N	S	H
○	●		○	○	

HSS-E | IS | ~5xD | DIN 338 | 130° | h8 | R | Cyl

punta per INOX • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura
acciai inossidabili, resistenti al calore ed austenitici (V2A e V4A)



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	5,100		86,000	52,000
1,100		36,000	14,000	5,200		86,000	52,000
1,200		38,000	16,000	5,300		86,000	52,000
1,300		38,000	16,000	5,400		93,000	57,000
1,400		40,000	18,000	5,500		93,000	57,000
1,500		40,000	18,000	5,600		93,000	57,000
1,600		43,000	20,000	5,700		93,000	57,000
1,700		43,000	20,000	5,800		93,000	57,000
1,800		46,000	22,000	5,900		93,000	57,000
1,900		46,000	22,000	6,000		93,000	57,000
2,000		49,000	24,000	6,100		101,000	63,000
2,100		49,000	24,000	6,200		101,000	63,000
2,200		53,000	27,000	6,300		101,000	63,000
2,300		53,000	27,000	6,400		101,000	63,000
2,400		57,000	30,000	6,500		101,000	63,000
2,500		57,000	30,000	6,600		101,000	63,000
2,600		57,000	30,000	6,700		101,000	63,000
2,700		61,000	33,000	6,800		109,000	69,000
2,800		61,000	33,000	6,900		109,000	69,000
2,900		61,000	33,000	7,000		109,000	69,000
3,000		61,000	33,000	7,100		109,000	69,000
3,100		65,000	36,000	7,200		109,000	69,000
3,200		65,000	36,000	7,300		109,000	69,000
3,300		65,000	36,000	7,400		109,000	69,000
3,400		70,000	39,000	7,500		109,000	69,000
3,500		70,000	39,000	7,600		117,000	75,000
3,570	9/64	70,000	39,000	7,700		117,000	75,000
3,600		70,000	39,000	7,800		117,000	75,000
3,700		70,000	39,000	7,900		117,000	75,000
3,800		75,000	43,000	8,000		117,000	75,000
3,900		75,000	43,000	8,100		117,000	75,000
4,000		75,000	43,000	8,200		117,000	75,000
4,100		75,000	43,000	8,300		117,000	75,000
4,200		75,000	43,000	8,400		117,000	75,000
4,300		80,000	47,000	8,500		117,000	75,000
4,400		80,000	47,000	8,600		125,000	81,000
4,500		80,000	47,000	8,700		125,000	81,000
4,600		80,000	47,000	8,800		125,000	81,000
4,700		80,000	47,000	8,900		125,000	81,000
4,800		86,000	52,000	9,000		125,000	81,000
4,900		86,000	52,000	9,100		125,000	81,000
5,000		86,000	52,000	9,200		125,000	81,000

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
9,300		125,000	81,000	10,500		133,000	87,000
9,400		125,000	81,000	10,600		133,000	87,000
9,500		125,000	81,000	11,000		142,000	94,000
9,600		133,000	87,000	11,100		142,000	94,000
9,700		133,000	87,000	11,200		142,000	94,000
9,800		133,000	87,000	11,500		142,000	94,000
9,900		133,000	87,000	11,600		142,000	94,000
10,000		133,000	87,000	11,800		142,000	94,000
10,100		133,000	87,000	12,000		151,000	101,000
10,200		133,000	87,000	12,500		151,000	101,000
10,300		133,000	87,000	13,000		151,000	101,000
10,400		133,000	87,000				

HARTNER

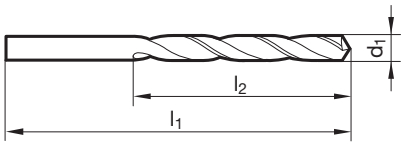
Punte elicoidali, corte

Articolo nr. 81061

P	M	K	N	S	H
○	●			●	

HSS-E | ◯ | S | ~5xD | DIN 338 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura titanio e leghe di titanio • acciai inossidabili, resistenti al calore ed austenitici • acciai molto tenaci ed a truciolo corto con R da ca. 900 N/mm² • Hastelloy, Inconel, Nimonic



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,200		19,000	2,500	1,850		46,000	22,000
0,300		19,000	3,000	1,900		46,000	22,000
0,400		20,000	5,000	1,950		49,000	24,000
0,500		22,000	6,000	1,990		49,000	24,000
0,550		24,000	7,000	2,000		49,000	24,000
0,580		24,000	7,000	2,030		49,000	24,000
0,600		24,000	7,000	2,050		49,000	24,000
0,650		26,000	8,000	2,080		49,000	24,000
0,700		28,000	9,000	2,100		49,000	24,000
0,750		28,000	9,000	2,200		53,000	27,000
0,800		30,000	10,000	2,250		53,000	27,000
0,820		30,000	10,000	2,300		53,000	27,000
0,840		30,000	10,000	2,350		53,000	27,000
0,850		30,000	10,000	2,380	3/32	57,000	30,000
0,900		32,000	11,000	2,400		57,000	30,000
0,950		32,000	11,000	2,450		57,000	30,000
1,000		34,000	12,000	2,500		57,000	30,000
1,050		34,000	12,000	2,550		57,000	30,000
1,100		36,000	14,000	2,600		57,000	30,000
1,150		36,000	14,000	2,700		61,000	33,000
1,180		36,000	14,000	2,750		61,000	33,000
1,190	3/64	38,000	16,000	2,800		61,000	33,000
1,200		38,000	16,000	2,850		61,000	33,000
1,210		38,000	16,000	2,900		61,000	33,000
1,250		38,000	16,000	2,950		61,000	33,000
1,300		38,000	16,000	3,000		61,000	33,000
1,350		40,000	18,000	3,050		65,000	36,000
1,400		40,000	18,000	3,100		65,000	36,000
1,450		40,000	18,000	3,200		65,000	36,000
1,500		40,000	18,000	3,250		65,000	36,000
1,510		43,000	20,000	3,300		65,000	36,000
1,520		43,000	20,000	3,350		65,000	36,000
1,530		43,000	20,000	3,400		70,000	39,000
1,550		43,000	20,000	3,450		70,000	39,000
1,600		43,000	20,000	3,500		70,000	39,000
1,630		43,000	20,000	3,600		70,000	39,000
1,650		43,000	20,000	3,700		70,000	39,000
1,700		43,000	20,000	3,800		75,000	43,000
1,730		46,000	22,000	3,900		75,000	43,000
1,750		46,000	22,000	4,000		75,000	43,000
1,800		46,000	22,000	4,050		75,000	43,000
1,820		46,000	22,000	4,100		75,000	43,000

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
4,200		75,000	43,000	8,600		125,000	81,000
4,250		75,000	43,000	8,700		125,000	81,000
4,300		80,000	47,000	8,800		125,000	81,000
4,400		80,000	47,000	8,900		125,000	81,000
4,500		80,000	47,000	9,000		125,000	81,000
4,600		80,000	47,000	9,100		125,000	81,000
4,700		80,000	47,000	9,200		125,000	81,000
4,750		80,000	47,000	9,300		125,000	81,000
4,800		86,000	52,000	9,400		125,000	81,000
4,850		86,000	52,000	9,500		125,000	81,000
4,900		86,000	52,000	9,600		133,000	87,000
5,000		86,000	52,000	9,700		133,000	87,000
5,100		86,000	52,000	9,800		133,000	87,000
5,200		86,000	52,000	9,900		133,000	87,000
5,300		86,000	52,000	10,000		133,000	87,000
5,400		93,000	57,000	10,100		133,000	87,000
5,500		93,000	57,000	10,200		133,000	87,000
5,600		93,000	57,000	10,300		133,000	87,000
5,700		93,000	57,000	10,400		133,000	87,000
5,800		93,000	57,000	10,500		133,000	87,000
5,900		93,000	57,000	10,600		133,000	87,000
6,000		93,000	57,000	10,700		142,000	94,000
6,100		101,000	63,000	10,800		142,000	94,000
6,200		101,000	63,000	11,000		142,000	94,000
6,300		101,000	63,000	11,100		142,000	94,000
6,400		101,000	63,000	11,200		142,000	94,000
6,500		101,000	63,000	11,300		142,000	94,000
6,600		101,000	63,000	11,500		142,000	94,000
6,700		101,000	63,000	11,700		142,000	94,000
6,750	17/64	109,000	69,000	11,800		142,000	94,000
6,800		109,000	69,000	12,000		151,000	101,000
6,900		109,000	69,000	12,100		151,000	101,000
7,000		109,000	69,000	12,200		151,000	101,000
7,100		109,000	69,000	12,300	31/64	151,000	101,000
7,200		109,000	69,000	12,500		151,000	101,000
7,300		109,000	69,000	12,700	1/2	151,000	101,000
7,400		109,000	69,000	13,000		151,000	101,000
7,500		109,000	69,000	13,500		160,000	108,000
7,600		117,000	75,000	14,000		160,000	108,000
7,700		117,000	75,000	14,500		169,000	114,000
7,800		117,000	75,000	15,000		169,000	114,000
7,900		117,000	75,000	15,500		178,000	120,000
8,000		117,000	75,000	16,000		178,000	120,000
8,100		117,000	75,000	16,500		184,000	125,000
8,200		117,000	75,000	17,000		184,000	125,000
8,300		117,000	75,000	17,500		191,000	130,000
8,400		117,000	75,000				
8,500		117,000	75,000				

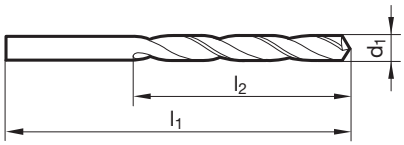
Punte elicoidali, corte

Articolo nr. 81062

P	M	K	N	S	H
●	○	○	○		

HSS-E | P2000 | ~5xD | DIN 338 | 118° | h8 | R | Cyl

spoglia sul cono tagliente • uso universale con wave grind • acciaio HSS legato al Co • massima resistenza all'usura acciai con R fino a 1000 N/mm² • leghe di AlSi



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
1,000	34,000	12,000	5,200	86,000	52,000
1,100	36,000	14,000	5,300	86,000	52,000
1,200	38,000	16,000	5,400	93,000	57,000
1,300	38,000	16,000	5,500	93,000	57,000
1,400	40,000	18,000	5,600	93,000	57,000
1,500	40,000	18,000	5,700	93,000	57,000
1,600	43,000	20,000	5,800	93,000	57,000
1,700	43,000	20,000	5,900	93,000	57,000
1,800	46,000	22,000	6,000	93,000	57,000
1,900	46,000	22,000	6,100	101,000	63,000
2,000	49,000	24,000	6,200	101,000	63,000
2,100	49,000	24,000	6,300	101,000	63,000
2,200	53,000	27,000	6,400	101,000	63,000
2,300	53,000	27,000	6,500	101,000	63,000
2,400	57,000	30,000	6,600	101,000	63,000
2,500	57,000	30,000	6,700	101,000	63,000
2,600	57,000	30,000	6,800	109,000	69,000
2,700	61,000	33,000	6,900	109,000	69,000
2,800	61,000	33,000	7,000	109,000	69,000
2,900	61,000	33,000	7,100	109,000	69,000
3,000	61,000	33,000	7,200	109,000	69,000
3,100	65,000	36,000	7,300	109,000	69,000
3,200	65,000	36,000	7,400	109,000	69,000
3,300	65,000	36,000	7,500	109,000	69,000
3,400	70,000	39,000	7,600	117,000	75,000
3,500	70,000	39,000	7,700	117,000	75,000
3,600	70,000	39,000	7,800	117,000	75,000
3,700	70,000	39,000	7,900	117,000	75,000
3,800	75,000	43,000	8,000	117,000	75,000
3,900	75,000	43,000	8,100	117,000	75,000
4,000	75,000	43,000	8,200	117,000	75,000
4,100	75,000	43,000	8,300	117,000	75,000
4,200	75,000	43,000	8,400	117,000	75,000
4,300	80,000	47,000	8,500	117,000	75,000
4,400	80,000	47,000	8,600	125,000	81,000
4,500	80,000	47,000	8,700	125,000	81,000
4,600	80,000	47,000	8,800	125,000	81,000
4,700	80,000	47,000	8,900	125,000	81,000
4,800	86,000	52,000	9,000	125,000	81,000
4,900	86,000	52,000	9,100	125,000	81,000
5,000	86,000	52,000	9,200	125,000	81,000
5,100	86,000	52,000	9,300	125,000	81,000

Punte elicoidali, corte

d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
9,400	125,000	81,000	12,500	151,000	101,000
9,500	125,000	81,000	13,000	151,000	101,000
9,600	133,000	87,000			
9,700	133,000	87,000			
9,800	133,000	87,000			
9,900	133,000	87,000			
10,000	133,000	87,000			
10,200	133,000	87,000			
10,500	133,000	87,000			
11,000	142,000	94,000			
11,500	142,000	94,000			
12,000	151,000	101,000			

Punte elicoidali, corte

Articolo nr. 84807

P	M	K	N	S	H
○	●			●	

HSS-E | T | S | ~5xD | DIN 338 | 130° | h8 | R | Cyl

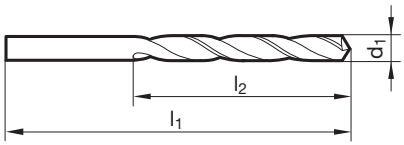
Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura titanio e leghe di titanio • acciai inossidabili, resistenti al calore ed austenitici • acciai molto tenaci ed a truciolo corto con R da ca. 900 N/mm² • Hastelloy, Inconel, Nimonic

Articolo nr. 84505

P	M	K	N	S	H
○	●			●	

HSS-E | F | S | ~5xD | DIN 338 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura titanio e leghe di titanio • acciai inossidabili, resistenti al calore ed austenitici • acciai molto tenaci ed a truciolo corto con R da ca. 900 N/mm² • Hastelloy, Inconel, Nimonic



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,500		22,000	6,000	2,600		57,000	30,000
0,650		26,000	8,000	2,700		61,000	33,000
0,700		28,000	9,000	2,800		61,000	33,000
0,750		28,000	9,000	2,900		61,000	33,000
0,800		30,000	10,000	3,000		61,000	33,000
0,850		30,000	10,000	3,100		65,000	36,000
0,900		32,000	11,000	3,200		65,000	36,000
0,950		32,000	11,000	3,300		65,000	36,000
1,000		34,000	12,000	3,350		65,000	36,000
1,050		34,000	12,000	3,400		70,000	39,000
1,100		36,000	14,000	3,500		70,000	39,000
1,200		38,000	16,000	3,600		70,000	39,000
1,250		38,000	16,000	3,700		70,000	39,000
1,300		38,000	16,000	3,800		75,000	43,000
1,350		40,000	18,000	3,900		75,000	43,000
1,400		40,000	18,000	4,000		75,000	43,000
1,500		40,000	18,000	4,100		75,000	43,000
1,550		43,000	20,000	4,200		75,000	43,000
1,600		43,000	20,000	4,300		80,000	47,000
1,700		43,000	20,000	4,400		80,000	47,000
1,800		46,000	22,000	4,500		80,000	47,000
1,850		46,000	22,000	4,600		80,000	47,000
1,900		46,000	22,000	4,700		80,000	47,000
2,000		49,000	24,000	4,800		86,000	52,000
2,050		49,000	24,000	4,900		86,000	52,000
2,100		49,000	24,000	5,000		86,000	52,000
2,200		53,000	27,000	5,050		86,000	52,000
2,300		53,000	27,000	5,100		86,000	52,000
2,400		57,000	30,000	5,200		86,000	52,000
2,500		57,000	30,000	5,300		86,000	52,000

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
5,400		93,000	57,000	9,000		125,000	81,000
5,500		93,000	57,000	9,100		125,000	81,000
5,600		93,000	57,000	9,200		125,000	81,000
5,700		93,000	57,000	9,300		125,000	81,000
5,800		93,000	57,000	9,400		125,000	81,000
5,900		93,000	57,000	9,500		125,000	81,000
6,000		93,000	57,000	9,600		133,000	87,000
6,100		101,000	63,000	9,700		133,000	87,000
6,200		101,000	63,000	9,800		133,000	87,000
6,300		101,000	63,000	9,900		133,000	87,000
6,400		101,000	63,000	10,000		133,000	87,000
6,500		101,000	63,000	10,100		133,000	87,000
6,600		101,000	63,000	10,200		133,000	87,000
6,700		101,000	63,000	10,300		133,000	87,000
6,800		109,000	69,000	10,400		133,000	87,000
6,900		109,000	69,000	10,500		133,000	87,000
7,000		109,000	69,000	10,800		142,000	94,000
7,100		109,000	69,000	11,000		142,000	94,000
7,200		109,000	69,000	11,200		142,000	94,000
7,300		109,000	69,000	11,500		142,000	94,000
7,400		109,000	69,000	12,000		151,000	101,000
7,500		109,000	69,000	12,300	31/64	151,000	101,000
7,600		117,000	75,000	12,500		151,000	101,000
7,700		117,000	75,000	12,700	1/2	151,000	101,000
7,800		117,000	75,000	13,000		151,000	101,000
7,900		117,000	75,000				
8,000		117,000	75,000				
8,100		117,000	75,000				
8,200		117,000	75,000				
8,300		117,000	75,000				
8,400		117,000	75,000				
8,500		117,000	75,000				
8,600		125,000	81,000				
8,700		125,000	81,000				
8,800		125,000	81,000				
8,900		125,000	81,000				

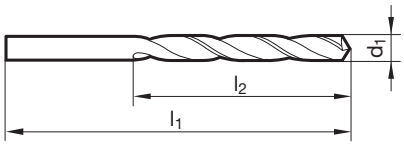
Punte elicoidali, corte

Articolo nr. 81063

P	M	K	N	S	H
●	○	○	○		

HSS-E | M | P2000 | ~5xD | DIN 338 | 130° | h8 | R | Cyl

spoglia sul cono tagliente • uso universale con wave grind • massima resistenza all'usura • acciaio HSS legato al Co acciai con R fino a 1000 N/mm² • leghe di AlSi



d1 mm	l1 mm	l2 mm
3,300	65,000	36,000
3,500	70,000	39,000
4,200	75,000	43,000
4,500	80,000	47,000
5,000	86,000	52,000
6,000	93,000	57,000
6,500	101,000	63,000
6,800	109,000	69,000
7,500	109,000	69,000
8,000	117,000	75,000
8,500	117,000	75,000
9,000	125,000	81,000

d1 mm	l1 mm	l2 mm
9,500	125,000	81,000
10,000	133,000	87,000
10,500	133,000	87,000
11,000	142,000	94,000
12,000	151,000	101,000

Punte elicoidali, corte

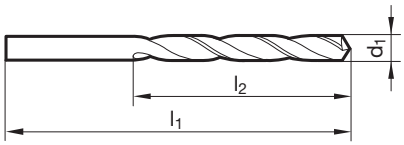
Articolo nr. 84811

P	M	K	N	S	H
●	○	●	○	○	○

HSS-E-PM | T | FN 500 DZ | ~5xD | DIN 338 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • acciaio HSS legato al Co PM • stabilità elevata • specifico per elevata resistenza all'usura

acciai legati in alta percentuale • acciai da bonifica e da cementazione • ghise, ottone e bronzo



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	5,560	7/32	93,000	57,000
1,200		38,000	16,000	5,950	15/64	93,000	57,000
1,300		38,000	16,000	6,000		93,000	57,000
1,400		40,000	18,000	6,300		101,000	63,000
1,500		40,000	18,000	6,350	1/4	101,000	63,000
1,600		43,000	20,000	6,700		101,000	63,000
1,700		43,000	20,000	6,800		109,000	69,000
1,900		46,000	22,000	7,000		109,000	69,000
2,000		49,000	24,000	7,140	9/32	109,000	69,000
2,100		49,000	24,000	7,400		109,000	69,000
2,200		53,000	27,000	7,900		117,000	75,000
2,300		53,000	27,000	7,940	5/16	117,000	75,000
2,380	3/32	57,000	30,000	8,000		117,000	75,000
2,500		57,000	30,000	8,500		117,000	75,000
2,600		57,000	30,000	8,730	11/32	125,000	81,000
2,780	7/64	61,000	33,000	9,000		125,000	81,000
2,800		61,000	33,000	9,300		125,000	81,000
2,900		61,000	33,000	9,500		125,000	81,000
3,000		61,000	33,000	9,800		133,000	87,000
3,100		65,000	36,000	10,000		133,000	87,000
3,170	1/8	65,000	36,000	10,200		133,000	87,000
3,300		65,000	36,000	10,500		133,000	87,000
3,500		70,000	39,000	11,000		142,000	94,000
3,570	9/64	70,000	39,000	11,110	7/16	142,000	94,000
3,600		70,000	39,000	11,500		142,000	94,000
3,700		70,000	39,000	12,000		151,000	101,000
3,900		75,000	43,000	12,500		151,000	101,000
4,000		75,000	43,000	13,000		151,000	101,000
4,100		75,000	43,000	13,500		160,000	108,000
4,200		75,000	43,000	14,000		160,000	108,000
4,760	3/16	86,000	52,000				
4,800		86,000	52,000				
5,000		86,000	52,000				
5,160	13/64	86,000	52,000				
5,400		93,000	57,000				
5,500		93,000	57,000				

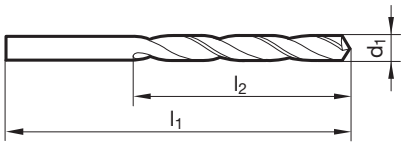
Punte elicoidali, corte

Articolo nr. 81012

P	M	K	N	S	H
●	○	○	●	●	○

M42 | N | ~5xD | DIN 338 | 135° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • specifico per elevata resistenza all'usura • con alta perc. di CoMo
leghe tenaci e molto ten. base di CrNi • acciai inossidabili e resistenti al calore • lamiere resistente all'usura • acciai o bronzi con R fino a ca. 1400 N/mm² • Hastelloy, Inconel, Nimonic



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
1,000	34,000	12,000	5,200	86,000	52,000
1,100	36,000	14,000	5,300	86,000	52,000
1,200	38,000	16,000	5,400	93,000	57,000
1,300	38,000	16,000	5,500	93,000	57,000
1,400	40,000	18,000	5,600	93,000	57,000
1,500	40,000	18,000	5,700	93,000	57,000
1,600	43,000	20,000	5,800	93,000	57,000
1,700	43,000	20,000	5,900	93,000	57,000
1,800	46,000	22,000	6,000	93,000	57,000
1,900	46,000	22,000	6,100	101,000	63,000
2,000	49,000	24,000	6,200	101,000	63,000
2,100	49,000	24,000	6,300	101,000	63,000
2,200	53,000	27,000	6,400	101,000	63,000
2,300	53,000	27,000	6,500	101,000	63,000
2,400	57,000	30,000	6,600	101,000	63,000
2,500	57,000	30,000	6,700	101,000	63,000
2,600	57,000	30,000	6,800	109,000	69,000
2,700	61,000	33,000	6,900	109,000	69,000
2,800	61,000	33,000	7,000	109,000	69,000
2,900	61,000	33,000	7,100	109,000	69,000
3,000	61,000	33,000	7,200	109,000	69,000
3,100	65,000	36,000	7,300	109,000	69,000
3,200	65,000	36,000	7,400	109,000	69,000
3,300	65,000	36,000	7,500	109,000	69,000
3,400	70,000	39,000	7,600	117,000	75,000
3,500	70,000	39,000	7,700	117,000	75,000
3,600	70,000	39,000	7,800	117,000	75,000
3,700	70,000	39,000	7,900	117,000	75,000
3,800	75,000	43,000	8,000	117,000	75,000
3,900	75,000	43,000	8,100	117,000	75,000
4,000	75,000	43,000	8,200	117,000	75,000
4,100	75,000	43,000	8,300	117,000	75,000
4,200	75,000	43,000	8,400	117,000	75,000
4,300	80,000	47,000	8,500	117,000	75,000
4,400	80,000	47,000	8,600	125,000	81,000
4,500	80,000	47,000	8,700	125,000	81,000
4,600	80,000	47,000	8,800	125,000	81,000
4,700	80,000	47,000	8,900	125,000	81,000
4,800	86,000	52,000	9,000	125,000	81,000
4,900	86,000	52,000	9,100	125,000	81,000
5,000	86,000	52,000	9,200	125,000	81,000
5,100	86,000	52,000	9,300	125,000	81,000

Punte elicoidali, corte

d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
9,400	125,000	81,000	12,500	151,000	101,000
9,500	125,000	81,000	13,000	151,000	101,000
9,600	133,000	87,000	14,000	160,000	108,000
9,700	133,000	87,000			
9,800	133,000	87,000			
9,900	133,000	87,000			
10,000	133,000	87,000			
10,200	133,000	87,000			
10,500	133,000	87,000			
11,000	142,000	94,000			
11,500	142,000	94,000			
12,000	151,000	101,000			

HARTNER

Punte elicoidali, corte

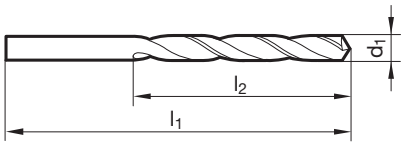
Articolo nr. 89244

P	M	K	N	S	H
○	○	○	●	○	

VHM | N | ~5xD | WN | 118° | h7 | R | Cyl

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • ghisa grigia • bronzo/ottone • alluminio e leghe di alluminio • magnesio e leghe di magnesio • materie sintetiche e materie sintetiche a fibre rinforzate



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	4,600		80,000	47,000
1,100		36,000	14,000	4,700		80,000	47,000
1,200		38,000	16,000	4,760	3/16	86,000	52,000
1,300		38,000	16,000	4,800		86,000	52,000
1,400		40,000	18,000	4,900		86,000	52,000
1,500		40,000	18,000	5,000		86,000	52,000
1,600		43,000	20,000	5,100		86,000	52,000
1,700		43,000	20,000	5,160	13/64	86,000	52,000
1,800		46,000	22,000	5,200		86,000	52,000
1,900		46,000	22,000	5,300		86,000	52,000
2,000		49,000	24,000	5,400		93,000	57,000
2,100		49,000	24,000	5,500		93,000	57,000
2,200		53,000	27,000	5,560	7/32	93,000	57,000
2,300		53,000	27,000	5,600		93,000	57,000
2,380	3/32	57,000	30,000	5,700		93,000	57,000
2,400		57,000	30,000	5,800		93,000	57,000
2,500		57,000	30,000	5,900		93,000	57,000
2,600		57,000	30,000	5,950	15/64	93,000	57,000
2,700		61,000	33,000	6,000		93,000	57,000
2,780	7/64	61,000	33,000	6,100		101,000	63,000
2,800		61,000	33,000	6,200		101,000	63,000
2,900		61,000	33,000	6,300		101,000	63,000
3,000		61,000	33,000	6,350	1/4	101,000	63,000
3,100		65,000	36,000	6,400		101,000	63,000
3,170	1/8	65,000	36,000	6,500		101,000	63,000
3,200		65,000	36,000	6,600		101,000	63,000
3,300		65,000	36,000	6,700		101,000	63,000
3,400		70,000	39,000	6,800		109,000	69,000
3,500		70,000	39,000	6,900		109,000	69,000
3,570	9/64	70,000	39,000	7,000		109,000	69,000
3,600		70,000	39,000	7,100		109,000	69,000
3,700		70,000	39,000	7,140	9/32	109,000	69,000
3,800		75,000	43,000	7,200		109,000	69,000
3,900		75,000	43,000	7,300		109,000	69,000
3,970	5/32	75,000	43,000	7,400		109,000	69,000
4,000		75,000	43,000	7,500		109,000	69,000
4,100		75,000	43,000	7,600		117,000	75,000
4,200		75,000	43,000	7,700		117,000	75,000
4,300		80,000	47,000	7,800		117,000	75,000
4,370	11/64	80,000	47,000	7,900		117,000	75,000
4,400		80,000	47,000	7,940	5/16	117,000	75,000
4,500		80,000	47,000	8,000		117,000	75,000

HARTNER

Punte elicoidali, corte

d1 mm	inch	l1 mm	l2 mm
8,200		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
10,000		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,500		133,000	87,000
10,720	27/64	142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,500		142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000

HARTNER

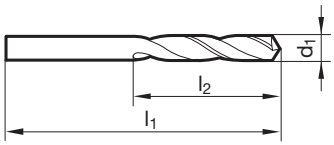
Punte elicoidali, extra corte

Articolo nr. 81110

P	M	K	N	S	H
●		●	○		

HSS | >Ø 2,36 | N | ~3xD | DIN 1897 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • per torni automatici/revolver • anche per trapani a mano materiale a spessore sottile • acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato, alpacca e grafite



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,500		20,000	3,000	3,100		49,000	18,000
0,600		21,000	3,500	3,200		49,000	18,000
0,700		23,000	4,500	3,250		49,000	18,000
0,800		24,000	5,000	3,300		49,000	18,000
0,850		24,000	5,000	3,350		49,000	18,000
0,900		25,000	5,500	3,400		52,000	20,000
1,000		26,000	6,000	3,500		52,000	20,000
1,050		26,000	6,000	3,600		52,000	20,000
1,100		28,000	7,000	3,650		52,000	20,000
1,200		30,000	8,000	3,700		52,000	20,000
1,250		30,000	8,000	3,750		52,000	20,000
1,300		30,000	8,000	3,800		55,000	22,000
1,350		32,000	9,000	3,850		55,000	22,000
1,400		32,000	9,000	3,900		55,000	22,000
1,500		32,000	9,000	4,000		55,000	22,000
1,550		34,000	10,000	4,100		55,000	22,000
1,600		34,000	10,000	4,200		55,000	22,000
1,650		34,000	10,000	4,250		55,000	22,000
1,700		34,000	10,000	4,300		58,000	24,000
1,750		36,000	11,000	4,400		58,000	24,000
1,800		36,000	11,000	4,500		58,000	24,000
1,900		36,000	11,000	4,600		58,000	24,000
1,950		38,000	12,000	4,650		58,000	24,000
2,000		38,000	12,000	4,700		58,000	24,000
2,050		38,000	12,000	4,750		58,000	24,000
2,100		38,000	12,000	4,800		62,000	26,000
2,200		40,000	13,000	4,850		62,000	26,000
2,250		40,000	13,000	4,900		62,000	26,000
2,300		40,000	13,000	4,950		62,000	26,000
2,400		43,000	14,000	5,000		62,000	26,000
2,450		43,000	14,000	5,050		62,000	26,000
2,500		43,000	14,000	5,100		62,000	26,000
2,550		43,000	14,000	5,200		62,000	26,000
2,600		43,000	14,000	5,250		62,000	26,000
2,650		43,000	14,000	5,300		62,000	26,000
2,700		46,000	16,000	5,400		66,000	28,000
2,750		46,000	16,000	5,500		66,000	28,000
2,800		46,000	16,000	5,600		66,000	28,000
2,900		46,000	16,000	5,700		66,000	28,000
2,950		46,000	16,000	5,750		66,000	28,000
3,000		46,000	16,000	5,800		66,000	28,000
3,050		49,000	18,000	5,850		66,000	28,000

Punte elicoidali, extra corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
5,900		66,000	28,000	11,500		95,000	47,000
6,000		66,000	28,000	11,700		95,000	47,000
6,100		70,000	31,000	11,800		95,000	47,000
6,150		70,000	31,000	12,000		102,000	51,000
6,200		70,000	31,000	12,050		102,000	51,000
6,250		70,000	31,000	12,200		102,000	51,000
6,300		70,000	31,000	12,300	31/64	102,000	51,000
6,350	1/4	70,000	31,000	12,500		102,000	51,000
6,400		70,000	31,000	12,600		102,000	51,000
6,500		70,000	31,000	12,700		102,000	51,000
6,600		70,000	31,000	12,750		102,000	51,000
6,700		70,000	31,000	12,900		102,000	51,000
6,750	17/64	74,000	34,000	13,000		102,000	51,000
6,800		74,000	34,000	13,100	33/64	102,000	51,000
6,900		74,000	34,000	13,200		102,000	51,000
7,000		74,000	34,000	13,500		107,000	54,000
7,100		74,000	34,000	13,600		107,000	54,000
7,200		74,000	34,000	13,750		107,000	54,000
7,300		74,000	34,000	14,000		107,000	54,000
7,400		74,000	34,000	14,200		111,000	56,000
7,500		74,000	34,000	14,250		111,000	56,000
7,600		79,000	37,000	14,300		111,000	56,000
7,700		79,000	37,000	14,500		111,000	56,000
7,750		79,000	37,000	14,750		111,000	56,000
7,800		79,000	37,000	15,000		111,000	56,000
7,900		79,000	37,000	15,250		115,000	58,000
8,000		79,000	37,000	15,500		115,000	58,000
8,100		79,000	37,000	15,750		115,000	58,000
8,200		79,000	37,000	16,000		115,000	58,000
8,250		79,000	37,000	16,250		119,000	60,000
8,300		79,000	37,000	16,270	41/64	119,000	60,000
8,400		79,000	37,000	16,500		119,000	60,000
8,500		79,000	37,000	17,000		119,000	60,000
8,600		84,000	40,000	17,500		123,000	62,000
8,700		84,000	40,000	18,000		123,000	62,000
8,750		84,000	40,000	18,200		127,000	64,000
8,800		84,000	40,000	18,500		127,000	64,000
8,900		84,000	40,000	18,750		127,000	64,000
9,000		84,000	40,000	19,000		127,000	64,000
9,100		84,000	40,000	19,100		131,000	66,000
9,200		84,000	40,000	19,500		131,000	66,000
9,250		84,000	40,000	20,000		131,000	66,000
9,300		84,000	40,000	20,500		136,000	68,000
9,400		84,000	40,000	21,000		136,000	68,000
9,500		84,000	40,000	21,500		141,000	70,000
9,600		89,000	43,000	22,000		141,000	70,000
9,700		89,000	43,000	22,500		146,000	72,000
9,750		89,000	43,000	23,000		146,000	72,000
9,800		89,000	43,000	23,500		146,000	72,000
9,900		89,000	43,000	24,000		151,000	75,000
10,000		89,000	43,000	24,500		151,000	75,000
10,050		89,000	43,000	25,000	63/64	151,000	75,000
10,100		89,000	43,000	26,000		156,000	78,000
10,200		89,000	43,000	26,500		156,000	78,000
10,250		89,000	43,000	27,000		162,000	81,000
10,300		89,000	43,000	27,500		162,000	81,000
10,400		89,000	43,000	28,000		162,000	81,000
10,500		89,000	43,000	28,750		168,000	84,000
10,700		95,000	47,000	29,000		168,000	84,000
10,750		95,000	47,000	30,000		168,000	84,000
10,800		95,000	47,000	31,000		174,000	87,000
10,900		95,000	47,000	32,000		180,000	90,000
11,000		95,000	47,000	39,500		200,000	100,000
11,100		95,000	47,000				
11,200		95,000	47,000				
11,400		95,000	47,000				

HARTNER

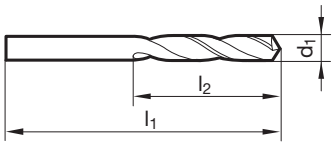
Punte elicoidali, extra corte

Articolo nr. 81115

P	M	K	N	S	H
●		●	○		

HSS | >Ø 5,00 | N | ~3xD | DIN 1897 | 118° | h8 | L | Cyl

Assott. del nocc. ≥ Ø 14,200 • spoglia sul cono tagliente • per torni automatici/revolver
materiale a spessore sottile • acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato, alpacca e grafite



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,500		20,000	3,000	3,350		49,000	18,000
0,550		21,000	3,500	3,400		52,000	20,000
0,700		23,000	4,500	3,450		52,000	20,000
0,750		23,000	4,500	3,500		52,000	20,000
0,800		24,000	5,000	3,600		52,000	20,000
0,850		24,000	5,000	3,700		52,000	20,000
0,950		25,000	5,500	3,750		52,000	20,000
1,000		26,000	6,000	3,800		55,000	22,000
1,150		28,000	7,000	3,850		55,000	22,000
1,180		28,000	7,000	4,000		55,000	22,000
1,250		30,000	8,000	4,100		55,000	22,000
1,330		32,000	9,000	4,150		55,000	22,000
1,350		32,000	9,000	4,200		55,000	22,000
1,500		32,000	9,000	4,250		55,000	22,000
1,550		34,000	10,000	4,300		58,000	24,000
1,600		34,000	10,000	4,400		58,000	24,000
1,700		34,000	10,000	4,450		58,000	24,000
1,710		36,000	11,000	4,500		58,000	24,000
1,800		36,000	11,000	4,600		58,000	24,000
1,830		36,000	11,000	4,700		58,000	24,000
1,900		36,000	11,000	4,750		58,000	24,000
1,980	5/64	38,000	12,000	4,800		62,000	26,000
2,000		38,000	12,000	4,850		62,000	26,000
2,100		38,000	12,000	4,900		62,000	26,000
2,200		40,000	13,000	5,000		62,000	26,000
2,400		43,000	14,000	5,100		62,000	26,000
2,420		43,000	14,000	5,200		62,000	26,000
2,500		43,000	14,000	5,250		62,000	26,000
2,550		43,000	14,000	5,300		62,000	26,000
2,600		43,000	14,000	5,400		66,000	28,000
2,720		46,000	16,000	5,500		66,000	28,000
2,800		46,000	16,000	5,600		66,000	28,000
2,820		46,000	16,000	5,700		66,000	28,000
2,850		46,000	16,000	5,750		66,000	28,000
2,900		46,000	16,000	5,800		66,000	28,000
3,000		46,000	16,000	5,900		66,000	28,000
3,010		49,000	18,000	5,950	15/64	66,000	28,000
3,050		49,000	18,000	6,000		66,000	28,000
3,100		49,000	18,000	6,100		70,000	31,000
3,200		49,000	18,000	6,150		70,000	31,000
3,250		49,000	18,000	6,200		70,000	31,000
3,300		49,000	18,000	6,400		70,000	31,000

Punte elicoidali, extra corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
6,500		70,000	31,000	11,250		95,000	47,000
6,600		70,000	31,000	11,300		95,000	47,000
6,700		70,000	31,000	11,500		95,000	47,000
6,750	17/64	74,000	34,000	11,750		95,000	47,000
6,800		74,000	34,000	11,800		95,000	47,000
6,900		74,000	34,000	11,900		102,000	51,000
7,000		74,000	34,000	12,000		102,000	51,000
7,100		74,000	34,000	12,100		102,000	51,000
7,200		74,000	34,000	12,200		102,000	51,000
7,300		74,000	34,000	12,500		102,000	51,000
7,400		74,000	34,000	12,750		102,000	51,000
7,500		74,000	34,000	12,900		102,000	51,000
7,600		79,000	37,000	13,000		102,000	51,000
7,700		79,000	37,000	13,200		102,000	51,000
7,750		79,000	37,000	13,250		107,000	54,000
7,800		79,000	37,000	13,400		107,000	54,000
7,900		79,000	37,000	13,500		107,000	54,000
8,000		79,000	37,000	13,600		107,000	54,000
8,100		79,000	37,000	13,750		107,000	54,000
8,200		79,000	37,000	13,800		107,000	54,000
8,300		79,000	37,000	14,000		107,000	54,000
8,400		79,000	37,000	14,200		111,000	56,000
8,500		79,000	37,000	14,250		111,000	56,000
8,600		84,000	40,000	14,300		111,000	56,000
8,700		84,000	40,000	14,500		111,000	56,000
8,750		84,000	40,000	14,700		111,000	56,000
8,800		84,000	40,000	14,750		111,000	56,000
8,900		84,000	40,000	15,000		111,000	56,000
9,000		84,000	40,000	15,200		115,000	58,000
9,100		84,000	40,000	15,600		115,000	58,000
9,200		84,000	40,000	15,700		115,000	58,000
9,250		84,000	40,000	16,000		115,000	58,000
9,300		84,000	40,000	16,500		119,000	60,000
9,400		84,000	40,000	17,000		119,000	60,000
9,500		84,000	40,000	18,000		123,000	62,000
9,600		89,000	43,000	19,000		127,000	64,000
9,700		89,000	43,000	20,000		131,000	66,000
9,750		89,000	43,000	29,750		168,000	84,000
10,000		89,000	43,000	30,000		168,000	84,000
10,100		89,000	43,000	31,500		174,000	87,000
10,200		89,000	43,000	36,000		193,000	96,000
10,300		89,000	43,000	36,500		193,000	96,000
10,500		89,000	43,000				
10,600		89,000	43,000				
10,700		95,000	47,000				
10,800		95,000	47,000				
11,000		95,000	47,000				
11,200		95,000	47,000				

HARTNER

Punte elicoidali, extra corte

Articolo nr. 84400

P	M	K	N	S	H
●		●	○		

HSS | T | N | ~3xD | DIN 1897 | 118° | h8 | R | Cyl

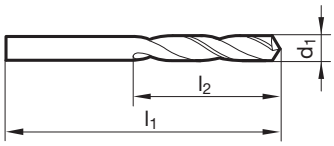
Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • per torni automatici/revolver • anche per trapani a mano materiale a spessore sottile • acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato, alpacca e grafite

Articolo nr. 84501

P	M	K	N	S	H
●		●	●		

HSS | F | N | ~3xD | DIN 1897 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • per torni automatici/revolver • anche per trapani a mano materiale a spessore sottile • acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato, alpacca e grafite



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		26,000	6,000	3,650		52,000	20,000
1,100		28,000	7,000	3,700		52,000	20,000
1,200		30,000	8,000	3,800		55,000	22,000
1,300		30,000	8,000	3,900		55,000	22,000
1,350		32,000	9,000	4,000		55,000	22,000
1,400		32,000	9,000	4,100		55,000	22,000
1,450		32,000	9,000	4,200		55,000	22,000
1,500		32,000	9,000	4,300		58,000	24,000
1,600		34,000	10,000	4,400		58,000	24,000
1,700		34,000	10,000	4,500		58,000	24,000
1,800		36,000	11,000	4,600		58,000	24,000
1,900		36,000	11,000	4,700		58,000	24,000
2,000		38,000	12,000	4,800		62,000	26,000
2,100		38,000	12,000	4,900		62,000	26,000
2,200		40,000	13,000	5,000		62,000	26,000
2,300		40,000	13,000	5,100		62,000	26,000
2,400		43,000	14,000	5,200		62,000	26,000
2,500		43,000	14,000	5,300		62,000	26,000
2,600		43,000	14,000	5,400		66,000	28,000
2,700		46,000	16,000	5,500		66,000	28,000
2,800		46,000	16,000	5,600		66,000	28,000
2,900		46,000	16,000	5,700		66,000	28,000
3,000		46,000	16,000	5,800		66,000	28,000
3,100		49,000	18,000	5,900		66,000	28,000
3,200		49,000	18,000	6,000		66,000	28,000
3,300		49,000	18,000	6,100		70,000	31,000
3,400		52,000	20,000	6,200		70,000	31,000
3,450		52,000	20,000	6,300		70,000	31,000
3,500		52,000	20,000	6,400		70,000	31,000
3,600		52,000	20,000	6,500		70,000	31,000

Punte elicoidali, extra corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
6,600		70,000	31,000	11,700		95,000	47,000
6,700		70,000	31,000	11,800		95,000	47,000
6,800		74,000	34,000	11,900		102,000	51,000
6,900		74,000	34,000	12,000		102,000	51,000
7,000		74,000	34,000	12,100		102,000	51,000
7,100		74,000	34,000	12,200		102,000	51,000
7,200		74,000	34,000	12,300	31/64	102,000	51,000
7,300		74,000	34,000	12,500		102,000	51,000
7,400		74,000	34,000	12,700	1/2	102,000	51,000
7,500		74,000	34,000	12,800		102,000	51,000
7,600		79,000	37,000	13,000		102,000	51,000
7,700		79,000	37,000	13,200		102,000	51,000
7,800		79,000	37,000	13,500		107,000	54,000
7,900		79,000	37,000	13,800		107,000	54,000
8,000		79,000	37,000	14,000		107,000	54,000
8,100		79,000	37,000	14,200		111,000	56,000
8,200		79,000	37,000	14,500		111,000	56,000
8,300		79,000	37,000	14,800		111,000	56,000
8,400		79,000	37,000	15,000		111,000	56,000
8,500		79,000	37,000	15,300		115,000	58,000
8,600		84,000	40,000	15,500		115,000	58,000
8,700		84,000	40,000	16,000		115,000	58,000
8,800		84,000	40,000	16,500		119,000	60,000
8,900		84,000	40,000	17,000		119,000	60,000
9,000		84,000	40,000	17,500		123,000	62,000
9,100		84,000	40,000	18,000		123,000	62,000
9,200		84,000	40,000	19,000		127,000	64,000
9,300		84,000	40,000	19,500		131,000	66,000
9,400		84,000	40,000	20,000		131,000	66,000
9,500		84,000	40,000	20,500		136,000	68,000
9,600		89,000	43,000	21,000		136,000	68,000
9,700		89,000	43,000	21,500		141,000	70,000
9,800		89,000	43,000	22,000		141,000	70,000
9,900		89,000	43,000	22,500		146,000	72,000
10,000		89,000	43,000	23,000		146,000	72,000
10,100		89,000	43,000	24,000		151,000	75,000
10,200		89,000	43,000	24,500		151,000	75,000
10,300		89,000	43,000	25,000		151,000	75,000
10,400		89,000	43,000				
10,500		89,000	43,000				
10,600		89,000	43,000				
10,720	27/64	95,000	47,000				
10,800		95,000	47,000				
11,000		95,000	47,000				
11,200		95,000	47,000				
11,300		95,000	47,000				
11,400		95,000	47,000				
11,500		95,000	47,000				

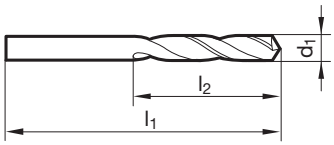
Punte elicoidali, extra corte

Articolo nr. 81120

P	M	K	N	S	H
			•		

HSS | H | ~3xD | DIN 1897 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 15,000 • spoglia sul cono tagliente
materiali duri e secchi • ottone, leghe di magnesio • bronze, bronzo fosforoso • ardesia, mica, pertinax



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,200		30,000	8,000	5,000		62,000	26,000
1,400		32,000	9,000	5,200		62,000	26,000
1,500		32,000	9,000	5,300		62,000	26,000
1,600		34,000	10,000	5,400		66,000	28,000
1,700		34,000	10,000	5,500		66,000	28,000
1,900		36,000	11,000	5,600		66,000	28,000
2,000		38,000	12,000	5,700		66,000	28,000
2,350		40,000	13,000	5,800		66,000	28,000
2,380	3/32	43,000	14,000	6,000		66,000	28,000
2,400		43,000	14,000	6,100		70,000	31,000
2,500		43,000	14,000	6,200		70,000	31,000
2,600		43,000	14,000	6,500		70,000	31,000
2,650		43,000	14,000	7,000		74,000	34,000
2,700		46,000	16,000	7,500		74,000	34,000
2,800		46,000	16,000	8,000		79,000	37,000
2,950		46,000	16,000	8,500		79,000	37,000
3,000		46,000	16,000	8,600		84,000	40,000
3,100		49,000	18,000	9,000		84,000	40,000
3,200		49,000	18,000	9,500		84,000	40,000
3,250		49,000	18,000	10,000		89,000	43,000
3,300		49,000	18,000	10,200		89,000	43,000
3,400		52,000	20,000	10,500		89,000	43,000
3,500		52,000	20,000	11,000		95,000	47,000
3,700		52,000	20,000	12,000		102,000	51,000
3,800		55,000	22,000	13,000		102,000	51,000
3,900		55,000	22,000	14,000		107,000	54,000
4,000		55,000	22,000	15,000		111,000	56,000
4,100		55,000	22,000				
4,200		55,000	22,000				
4,300		58,000	24,000				
4,400		58,000	24,000				
4,500		58,000	24,000				
4,600		58,000	24,000				
4,700		58,000	24,000				
4,800		62,000	26,000				
4,900		62,000	26,000				

Punte elicoidali, extra corte

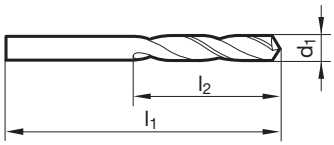
Articolo nr. 81130

P	M	K	N	S	H
			•		

HSS | W | ~3xD | DIN 1897 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 2,500 • spoglia sul cono tagliente

materiali teneri a truciolo lungo • alluminio, leghe di alluminio (a truciolo lungo) • zinco, rame affinato, silumin, elektron • materie sintetiche (tenere) e legno



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
1,500	32,000	9,000	5,700	66,000	28,000
2,000	38,000	12,000	5,800	66,000	28,000
2,200	40,000	13,000	6,000	66,000	28,000
2,500	43,000	14,000	6,400	70,000	31,000
2,600	43,000	14,000	6,500	70,000	31,000
2,700	46,000	16,000	6,800	74,000	34,000
2,800	46,000	16,000	7,000	74,000	34,000
3,000	46,000	16,000	7,500	74,000	34,000
3,100	49,000	18,000	7,800	79,000	37,000
3,200	49,000	18,000	8,000	79,000	37,000
3,300	49,000	18,000	8,500	79,000	37,000
3,400	52,000	20,000	9,000	84,000	40,000
3,500	52,000	20,000	9,500	84,000	40,000
3,800	55,000	22,000	10,000	89,000	43,000
3,900	55,000	22,000	10,500	89,000	43,000
4,000	55,000	22,000	11,000	95,000	47,000
4,100	55,000	22,000	12,000	102,000	51,000
4,200	55,000	22,000	12,500	102,000	51,000
4,300	58,000	24,000	13,000	102,000	51,000
4,500	58,000	24,000	14,000	107,000	54,000
4,900	62,000	26,000	15,000	111,000	56,000
5,000	62,000	26,000	16,000	115,000	58,000
5,100	62,000	26,000			
5,300	62,000	26,000			

HARTNER

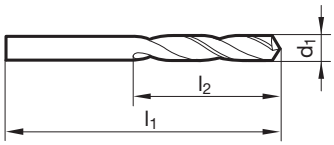
Punte elicoidali, extra corte

Articolo nr. 81140

P	M	K	N	S	H
●	○	○	●		

HSS | <Ø 2,36 >Ø 16,0 | FN | ~3xD | DIN 1897 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,500 • spoglia sul cono tagliente • per acciai molto duri
acciai automatici • acciai inossidabili e resist. al calore • acciai da cementazione e da bonifica con R fino a ca. 800 N/mm² • leghe di alluminio e rame a truciolo corto e medio



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,500		32,000	9,000	6,100		70,000	31,000
1,600		34,000	10,000	6,300		70,000	31,000
1,800		36,000	11,000	6,400		70,000	31,000
2,000		38,000	12,000	6,500		70,000	31,000
2,100		38,000	12,000	6,600		70,000	31,000
2,200		40,000	13,000	6,700		70,000	31,000
2,300		40,000	13,000	6,800		74,000	34,000
2,350		40,000	13,000	7,000		74,000	34,000
2,400		43,000	14,000	7,100		74,000	34,000
2,500		43,000	14,000	7,400		74,000	34,000
2,600		43,000	14,000	7,800		79,000	37,000
2,700		46,000	16,000	8,000		79,000	37,000
2,800		46,000	16,000	8,100		79,000	37,000
2,900		46,000	16,000	8,300		79,000	37,000
3,000		46,000	16,000	8,400		79,000	37,000
3,100		49,000	18,000	8,500		79,000	37,000
3,150		49,000	18,000	8,600		84,000	40,000
3,200		49,000	18,000	8,900		84,000	40,000
3,300		49,000	18,000	9,000		84,000	40,000
3,400		52,000	20,000	9,100		84,000	40,000
3,500		52,000	20,000	9,200		84,000	40,000
3,700		52,000	20,000	9,300		84,000	40,000
4,000		55,000	22,000	9,400		84,000	40,000
4,100		55,000	22,000	9,500		84,000	40,000
4,200		55,000	22,000	9,600		89,000	43,000
4,300		58,000	24,000	9,700		89,000	43,000
4,500		58,000	24,000	10,000		89,000	43,000
4,600		58,000	24,000	10,500		89,000	43,000
4,700		58,000	24,000	11,000		95,000	47,000
4,800		62,000	26,000	11,500		95,000	47,000
4,900		62,000	26,000	12,300	31/64	102,000	51,000
5,000		62,000	26,000	12,500		102,000	51,000
5,100		62,000	26,000	13,000		102,000	51,000
5,200		62,000	26,000	15,000		111,000	56,000
5,300		62,000	26,000	15,500		115,000	58,000
5,400		66,000	28,000				
5,500		66,000	28,000				
5,600		66,000	28,000				
5,700		66,000	28,000				
5,800		66,000	28,000				
5,900		66,000	28,000				
6,000		66,000	28,000				

HARTNER

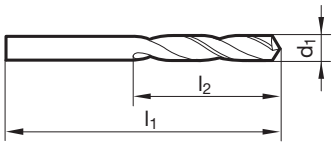
Punte elicoidali, extra corte

Articolo nr. 81145

P	M	K	N	S	H
●	○	○	●		

HSS | <Ø 2,36 >Ø 16,0 | FN | ~3xD | DIN 1897 | 130° | h8 | L | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • per acciai molto duri
acciai automatici • acciai inossidabili e resist. al calore • acciai da cementazione e da bonifica con R fino a ca. 800 N/mm² • leghe di alluminio e rame a truciolo corto e medio



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		26,000	6,000	3,700		52,000	20,000
1,100		28,000	7,000	3,800		55,000	22,000
1,250		30,000	8,000	3,900		55,000	22,000
1,300		30,000	8,000	4,000		55,000	22,000
1,400		32,000	9,000	4,100		55,000	22,000
1,500		32,000	9,000	4,200		55,000	22,000
1,600		34,000	10,000	4,300		58,000	24,000
1,650		34,000	10,000	4,400		58,000	24,000
1,700		34,000	10,000	4,500		58,000	24,000
1,800		36,000	11,000	4,600		58,000	24,000
1,850		36,000	11,000	4,650		58,000	24,000
1,900		36,000	11,000	4,700		58,000	24,000
2,000		38,000	12,000	4,800		62,000	26,000
2,100		38,000	12,000	4,900		62,000	26,000
2,200		40,000	13,000	5,000		62,000	26,000
2,250		40,000	13,000	5,100		62,000	26,000
2,300		40,000	13,000	5,200		62,000	26,000
2,350		40,000	13,000	5,300		62,000	26,000
2,400		43,000	14,000	5,400		66,000	28,000
2,500		43,000	14,000	5,500		66,000	28,000
2,550		43,000	14,000	5,600		66,000	28,000
2,600		43,000	14,000	5,700		66,000	28,000
2,650		43,000	14,000	5,800		66,000	28,000
2,700		46,000	16,000	5,900		66,000	28,000
2,750		46,000	16,000	6,000		66,000	28,000
2,780	7/64	46,000	16,000	6,100		70,000	31,000
2,800		46,000	16,000	6,200		70,000	31,000
2,850		46,000	16,000	6,300		70,000	31,000
2,870		46,000	16,000	6,500		70,000	31,000
2,900		46,000	16,000	6,600		70,000	31,000
2,950		46,000	16,000	6,700		70,000	31,000
3,000		46,000	16,000	6,800		74,000	34,000
3,100		49,000	18,000	6,900		74,000	34,000
3,150		49,000	18,000	7,000		74,000	34,000
3,170	1/8	49,000	18,000	7,500		74,000	34,000
3,200		49,000	18,000	7,600		79,000	37,000
3,250		49,000	18,000	7,800		79,000	37,000
3,300		49,000	18,000	7,900		79,000	37,000
3,400		52,000	20,000	8,000		79,000	37,000
3,500		52,000	20,000	8,200		79,000	37,000
3,650		52,000	20,000	8,300		79,000	37,000
3,680		52,000	20,000	8,400		79,000	37,000

HARTNER

Punte elicoidali, extra corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
8,500		79,000	37,000	12,500		102,000	51,000
8,600		84,000	40,000	16,000		115,000	58,000
8,700		84,000	40,000				
8,800		84,000	40,000				
9,000		84,000	40,000				
9,200		84,000	40,000				
9,500		84,000	40,000				
9,700		89,000	43,000				
10,000		89,000	43,000				
10,500		89,000	43,000				
11,000		95,000	47,000				
11,500		95,000	47,000				

HARTNER

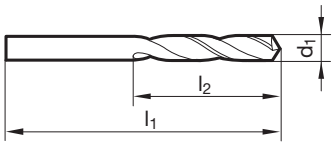
Punte elicoidali, extra corte

Articolo nr. 81173

P	M	K	N	S	H
○	●		○	○	

HSS-E | IS | ~3xD | DIN 1897 | 130° | h8 | R | Cyl

punta per INOX • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura
acciai inossidabili, resistenti al calore ed austenitici (V2A e V4A)



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
1,000	26,000	6,000	5,600	66,000	28,000
1,100	28,000	7,000	5,800	66,000	28,000
1,200	30,000	8,000	5,900	66,000	28,000
1,300	30,000	8,000	6,000	66,000	28,000
1,400	32,000	9,000	6,100	70,000	31,000
1,500	32,000	9,000	6,300	70,000	31,000
1,600	34,000	10,000	6,500	70,000	31,000
1,700	34,000	10,000	6,600	70,000	31,000
1,800	36,000	11,000	6,700	70,000	31,000
2,000	38,000	12,000	6,800	74,000	34,000
2,100	38,000	12,000	6,900	74,000	34,000
2,200	40,000	13,000	7,000	74,000	34,000
2,300	40,000	13,000	7,100	74,000	34,000
2,400	43,000	14,000	7,400	74,000	34,000
2,500	43,000	14,000	7,500	74,000	34,000
2,600	43,000	14,000	7,600	79,000	37,000
2,700	46,000	16,000	7,800	79,000	37,000
2,800	46,000	16,000	7,900	79,000	37,000
2,900	46,000	16,000	8,000	79,000	37,000
3,000	46,000	16,000	8,100	79,000	37,000
3,100	49,000	18,000	8,200	79,000	37,000
3,200	49,000	18,000	8,500	79,000	37,000
3,300	49,000	18,000	8,700	84,000	40,000
3,400	52,000	20,000	9,000	84,000	40,000
3,500	52,000	20,000	9,200	84,000	40,000
3,600	52,000	20,000	9,500	84,000	40,000
3,800	55,000	22,000	10,000	89,000	43,000
3,900	55,000	22,000	10,200	89,000	43,000
4,000	55,000	22,000	10,500	89,000	43,000
4,100	55,000	22,000	11,000	95,000	47,000
4,200	55,000	22,000	11,500	95,000	47,000
4,300	58,000	24,000	12,000	102,000	51,000
4,500	58,000	24,000			
4,600	58,000	24,000			
4,700	58,000	24,000			
4,800	62,000	26,000			
4,900	62,000	26,000			
5,000	62,000	26,000			
5,100	62,000	26,000			
5,200	62,000	26,000			
5,300	62,000	26,000			
5,500	66,000	28,000			

HARTNER

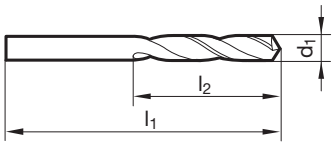
Punte elicoidali, extra corte

Articolo nr. 81171

P	M	K	N	S	H
●	●	●	○	●	○

HSS-E | >Ø 2,36 | V | ~3xD | DIN 1897 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura
acciai inossidabili e resist. al calore • acciai per molle • acciai austenitici • Hastelloy, Inconel, Nimonic



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,400		19,000	2,500	2,450		43,000	14,000
0,500		20,000	3,000	2,470		43,000	14,000
0,600		21,000	3,500	2,500		43,000	14,000
0,650		22,000	4,000	2,550		43,000	14,000
0,700		23,000	4,500	2,600		43,000	14,000
0,750		23,000	4,500	2,650		43,000	14,000
0,800		24,000	5,000	2,700		46,000	16,000
0,860		25,000	5,500	2,750		46,000	16,000
0,870		25,000	5,500	2,800		46,000	16,000
0,900		25,000	5,500	2,900		46,000	16,000
0,950		25,000	5,500	3,000		46,000	16,000
1,000		26,000	6,000	3,050		49,000	18,000
1,030		26,000	6,000	3,100		49,000	18,000
1,100		28,000	7,000	3,200		49,000	18,000
1,150		28,000	7,000	3,250		49,000	18,000
1,200		30,000	8,000	3,300		49,000	18,000
1,250		30,000	8,000	3,400		52,000	20,000
1,280		30,000	8,000	3,500		52,000	20,000
1,300		30,000	8,000	3,550		52,000	20,000
1,350		32,000	9,000	3,600		52,000	20,000
1,400		32,000	9,000	3,700		52,000	20,000
1,450		32,000	9,000	3,750		52,000	20,000
1,500		32,000	9,000	3,800		55,000	22,000
1,550		34,000	10,000	3,900		55,000	22,000
1,600		34,000	10,000	4,000		55,000	22,000
1,650		34,000	10,000	4,100		55,000	22,000
1,700		34,000	10,000	4,200		55,000	22,000
1,750		36,000	11,000	4,250		55,000	22,000
1,800		36,000	11,000	4,300		58,000	24,000
1,850		36,000	11,000	4,400		58,000	24,000
1,900		36,000	11,000	4,500		58,000	24,000
1,950		38,000	12,000	4,600		58,000	24,000
1,970		38,000	12,000	4,650		58,000	24,000
1,980	5/64	38,000	12,000	4,800		62,000	26,000
2,000		38,000	12,000	4,900		62,000	26,000
2,030		38,000	12,000	5,000		62,000	26,000
2,050		38,000	12,000	5,050		62,000	26,000
2,100		38,000	12,000	5,100		62,000	26,000
2,200		40,000	13,000	5,200		62,000	26,000
2,250		40,000	13,000	5,300		62,000	26,000
2,300		40,000	13,000	5,400		66,000	28,000
2,400		43,000	14,000	5,500		66,000	28,000

Punte elicoidali, extra corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
5,550		66,000	28,000	10,300		89,000	43,000
5,600		66,000	28,000	10,400		89,000	43,000
5,700		66,000	28,000	10,500		89,000	43,000
5,800		66,000	28,000	10,600		89,000	43,000
5,900		66,000	28,000	10,700		95,000	47,000
5,950	15/64	66,000	28,000	10,800		95,000	47,000
6,000		66,000	28,000	10,900		95,000	47,000
6,100		70,000	31,000	11,000		95,000	47,000
6,200		70,000	31,000	11,100		95,000	47,000
6,250		70,000	31,000	11,200		95,000	47,000
6,300		70,000	31,000	11,500		95,000	47,000
6,400		70,000	31,000	11,800		95,000	47,000
6,500		70,000	31,000	12,000		102,000	51,000
6,600		70,000	31,000	12,200		102,000	51,000
6,700		70,000	31,000	12,300	31/64	102,000	51,000
6,750	17/64	74,000	34,000	12,400		102,000	51,000
6,800		74,000	34,000	12,500		102,000	51,000
6,900		74,000	34,000	12,600		102,000	51,000
7,000		74,000	34,000	12,800		102,000	51,000
7,100		74,000	34,000	12,900		102,000	51,000
7,200		74,000	34,000	13,000		102,000	51,000
7,300		74,000	34,000	13,500		107,000	54,000
7,400		74,000	34,000	13,750		107,000	54,000
7,500		74,000	34,000	13,800		107,000	54,000
7,600		79,000	37,000	14,000		107,000	54,000
7,700		79,000	37,000	14,500		111,000	56,000
7,800		79,000	37,000	15,000		111,000	56,000
7,900		79,000	37,000	15,500		115,000	58,000
8,000		79,000	37,000	15,750		115,000	58,000
8,100		79,000	37,000	16,000		115,000	58,000
8,200		79,000	37,000	16,500		119,000	60,000
8,250		79,000	37,000	17,000		119,000	60,000
8,300		79,000	37,000	17,500		123,000	62,000
8,400		79,000	37,000	18,000		123,000	62,000
8,500		79,000	37,000	18,500		127,000	64,000
8,600		84,000	40,000	19,000		127,000	64,000
8,700		84,000	40,000	19,500		131,000	66,000
8,800		84,000	40,000	20,000		131,000	66,000
8,900		84,000	40,000	20,500		136,000	68,000
9,000		84,000	40,000	21,000		136,000	68,000
9,100		84,000	40,000	22,000		141,000	70,000
9,200		84,000	40,000	22,200		141,000	70,000
9,300		84,000	40,000	23,000		146,000	72,000
9,400		84,000	40,000	24,000		151,000	75,000
9,500		84,000	40,000	25,000	63/64	151,000	75,000
9,600		89,000	43,000				
9,700		89,000	43,000				
9,750		89,000	43,000				
9,800		89,000	43,000				
9,900		89,000	43,000				
10,000		89,000	43,000				
10,050		89,000	43,000				
10,100		89,000	43,000				
10,200		89,000	43,000				

Punte elicoidali, extra corte

Articolo nr. 84803

P	M	K	N	S	H
●	●	●	○	●	○

HSS-E | T | V | ~3xD | DIN 1897 | 130° | h8 | R | Cyl

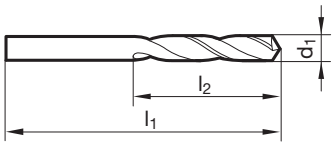
Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura acciai inossidabili e resist. al calore • acciai per molle • acciai austenitici • Hastelloy, Inconel, Nimonic

Articolo nr. 84503

P	M	K	N	S	H
●	●	●	○	●	○

HSS-E | F | V | ~3xD | DIN 1897 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura acciai inossidabili e resist. al calore • acciai per molle • acciai austenitici • Hastelloy, Inconel, Nimonic



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,500		20,000	3,000	3,100		49,000	18,000
0,700		23,000	4,500	3,200		49,000	18,000
1,000		26,000	6,000	3,250		49,000	18,000
1,100		28,000	7,000	3,300		49,000	18,000
1,200		30,000	8,000	3,350		49,000	18,000
1,300		30,000	8,000	3,400		52,000	20,000
1,400		32,000	9,000	3,450		52,000	20,000
1,500		32,000	9,000	3,500		52,000	20,000
1,600		34,000	10,000	3,600		52,000	20,000
1,700		34,000	10,000	3,700		52,000	20,000
1,800		36,000	11,000	3,800		55,000	22,000
1,850		36,000	11,000	3,900		55,000	22,000
1,900		36,000	11,000	4,000		55,000	22,000
2,000		38,000	12,000	4,100		55,000	22,000
2,050		38,000	12,000	4,200		55,000	22,000
2,100		38,000	12,000	4,300		58,000	24,000
2,200		40,000	13,000	4,400		58,000	24,000
2,300		40,000	13,000	4,500		58,000	24,000
2,350		40,000	13,000	4,600		58,000	24,000
2,400		43,000	14,000	4,700		58,000	24,000
2,450		43,000	14,000	4,800		62,000	26,000
2,500		43,000	14,000	4,900		62,000	26,000
2,550		43,000	14,000	5,000		62,000	26,000
2,600		43,000	14,000	5,100		62,000	26,000
2,700		46,000	16,000	5,200		62,000	26,000
2,800		46,000	16,000	5,300		62,000	26,000
2,900		46,000	16,000	5,400		66,000	28,000
2,950		46,000	16,000	5,500		66,000	28,000
3,000		46,000	16,000	5,600		66,000	28,000
3,050		49,000	18,000	5,700		66,000	28,000

Punte elicoidali, extra corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
5,800		66,000	28,000	8,600		84,000	40,000
5,900		66,000	28,000	8,700		84,000	40,000
6,000		66,000	28,000	8,800		84,000	40,000
6,050		70,000	31,000	9,000		84,000	40,000
6,100		70,000	31,000	9,100		84,000	40,000
6,200		70,000	31,000	9,200		84,000	40,000
6,300		70,000	31,000	9,300		84,000	40,000
6,350	1/4	70,000	31,000	9,500		84,000	40,000
6,400		70,000	31,000	9,600		89,000	43,000
6,500		70,000	31,000	9,700		89,000	43,000
6,600		70,000	31,000	9,800		89,000	43,000
6,700		70,000	31,000	9,900		89,000	43,000
6,800		74,000	34,000	10,000		89,000	43,000
6,900		74,000	34,000	10,200		89,000	43,000
7,000		74,000	34,000	10,500		89,000	43,000
7,100		74,000	34,000	11,000		95,000	47,000
7,200		74,000	34,000	11,500		95,000	47,000
7,300		74,000	34,000	12,000		102,000	51,000
7,400		74,000	34,000	12,500		102,000	51,000
7,500		74,000	34,000	13,000		102,000	51,000
7,600		79,000	37,000	14,000		107,000	54,000
7,700		79,000	37,000	14,500		111,000	56,000
7,800		79,000	37,000	15,000		111,000	56,000
7,900		79,000	37,000				
8,000		79,000	37,000				
8,100		79,000	37,000				
8,200		79,000	37,000				
8,300		79,000	37,000				
8,400		79,000	37,000				
8,500		79,000	37,000				

HARTNER

Punte elicoidali, extra corte

Articolo nr. 84806

P	M	K	N	S	H
•	•	•	•		

HSS-E | T | FU 500 DZ | ~3xD | DIN 1897 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • affilatura su piani • acciaio HSS legato al Co • è necess. una limitata forza di avanz. • è necess. un limitato momento torcente • uso universale

acciai legati e non legati con R fino a 800 N/mm² • acciai per lav. a caldo e a freddo • acciai per cuscinetti • metalli non ferrosi • ghise • acciai inossidabili • plastica

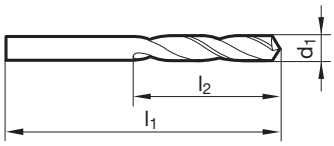
Articolo nr. 84808

P	M	K	N	S	H
•	•	•	○		

HSS-E | ○ | FU 500 DZ | ~3xD | DIN 1897 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • affilatura su piani • acciaio HSS legato al Co • è necess. una limitata forza di avanz. • è necess. un limitato momento torcente • uso universale

acciai legati e non legati con R fino a 800 N/mm² • acciai per lav. a caldo e a freddo • acciai per cuscinetti • metalli non ferrosi • ghise • acciai inossidabili • plastica



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		26,000	6,000	3,600		52,000	20,000
1,100		28,000	7,000	3,700		52,000	20,000
1,200		30,000	8,000	3,800		55,000	22,000
1,300		30,000	8,000	3,900		55,000	22,000
1,400		32,000	9,000	3,970	5/32	55,000	22,000
1,500		32,000	9,000	4,000		55,000	22,000
1,600		34,000	10,000	4,100		55,000	22,000
1,700		34,000	10,000	4,200		55,000	22,000
1,800		36,000	11,000	4,300		58,000	24,000
1,900		36,000	11,000	4,370	11/64	58,000	24,000
2,000		38,000	12,000	4,400		58,000	24,000
2,100		38,000	12,000	4,500		58,000	24,000
2,200		40,000	13,000	4,600		58,000	24,000
2,300		40,000	13,000	4,700		58,000	24,000
2,380	3/32	43,000	14,000	4,760	3/16	62,000	26,000
2,400		43,000	14,000	4,800		62,000	26,000
2,500		43,000	14,000	4,900		62,000	26,000
2,600		43,000	14,000	5,000		62,000	26,000
2,700		46,000	16,000	5,100		62,000	26,000
2,780	7/64	46,000	16,000	5,160	13/64	62,000	26,000
2,800		46,000	16,000	5,200		62,000	26,000
2,900		46,000	16,000	5,300		62,000	26,000
3,000		46,000	16,000	5,400		66,000	28,000
3,100		49,000	18,000	5,500		66,000	28,000
3,170	1/8	49,000	18,000	5,560	7/32	66,000	28,000
3,200		49,000	18,000	5,600		66,000	28,000
3,300		49,000	18,000	5,700		66,000	28,000
3,400		52,000	20,000	5,800		66,000	28,000
3,500		52,000	20,000	5,900		66,000	28,000
3,570	9/64	52,000	20,000	5,950	15/64	66,000	28,000

Punte elicoidali, extra corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
6,000		66,000	28,000	8,700		84,000	40,000
6,100		70,000	31,000	8,730	11/32	84,000	40,000
6,200		70,000	31,000	8,800		84,000	40,000
6,300		70,000	31,000	8,900		84,000	40,000
6,350	1/4	70,000	31,000	9,000		84,000	40,000
6,400		70,000	31,000	9,100		84,000	40,000
6,500		70,000	31,000	9,200		84,000	40,000
6,600		70,000	31,000	9,300		84,000	40,000
6,700		70,000	31,000	9,400		84,000	40,000
6,800		74,000	34,000	9,500		84,000	40,000
6,900		74,000	34,000	9,600		89,000	43,000
7,000		74,000	34,000	9,700		89,000	43,000
7,100		74,000	34,000	9,800		89,000	43,000
7,140	9/32	74,000	34,000	9,900		89,000	43,000
7,200		74,000	34,000	10,000		89,000	43,000
7,300		74,000	34,000	10,100		89,000	43,000
7,400		74,000	34,000	10,200		89,000	43,000
7,500		74,000	34,000	10,300		89,000	43,000
7,600		79,000	37,000	10,400		89,000	43,000
7,700		79,000	37,000	10,500		89,000	43,000
7,800		79,000	37,000	11,000		95,000	47,000
7,900		79,000	37,000	11,110	7/16	95,000	47,000
7,940	5/16	79,000	37,000	11,500		95,000	47,000
8,000		79,000	37,000	12,000		102,000	51,000
8,100		79,000	37,000	12,500		102,000	51,000
8,200		79,000	37,000	13,000		102,000	51,000
8,300		79,000	37,000	13,500		107,000	54,000
8,400		79,000	37,000	14,000		107,000	54,000
8,500		79,000	37,000				
8,600		84,000	40,000				

Punte elicoidali, extra corte

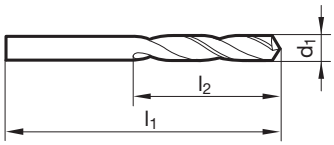
Articolo nr. 84511

P	M	K	N	S	H
●	○	●	○	○	○

HSS-E-PM · F · FN 500 · ~3xD · DIN 1897 · 130° · h8 · R · Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • acciaio HSS legato al Co PM • stabilità elevata • specifico per elevata resistenza all'usura

acciai ed acciai legati in alta percentuale • acciai da bonifica e da cementazione • ghise, ottone e bronzo



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		26,000	6,000	4,900		62,000	26,000
1,200		30,000	8,000	4,980		62,000	26,000
1,500		32,000	9,000	5,000		62,000	26,000
2,000		38,000	12,000	5,100		62,000	26,000
2,100		38,000	12,000	5,160	13/64	62,000	26,000
2,200		40,000	13,000	5,200		62,000	26,000
2,300		40,000	13,000	5,300		62,000	26,000
2,380	3/32	43,000	14,000	5,400		66,000	28,000
2,400		43,000	14,000	5,410		66,000	28,000
2,500		43,000	14,000	5,500		66,000	28,000
2,600		43,000	14,000	5,550		66,000	28,000
2,700		46,000	16,000	5,560	7/32	66,000	28,000
2,780	7/64	46,000	16,000	5,600		66,000	28,000
2,800		46,000	16,000	5,700		66,000	28,000
2,900		46,000	16,000	5,800		66,000	28,000
3,000		46,000	16,000	5,900		66,000	28,000
3,100		49,000	18,000	5,950	15/64	66,000	28,000
3,170	1/8	49,000	18,000	6,000		66,000	28,000
3,200		49,000	18,000	6,100		70,000	31,000
3,260		49,000	18,000	6,200		70,000	31,000
3,300		49,000	18,000	6,300		70,000	31,000
3,400		52,000	20,000	6,350	1/4	70,000	31,000
3,500		52,000	20,000	6,400		70,000	31,000
3,570	9/64	52,000	20,000	6,500		70,000	31,000
3,600		52,000	20,000	6,600		70,000	31,000
3,700		52,000	20,000	6,700		70,000	31,000
3,800		55,000	22,000	6,750	17/64	74,000	34,000
3,900		55,000	22,000	6,800		74,000	34,000
3,970	5/32	55,000	22,000	6,900		74,000	34,000
4,000		55,000	22,000	7,000		74,000	34,000
4,090		55,000	22,000	7,100		74,000	34,000
4,100		55,000	22,000	7,140	9/32	74,000	34,000
4,200		55,000	22,000	7,200		74,000	34,000
4,300		58,000	24,000	7,300		74,000	34,000
4,370	11/64	58,000	24,000	7,370		74,000	34,000
4,400		58,000	24,000	7,400		74,000	34,000
4,500		58,000	24,000	7,450		74,000	34,000
4,600		58,000	24,000	7,500		74,000	34,000
4,650		58,000	24,000	7,540	19/64	79,000	37,000
4,700		58,000	24,000	7,600		79,000	37,000
4,760	3/16	62,000	26,000	7,700		79,000	37,000
4,800		62,000	26,000	7,800		79,000	37,000

Punte elicoidali, extra corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
7,900		79,000	37,000	9,700		89,000	43,000
7,940	5/16	79,000	37,000	9,800		89,000	43,000
8,000		79,000	37,000	9,900		89,000	43,000
8,100		79,000	37,000	9,920	25/64	89,000	43,000
8,200		79,000	37,000	10,000		89,000	43,000
8,300		79,000	37,000	10,200		89,000	43,000
8,330	21/64	79,000	37,000	10,320	13/32	89,000	43,000
8,400		79,000	37,000	10,500		89,000	43,000
8,500		79,000	37,000	10,720	27/64	95,000	47,000
8,600		84,000	40,000	11,000		95,000	47,000
8,700		84,000	40,000	11,110	7/16	95,000	47,000
8,730	11/32	84,000	40,000	11,500		95,000	47,000
8,800		84,000	40,000	11,510	29/64	95,000	47,000
8,900		84,000	40,000	11,800		95,000	47,000
9,000		84,000	40,000	11,910	15/32	102,000	51,000
9,100		84,000	40,000	12,000		102,000	51,000
9,130	23/64	84,000	40,000	12,300	31/64	102,000	51,000
9,200		84,000	40,000	12,500		102,000	51,000
9,300		84,000	40,000	12,700	1/2	102,000	51,000
9,350		84,000	40,000	13,000		102,000	51,000
9,400		84,000	40,000	13,500		107,000	54,000
9,500		84,000	40,000				
9,520	3/8	89,000	43,000				
9,600		89,000	43,000				

HARTNER

Punte elicoidali, extra corte

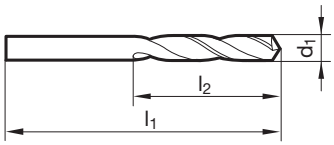
Articolo nr. 89235

P	M	K	N	S	H
○	○	○	●	○	

VHM | ◯ | N | ~3xD | DIN 6539 | 118° | h7 | R | Cyl

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • ghisa grigia • bronzo/ottone • alluminio e leghe di alluminio • magnesio e leghe di magnesio • materie sintetiche e materie sintetiche a fibre rinforzate



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,800		24,000	5,000	4,200		55,000	22,000
0,900		25,000	5,500	4,300		58,000	24,000
1,000		26,000	6,000	4,370	11/64	58,000	24,000
1,100		28,000	7,000	4,400		58,000	24,000
1,200		30,000	8,000	4,500		58,000	24,000
1,300		30,000	8,000	4,600		58,000	24,000
1,400		32,000	9,000	4,700		58,000	24,000
1,500		32,000	9,000	4,760	3/16	62,000	26,000
1,600		34,000	10,000	4,800		62,000	26,000
1,700		34,000	10,000	4,850		62,000	26,000
1,800		36,000	11,000	4,900		62,000	26,000
1,900		36,000	11,000	5,000		62,000	26,000
1,980	5/64	38,000	12,000	5,100		62,000	26,000
2,000		38,000	12,000	5,200		62,000	26,000
2,100		38,000	12,000	5,300		62,000	26,000
2,200		40,000	13,000	5,400		66,000	28,000
2,300		40,000	13,000	5,500		66,000	28,000
2,380	3/32	43,000	14,000	5,560	7/32	66,000	28,000
2,400		43,000	14,000	5,600		66,000	28,000
2,500		43,000	14,000	5,700		66,000	28,000
2,600		43,000	14,000	5,800		66,000	28,000
2,700		46,000	16,000	5,900		66,000	28,000
2,780	7/64	46,000	16,000	6,000		66,000	28,000
2,800		46,000	16,000	6,100		70,000	31,000
2,900		46,000	16,000	6,200		70,000	31,000
3,000		46,000	16,000	6,300		70,000	31,000
3,050		49,000	18,000	6,350	1/4	70,000	31,000
3,100		49,000	18,000	6,400		70,000	31,000
3,170	1/8	49,000	18,000	6,500		70,000	31,000
3,200		49,000	18,000	6,600		70,000	31,000
3,300		49,000	18,000	6,700		70,000	31,000
3,400		52,000	20,000	6,800		74,000	34,000
3,500		52,000	20,000	6,900		74,000	34,000
3,570	9/64	52,000	20,000	7,000		74,000	34,000
3,600		52,000	20,000	7,100		74,000	34,000
3,700		52,000	20,000	7,140	9/32	74,000	34,000
3,800		55,000	22,000	7,200		74,000	34,000
3,900		55,000	22,000	7,300		74,000	34,000
3,970	5/32	55,000	22,000	7,400		74,000	34,000
4,000		55,000	22,000	7,500		74,000	34,000
4,040		55,000	22,000	7,600		79,000	37,000
4,100		55,000	22,000	7,700		79,000	37,000

Punte elicoidali, extra corte

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
7,800		79,000	37,000	10,200		89,000	43,000
7,900		79,000	37,000	10,300		89,000	43,000
7,940	5/16	79,000	37,000	10,500		89,000	43,000
8,000		79,000	37,000	11,000		95,000	47,000
8,100		79,000	37,000	11,110	7/16	95,000	47,000
8,200		79,000	37,000	11,500		95,000	47,000
8,300		79,000	37,000	11,910	15/32	102,000	51,000
8,400		79,000	37,000	12,000		102,000	51,000
8,500		79,000	37,000	12,300	31/64	102,000	51,000
8,600		84,000	40,000	13,000		102,000	51,000
8,700		84,000	40,000	14,000		107,000	54,000
8,730	11/32	84,000	40,000	15,000		111,000	56,000
8,800		84,000	40,000	16,000		115,000	58,000
8,900		84,000	40,000				
9,000		84,000	40,000				
9,100		84,000	40,000				
9,300		84,000	40,000				
9,400		84,000	40,000				
9,500		84,000	40,000				
9,600		89,000	43,000				
9,700		89,000	43,000				
9,800		89,000	43,000				
9,900		89,000	43,000				
10,000		89,000	43,000				

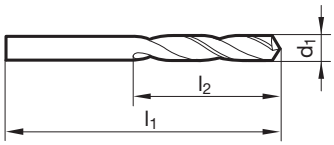
Punte elicoidali, extra corte

Articolo nr. 89246

P	M	K	N	S	H
○	○	○	○	○	○

VHM | ◯ | N | ~3xD | WN | 130° | h8 | R | Cyl

affilatura su piani • forma dei taglienti principali diritta
materie sintetiche a fibre vetrose • altri materiali che esercitano un'azione abrasiva sui taglienti e sulle fasi della punta



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
0,500	30,000	6,500	4,600	50,000	25,000
0,800	30,000	8,500	4,700	50,000	25,000
0,900	30,000	9,500	5,000	50,000	25,000
1,000	30,000	11,000	5,200	50,000	25,000
1,200	30,000	13,000	5,300	50,000	25,000
1,400	30,000	13,000	5,600	50,000	25,000
1,700	40,000	17,500	5,800	50,000	25,000
2,000	40,000	17,500	5,900	50,000	25,000
2,500	40,000	17,500	6,100	65,000	30,000
3,000	45,000	20,000	6,500	65,000	30,000
3,100	50,000	22,000			
3,200	50,000	22,000			
3,400	50,000	22,000			
3,600	50,000	22,000			
4,000	50,000	22,000			
4,100	50,000	25,000			
4,200	50,000	25,000			
4,300	50,000	25,000			

HARTNER

Punte con codolo rinforzato

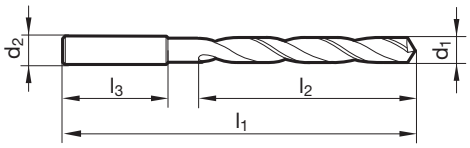
Articolo nr. 84805

P	M	K	N	S	H
•	•	•	•		

HSS-E | T | FU 500 | ~3xD | WN | 118° | h8 | R | HA

Assott. del nocc. ≥ Ø 2,000 • affilatura su piani • acciaio HSS legato al Co • è necess. una limitata forza di avanz. • è necess. un limitato momento torcente • massima resistenza all'usura • uso universale

acciai legati e non legati con R fino a 800 N/mm² • acciai per lav. a caldo e a freddo • acciai inossidabili • metalli non ferrosi • ghise • plastica • acciai per cuscinetti



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
2,000		3,000	44,000	12,000	28,000
2,100		3,000	44,000	12,000	28,000
2,200		3,000	45,000	13,000	28,000
2,300		3,000	45,000	13,000	28,000
2,380	3/32	3,000	46,000	14,000	28,000
2,400		3,000	46,000	14,000	28,000
2,500		3,000	46,000	14,000	28,000
2,600		3,000	46,000	14,000	28,000
2,700		3,000	48,000	16,000	28,000
2,780	7/64	3,000	48,000	16,000	28,000
2,800		3,000	48,000	16,000	28,000
2,900		3,000	48,000	16,000	28,000
3,000		3,000	48,000	16,000	28,000
3,100		4,000	50,000	18,000	28,000
3,170	1/8	4,000	50,000	18,000	28,000
3,200		4,000	50,000	18,000	28,000
3,300		4,000	50,000	18,000	28,000
3,400		4,000	52,000	20,000	28,000
3,500		4,000	52,000	20,000	28,000
3,570	9/64	4,000	52,000	20,000	28,000
3,600		4,000	52,000	20,000	28,000
3,700		4,000	52,000	20,000	28,000
3,800		4,000	54,000	22,000	28,000
3,900		4,000	54,000	22,000	28,000
3,970	5/32	4,000	54,000	22,000	28,000
4,000		4,000	54,000	22,000	28,000
4,100		6,000	66,000	22,000	36,000
4,200		6,000	66,000	22,000	36,000
4,300		6,000	68,000	24,000	36,000
4,370	11/64	6,000	68,000	24,000	36,000
4,400		6,000	68,000	24,000	36,000
4,500		6,000	68,000	24,000	36,000
4,600		6,000	68,000	24,000	36,000
4,650		6,000	68,000	24,000	36,000
4,700		6,000	68,000	24,000	36,000
4,760	3/16	6,000	70,000	26,000	36,000
4,800		6,000	70,000	26,000	36,000
4,900		6,000	70,000	26,000	36,000
5,000		6,000	70,000	26,000	36,000
5,100		6,000	70,000	26,000	36,000
5,160	13/64	6,000	70,000	26,000	36,000
5,200		6,000	70,000	26,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
5,300		6,000	70,000	26,000	36,000
5,400		6,000	72,000	28,000	36,000
5,500		6,000	72,000	28,000	36,000
5,550		6,000	72,000	28,000	36,000
5,560	7/32	6,000	72,000	28,000	36,000
5,600		6,000	72,000	28,000	36,000
5,700		6,000	72,000	28,000	36,000
5,800		6,000	72,000	28,000	36,000
5,900		6,000	72,000	28,000	36,000
5,950	15/64	6,000	72,000	28,000	36,000
6,000		6,000	72,000	28,000	36,000
6,100		8,000	75,000	31,000	36,000
6,200		8,000	75,000	31,000	36,000
6,300		8,000	75,000	31,000	36,000
6,350	1/4	8,000	75,000	31,000	36,000
6,400		8,000	75,000	31,000	36,000
6,500		8,000	75,000	31,000	36,000
6,600		8,000	75,000	31,000	36,000
6,700		8,000	75,000	31,000	36,000
6,750	17/64	8,000	78,000	34,000	36,000
6,800		8,000	78,000	34,000	36,000
6,900		8,000	78,000	34,000	36,000
7,000		8,000	78,000	34,000	36,000
7,100		8,000	78,000	34,000	36,000
7,140	9/32	8,000	78,000	34,000	36,000
7,200		8,000	78,000	34,000	36,000
7,300		8,000	78,000	34,000	36,000
7,400		8,000	78,000	34,000	36,000
7,500		8,000	78,000	34,000	36,000
7,540	19/64	8,000	81,000	37,000	36,000
7,550		8,000	81,000	37,000	36,000
7,600		8,000	81,000	37,000	36,000
7,700		8,000	81,000	37,000	36,000
7,800		8,000	81,000	37,000	36,000
7,900		8,000	81,000	37,000	36,000
7,940	5/16	8,000	81,000	37,000	36,000
8,000		8,000	81,000	37,000	36,000
8,100		10,000	87,000	37,000	40,000
8,200		10,000	87,000	37,000	40,000
8,300		10,000	87,000	37,000	40,000
8,330	21/64	10,000	87,000	37,000	40,000
8,400		10,000	87,000	37,000	40,000

Punte con codolo rinforzato

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
8,500		10,000	87,000	37,000	40,000
8,600		10,000	91,000	40,000	40,000
8,700		10,000	91,000	40,000	40,000
8,730	11/32	10,000	91,000	40,000	40,000
8,800		10,000	91,000	40,000	40,000
8,900		10,000	91,000	40,000	40,000
9,000		10,000	91,000	40,000	40,000
9,100		10,000	91,000	40,000	40,000
9,130	23/64	10,000	91,000	40,000	40,000
9,200		10,000	91,000	40,000	40,000
9,300		10,000	91,000	40,000	40,000
9,400		10,000	91,000	40,000	40,000
9,500		10,000	91,000	40,000	40,000
9,520	3/8	10,000	93,000	43,000	40,000
9,550		10,000	93,000	43,000	40,000
9,600		10,000	93,000	43,000	40,000
9,700		10,000	93,000	43,000	40,000
9,800		10,000	93,000	43,000	40,000
9,900		10,000	93,000	43,000	40,000
9,920	25/64	10,000	93,000	43,000	40,000
10,000		10,000	93,000	43,000	40,000
10,100		12,000	100,000	43,000	45,000
10,200		12,000	100,000	43,000	45,000
10,300		12,000	100,000	43,000	45,000
10,320	13/32	12,000	100,000	43,000	45,000
10,400		12,000	100,000	43,000	45,000
10,500		12,000	100,000	43,000	45,000
10,600		12,000	100,000	43,000	45,000
10,700		12,000	104,000	47,000	45,000
10,720	27/64	12,000	104,000	47,000	45,000
10,800		12,000	104,000	47,000	45,000
10,900		12,000	104,000	47,000	45,000
11,000		12,000	104,000	47,000	45,000
11,100		12,000	104,000	47,000	45,000
11,110	7/16	12,000	104,000	47,000	45,000
11,200		12,000	104,000	47,000	45,000
11,300		12,000	104,000	47,000	45,000
11,400		12,000	104,000	47,000	45,000
11,500		12,000	104,000	47,000	45,000
11,510	29/64	12,000	104,000	47,000	45,000
11,600		12,000	104,000	47,000	45,000
11,700		12,000	104,000	47,000	45,000
11,800		12,000	104,000	47,000	45,000
11,900		12,000	108,000	51,000	45,000
11,910	15/32	12,000	108,000	51,000	45,000
12,000		12,000	108,000	51,000	45,000
12,100		16,000	111,000	51,000	48,000
12,200		16,000	111,000	51,000	48,000
12,300	31/64	16,000	111,000	51,000	48,000
12,400		16,000	111,000	51,000	48,000
12,500		16,000	111,000	51,000	48,000
12,600		16,000	111,000	51,000	48,000
12,700	1/2	16,000	111,000	51,000	48,000
12,800		16,000	111,000	51,000	48,000
12,900		16,000	111,000	51,000	48,000
13,000		16,000	111,000	51,000	48,000
13,100	33/64	16,000	111,000	51,000	48,000
13,490	17/32	16,000	114,000	54,000	48,000
13,500		16,000	114,000	54,000	48,000
13,890	35/64	16,000	114,000	54,000	48,000
14,000		16,000	114,000	54,000	48,000
14,290	9/16	16,000	116,000	56,000	48,000
14,500		16,000	116,000	56,000	48,000
15,000		16,000	116,000	56,000	48,000
15,500		16,000	118,000	58,000	48,000
15,870	5/8	16,000	118,000	58,000	48,000
16,000		16,000	118,000	58,000	48,000
16,500		20,000	126,000	60,000	50,000
16,670	21/32	20,000	126,000	60,000	50,000
17,000		20,000	126,000	60,000	50,000
17,500		20,000	128,000	62,000	50,000
18,000		20,000	128,000	62,000	50,000
18,500		20,000	130,000	64,000	50,000
19,000		20,000	130,000	64,000	50,000
19,500		20,000	132,000	66,000	50,000
20,000		20,000	132,000	66,000	50,000

Punte con codolo rinforzato

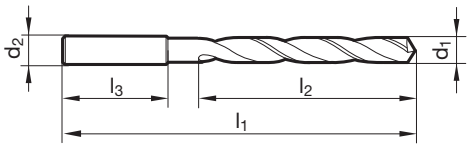
Articolo nr. 84801

P	M	K	N	S	H
•	•	•	•		

HSS-E | T | FU 500 | ~5xD | WN | 118° | h8 | R | HA

Assott. del nocc. ≥ Ø 2,000 • affilatura su piani • acciaio HSS legato al Co • è necess. una limitata forza di avanz. • è necess. un limitato momento torcente • massima resistenza all'usura • uso universale

acciai legati e non legati con R fino a 800 N/mm² • acciai per lav. a caldo e a freddo • acciai inossidabili • metalli non ferrosi • ghise • plastica



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
2,000		3,000	56,000	24,000	28,000
2,100		3,000	56,000	24,000	28,000
2,200		3,000	59,000	27,000	28,000
2,300		3,000	59,000	27,000	28,000
2,380	3/32	3,000	62,000	30,000	28,000
2,400		3,000	62,000	30,000	28,000
2,500		3,000	62,000	30,000	28,000
2,600		3,000	62,000	30,000	28,000
2,700		3,000	65,000	33,000	28,000
2,780	7/64	3,000	65,000	33,000	28,000
2,800		3,000	65,000	33,000	28,000
2,900		3,000	65,000	33,000	28,000
3,000		3,000	65,000	33,000	28,000
3,100		4,000	68,000	36,000	28,000
3,170	1/8	4,000	68,000	36,000	28,000
3,200		4,000	68,000	36,000	28,000
3,300		4,000	68,000	36,000	28,000
3,400		4,000	71,000	39,000	28,000
3,500		4,000	71,000	39,000	28,000
3,570	9/64	4,000	71,000	39,000	28,000
3,600		4,000	71,000	39,000	28,000
3,700		4,000	71,000	39,000	28,000
3,800		4,000	75,000	43,000	28,000
3,900		4,000	75,000	43,000	28,000
3,970	5/32	4,000	75,000	43,000	28,000
4,000		4,000	75,000	43,000	28,000
4,100		6,000	87,000	43,000	36,000
4,200		6,000	87,000	43,000	36,000
4,300		6,000	91,000	47,000	36,000
4,370	11/64	6,000	91,000	47,000	36,000
4,400		6,000	91,000	47,000	36,000
4,500		6,000	91,000	47,000	36,000
4,600		6,000	91,000	47,000	36,000
4,650		6,000	91,000	47,000	36,000
4,700		6,000	91,000	47,000	36,000
4,760	3/16	6,000	96,000	52,000	36,000
4,800		6,000	96,000	52,000	36,000
4,900		6,000	96,000	52,000	36,000
5,000		6,000	96,000	52,000	36,000
5,100		6,000	96,000	52,000	36,000
5,160	13/64	6,000	96,000	52,000	36,000
5,200		6,000	96,000	52,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
5,300		6,000	96,000	52,000	36,000
5,400		6,000	101,000	57,000	36,000
5,500		6,000	101,000	57,000	36,000
5,550		6,000	101,000	57,000	36,000
5,560	7/32	6,000	101,000	57,000	36,000
5,600		6,000	101,000	57,000	36,000
5,700		6,000	101,000	57,000	36,000
5,800		6,000	101,000	57,000	36,000
5,900		6,000	101,000	57,000	36,000
5,950	15/64	6,000	101,000	57,000	36,000
6,000		6,000	101,000	57,000	36,000
6,100		8,000	107,000	63,000	36,000
6,200		8,000	107,000	63,000	36,000
6,300		8,000	107,000	63,000	36,000
6,350	1/4	8,000	107,000	63,000	36,000
6,400		8,000	107,000	63,000	36,000
6,500		8,000	107,000	63,000	36,000
6,600		8,000	107,000	63,000	36,000
6,700		8,000	107,000	63,000	36,000
6,750	17/64	8,000	113,000	69,000	36,000
6,800		8,000	113,000	69,000	36,000
6,900		8,000	113,000	69,000	36,000
7,000		8,000	113,000	69,000	36,000
7,100		8,000	113,000	69,000	36,000
7,140	9/32	8,000	113,000	69,000	36,000
7,200		8,000	113,000	69,000	36,000
7,300		8,000	113,000	69,000	36,000
7,400		8,000	113,000	69,000	36,000
7,500		8,000	113,000	69,000	36,000
7,540	19/64	8,000	119,000	75,000	36,000
7,550		8,000	119,000	75,000	36,000
7,600		8,000	119,000	75,000	36,000
7,700		8,000	119,000	75,000	36,000
7,800		8,000	119,000	75,000	36,000
7,900		8,000	119,000	75,000	36,000
7,940	5/16	8,000	119,000	75,000	36,000
8,000		8,000	119,000	75,000	36,000
8,100		10,000	125,000	75,000	40,000
8,200		10,000	125,000	75,000	40,000
8,300		10,000	125,000	75,000	40,000
8,330	21/64	10,000	125,000	75,000	40,000
8,400		10,000	125,000	75,000	40,000

Punte con codolo rinforzato

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
8,500		10,000	125,000	75,000	40,000
8,600		10,000	131,000	81,000	40,000
8,700		10,000	131,000	81,000	40,000
8,730	11/32	10,000	131,000	81,000	40,000
8,800		10,000	131,000	81,000	40,000
8,900		10,000	131,000	81,000	40,000
9,000		10,000	131,000	81,000	40,000
9,100		10,000	131,000	81,000	40,000
9,130	23/64	10,000	131,000	81,000	40,000
9,200		10,000	131,000	81,000	40,000
9,300		10,000	131,000	81,000	40,000
9,400		10,000	131,000	81,000	40,000
9,500		10,000	131,000	81,000	40,000
9,520	3/8	10,000	137,000	87,000	40,000
9,550		10,000	137,000	87,000	40,000
9,600		10,000	137,000	87,000	40,000
9,700		10,000	137,000	87,000	40,000
9,800		10,000	137,000	87,000	40,000
9,900		10,000	137,000	87,000	40,000
9,920	25/64	10,000	137,000	87,000	40,000
10,000		10,000	137,000	87,000	40,000
10,100		12,000	144,000	87,000	45,000
10,200		12,000	144,000	87,000	45,000
10,300		12,000	144,000	87,000	45,000
10,320	13/32	12,000	144,000	87,000	45,000
10,400		12,000	144,000	87,000	45,000
10,500		12,000	144,000	87,000	45,000
10,600		12,000	144,000	87,000	45,000
10,700		12,000	151,000	94,000	45,000
10,720	27/64	12,000	151,000	94,000	45,000
10,800		12,000	151,000	94,000	45,000
10,900		12,000	151,000	94,000	45,000
11,000		12,000	151,000	94,000	45,000
11,100		12,000	151,000	94,000	45,000
11,110	7/16	12,000	151,000	94,000	45,000
11,200		12,000	151,000	94,000	45,000
11,300		12,000	151,000	94,000	45,000
11,400		12,000	151,000	94,000	45,000
11,500		12,000	151,000	94,000	45,000
11,510	29/64	12,000	151,000	94,000	45,000
11,600		12,000	151,000	94,000	45,000
11,700		12,000	151,000	94,000	45,000
11,800		12,000	151,000	94,000	45,000
11,900		12,000	158,000	101,000	45,000
11,910	15/32	12,000	158,000	101,000	45,000
12,000		12,000	158,000	101,000	45,000
12,100		16,000	161,000	101,000	48,000
12,200		16,000	161,000	101,000	48,000
12,300	31/64	16,000	161,000	101,000	48,000
12,400		16,000	161,000	101,000	48,000
12,500		16,000	161,000	101,000	48,000
12,600		16,000	161,000	101,000	48,000
12,700	1/2	16,000	161,000	101,000	48,000
12,800		16,000	161,000	101,000	48,000
12,900		16,000	161,000	101,000	48,000
13,000		16,000	161,000	101,000	48,000
13,100	33/64	16,000	161,000	101,000	48,000
13,490	17/32	16,000	166,000	106,000	48,000
13,500		16,000	166,000	106,000	48,000
13,890	35/64	16,000	166,000	106,000	48,000
14,000		16,000	166,000	106,000	48,000
14,290	9/16	16,000	169,000	109,000	48,000
14,500		16,000	169,000	109,000	48,000
15,000		16,000	169,000	109,000	48,000
15,500		16,000	172,000	112,000	48,000
15,870	5/8	16,000	172,000	112,000	48,000
16,000		16,000	172,000	112,000	48,000
16,500		20,000	181,000	115,000	50,000
16,670	21/32	20,000	181,000	115,000	50,000
17,000		20,000	181,000	115,000	50,000
17,460	11/16	20,000	184,000	118,000	50,000
17,500		20,000	184,000	118,000	50,000
18,000		20,000	184,000	118,000	50,000
18,500		20,000	188,000	122,000	50,000
19,000		20,000	188,000	122,000	50,000
19,500		20,000	191,000	125,000	50,000
20,000		20,000	191,000	125,000	50,000

Punte con codolo rinforzato

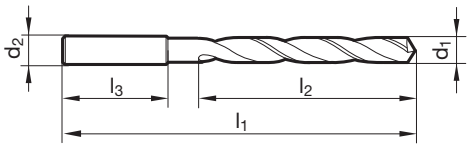
Articolo nr. 84507

P	M	K	N	S	H
●	○	●	○	○	○

HSS-E-PM · F · FN 500 · ~5xD · WN · 130° · h8 · R · HA

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • acciaio HSS legato al Co PM • specifico per elevata resistenza all'usura • stabilità elevata

acciai ed acciai legati in alta percentuale • acciai da bonifica e da cementazione • ghise, ottone e bronzo



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
2,000		3,000	56,000	24,000	28,000
2,100		3,000	56,000	24,000	28,000
2,200		3,000	59,000	27,000	28,000
2,300		3,000	59,000	27,000	28,000
2,380	3/32	3,000	62,000	30,000	28,000
2,400		3,000	62,000	30,000	28,000
2,500		3,000	62,000	30,000	28,000
2,600		3,000	62,000	30,000	28,000
2,700		3,000	65,000	33,000	28,000
2,780	7/64	3,000	65,000	33,000	28,000
2,800		3,000	65,000	33,000	28,000
2,900		3,000	65,000	33,000	28,000
3,000		3,000	65,000	33,000	28,000
3,100		4,000	68,000	36,000	28,000
3,170	1/8	4,000	68,000	36,000	28,000
3,200		4,000	68,000	36,000	28,000
3,300		4,000	68,000	36,000	28,000
3,400		4,000	71,000	39,000	28,000
3,500		4,000	71,000	39,000	28,000
3,570	9/64	4,000	71,000	39,000	28,000
3,600		4,000	71,000	39,000	28,000
3,700		4,000	71,000	39,000	28,000
3,800		4,000	75,000	43,000	28,000
3,900		4,000	75,000	43,000	28,000
3,970	5/32	4,000	75,000	43,000	28,000
4,000		4,000	75,000	43,000	28,000
4,100		6,000	87,000	43,000	36,000
4,200		6,000	87,000	43,000	36,000
4,300		6,000	91,000	47,000	36,000
4,370	11/64	6,000	91,000	47,000	36,000
4,400		6,000	91,000	47,000	36,000
4,500		6,000	91,000	47,000	36,000
4,600		6,000	91,000	47,000	36,000
4,650		6,000	91,000	47,000	36,000
4,700		6,000	91,000	47,000	36,000
4,760	3/16	6,000	96,000	52,000	36,000
4,800		6,000	96,000	52,000	36,000
4,900		6,000	96,000	52,000	36,000
5,000		6,000	96,000	52,000	36,000
5,100		6,000	96,000	52,000	36,000
5,160	13/64	6,000	96,000	52,000	36,000
5,200		6,000	96,000	52,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
5,300		6,000	96,000	52,000	36,000
5,400		6,000	101,000	57,000	36,000
5,500		6,000	101,000	57,000	36,000
5,550		6,000	101,000	57,000	36,000
5,560	7/32	6,000	101,000	57,000	36,000
5,600		6,000	101,000	57,000	36,000
5,700		6,000	101,000	57,000	36,000
5,800		6,000	101,000	57,000	36,000
5,900		6,000	101,000	57,000	36,000
5,950	15/64	6,000	101,000	57,000	36,000
6,000		6,000	101,000	57,000	36,000
6,100		8,000	107,000	63,000	36,000
6,200		8,000	107,000	63,000	36,000
6,300		8,000	107,000	63,000	36,000
6,350	1/4	8,000	107,000	63,000	36,000
6,400		8,000	107,000	63,000	36,000
6,500		8,000	107,000	63,000	36,000
6,600		8,000	107,000	63,000	36,000
6,700		8,000	107,000	63,000	36,000
6,750	17/64	8,000	113,000	69,000	36,000
6,800		8,000	113,000	69,000	36,000
6,900		8,000	113,000	69,000	36,000
7,000		8,000	113,000	69,000	36,000
7,100		8,000	113,000	69,000	36,000
7,140	9/32	8,000	113,000	69,000	36,000
7,200		8,000	113,000	69,000	36,000
7,300		8,000	113,000	69,000	36,000
7,400		8,000	113,000	69,000	36,000
7,500		8,000	113,000	69,000	36,000
7,540	19/64	8,000	119,000	75,000	36,000
7,550		8,000	119,000	75,000	36,000
7,600		8,000	119,000	75,000	36,000
7,700		8,000	119,000	75,000	36,000
7,800		8,000	119,000	75,000	36,000
7,900		8,000	119,000	75,000	36,000
7,940	5/16	8,000	119,000	75,000	36,000
8,000		8,000	119,000	75,000	36,000
8,100		10,000	125,000	75,000	40,000
8,200		10,000	125,000	75,000	40,000
8,300		10,000	125,000	75,000	40,000
8,330	21/64	10,000	125,000	75,000	40,000
8,400		10,000	125,000	75,000	40,000

Punte con codolo rinforzato

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
8,500		10,000	125,000	75,000	40,000
8,600		10,000	131,000	81,000	40,000
8,700		10,000	131,000	81,000	40,000
8,730	11/32	10,000	131,000	81,000	40,000
8,800		10,000	131,000	81,000	40,000
8,900		10,000	131,000	81,000	40,000
9,000		10,000	131,000	81,000	40,000
9,100		10,000	131,000	81,000	40,000
9,130	23/64	10,000	131,000	81,000	40,000
9,200		10,000	131,000	81,000	40,000
9,300		10,000	131,000	81,000	40,000
9,400		10,000	131,000	81,000	40,000
9,500		10,000	131,000	81,000	40,000
9,520	3/8	10,000	137,000	87,000	40,000
9,550		10,000	137,000	87,000	40,000
9,600		10,000	137,000	87,000	40,000
9,700		10,000	137,000	87,000	40,000
9,800		10,000	137,000	87,000	40,000
9,900		10,000	137,000	87,000	40,000
9,920	25/64	10,000	137,000	87,000	40,000
10,000		10,000	137,000	87,000	40,000
10,100		12,000	144,000	87,000	45,000
10,200		12,000	144,000	87,000	45,000
10,300		12,000	144,000	87,000	45,000
10,320	13/32	12,000	144,000	87,000	45,000
10,400		12,000	144,000	87,000	45,000
10,500		12,000	144,000	87,000	45,000
10,600		12,000	144,000	87,000	45,000
10,700		12,000	151,000	94,000	45,000
10,720	27/64	12,000	151,000	94,000	45,000
10,800		12,000	151,000	94,000	45,000
10,900		12,000	151,000	94,000	45,000
11,000		12,000	151,000	94,000	45,000
11,100		12,000	151,000	94,000	45,000
11,110	7/16	12,000	151,000	94,000	45,000
11,200		12,000	151,000	94,000	45,000
11,300		12,000	151,000	94,000	45,000
11,400		12,000	151,000	94,000	45,000
11,500		12,000	151,000	94,000	45,000
11,510	29/64	12,000	151,000	94,000	45,000
11,600		12,000	151,000	94,000	45,000
11,700		12,000	151,000	94,000	45,000
11,800		12,000	151,000	94,000	45,000
11,900		12,000	158,000	101,000	45,000
11,910	15/32	12,000	158,000	101,000	45,000
12,000		12,000	158,000	101,000	45,000
12,100		14,000	161,000	101,000	45,000
12,200		14,000	161,000	101,000	45,000
12,300	31/64	14,000	161,000	101,000	45,000
12,400		14,000	161,000	101,000	45,000
12,500		14,000	161,000	101,000	45,000
12,600		14,000	161,000	101,000	45,000
12,700	1/2	14,000	161,000	101,000	45,000
12,800		14,000	161,000	101,000	45,000
12,900		14,000	161,000	101,000	45,000
13,000		14,000	161,000	101,000	45,000

Serie di punte

Articolo nr. 88013

P	M	K	N	S	H
●		●	○		

HSS | >Ø 2,36 | N | ~5xD | DIN 338 | R | Cyl

Set in cassetta di plastica • spoglia sul cono tagliente
acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato, alpacca e grafite

d1	in progr. mm	Pezzi per set	Codice
1,0-10,0	0,5	19	0,013
1,0-13,0	0,5	25	0,014
1,0-5,9	0,1	50	0,015
6,0-10,0	0,1	41	0,016
1,0-10,5	0,5	32	0,019

Articolo nr. 88014

P	M	K	N	S	H
●	○	○	○		

HSS-E | P2000 | ~5xD | DIN 338 | R | Cyl

Set in cassetta di plastica • spoglia sul cono tagliente

d1	in progr. mm	Pezzi per set	Codice
1,0-5,0	0,1	41	0,011
5,1-10,0	0,1	50	0,012
1,0-10,0	0,5	19	0,013
1,0-13,0	0,5	25	0,014
1,0-10,5	0,5	24	0,018

Serie di punte

Articolo nr. 88015

P	M	K	N	S	H
●	○	○	○		

HSS-E | M | P2000 | ~3xD | DIN 1897 | R | Cyl

Set in cassetta di metallo • spoglia sul cono tagliente

d1	in progr. mm	Pezzi per set	Codice
1,0-5,0	0,1	41	0,011
5,1-10,0	0,1	50	0,012
1,0-10,0	0,5	19	0,013
1,0-13,0	0,5	25	0,014
1,0-10,5	0,5	24	0,018

Articolo nr. 88016

P	M	K	N	S	H
●		●	○		

HSS | T | N | ~5xD | DIN 338 | 118° | h8 | R | Cyl

Set in cassetta di plastica • spoglia sul cono tagliente • rivestimento in testa
acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato e grafite

d1	in progr. mm	Pezzi per set	Codice
1,0-13,0	0,5	25	6,014
1,0-5,9	0,1	50	6,015
6,0-10,0	0,1	41	6,016
1,0-10,5	0,5	24	6,018

Serie di punte

Articolo nr. 88026

P	M	K	N	S	H
●		●	○		

HSS-E | N | ~5xD | DIN 338 | h8 | R | Cyl

Set in cassetta di plastica • spoglia sul cono tagliente

acciaio e ghisa acciaiosa (legati e non legati) • ghise con R superiore a 800 N/mm² • acciai per lavorazioni a caldo e a freddo • acciai per cuscinetti • acciai legati in alta percentuale • acciai da bonifica e da cementazione

d1	in progr. mm	Pezzi per set	Codice
1,0-10,0	0,5	19	3,013
1,0-13,0	0,5	25	3,014

Serie di punte

Articolo nr. 88303

WN

Cassetta vuota in plastica

d1	in progr. mm	Pezzi per set	Codice
1,0-10,0	0,5	19	0,213
1,0-13,0	0,5	25	0,214
1,0-5,9	0,1	50	0,215
6,0-10,0	0,1	41	0,216

Punte per centri CN

Articolo nr. 81192

P	M	K	N	S	H
●	○	●	●	○	

HSS | N | WN | 90° | h6 | R | Cyl

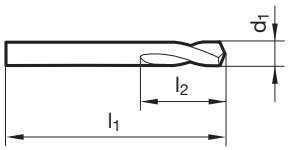
spoglia sul cono tagliente • adatte solo per centrare
di impiego universale

Articolo nr. 84435

P	M	K	N	S	H
●	○	●	●	○	

HSS | T | N | WN | 90° | h6 | R | Cyl

spoglia sul cono tagliente • adatte solo per centrare
di impiego universale



d1 mm	inch	l1 mm	l2 mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
6,350		70,000	17,000
8,000		79,000	21,000

d1 mm	inch	l1 mm	l2 mm
10,000		89,000	25,000
12,000		102,000	30,000
14,000		107,000	33,500
16,000		115,000	37,500
20,000		131,000	45,000
25,000	63/64	151,000	53,000

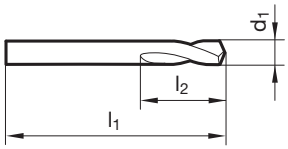
Punte per centri CN

Articolo nr. 89243

P	M	K	N	S	H
○	○	○	○	○	○

VHM | N | WN | 90° | h6 | R | Cyl

affilatura su piani • adatte solo per centrare
di impiego universale



d1 mm	l1 mm	l2 mm
4,000	55,000	12,000
5,000	62,000	14,000
6,000	66,000	16,000
8,000	79,000	21,000
10,000	89,000	25,000
12,000	102,000	30,000

d1 mm	l1 mm	l2 mm
16,000	115,000	37,500
20,000	131,000	45,000

Punte per centri CN

Articolo nr. 81191

P	M	K	N	S	H
●	○	●	●	○	

HSS | N | WN | 120° | h6 | R | Cyl

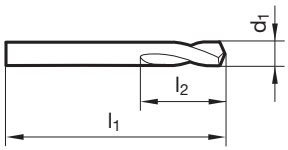
spoglia sul cono tagliente • adatte solo per centrare
di impiego universale

Articolo nr. 84434

P	M	K	N	S	H
●	○	●	●	○	

HSS | T | N | WN | 120° | h6 | R | Cyl

spoglia sul cono tagliente • adatte solo per centrare
di impiego universale



d1 mm	inch	l1 mm	l2 mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
8,000		79,000	21,000
10,000		89,000	25,000
12,000		102,000	30,000
14,000		107,000	33,500
15,000		111,000	33,500
16,000		115,000	37,500
19,050		131,000	45,000
20,000		131,000	45,000
25,000	63/64	151,000	53,000

Punte per centri CN

Articolo nr. 89242

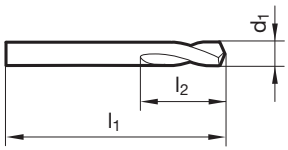
P	M	K	N	S	H
○	○	○	○	○	○

Assott. del nocc. ≥ Ø 16,000 • affilatura su piani • adatte solo per centrare
di impiego universale

Articolo nr. 89249

P	M	K	N	S	H
○	○	○	○	○	○

affilatura su piani • adatte solo per centrare
di impiego universale



d1 mm	inch	l1 mm	l2 mm
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
8,000		79,000	21,000
10,000		89,000	25,000
12,000		102,000	30,000

d1 mm	inch	l1 mm	l2 mm
12,700	1/2	102,000	30,000
16,000		115,000	37,500
20,000		131,000	45,000

HARTNER

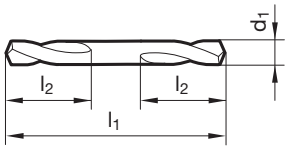
Punte doppie per carrozzeria

Articolo nr. 81190

P	M	K	N	S	H
●	○	●	●	○	

HSS | >Ø 2,36 | N | WN | 118° | h8 | R

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • per impiego su entrambi i lati • per trapani a mano per carrozzeria materiale a spessore sottile



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
2,000	38,000	7,500	4,900	62,000	17,000
2,100	38,000	7,500	5,000	62,000	17,000
2,300	40,000	8,500	5,100	62,000	17,000
2,400	43,000	9,500	5,200	62,000	17,000
2,500	43,000	9,500	5,300	62,000	17,000
2,600	43,000	9,500	5,400	66,000	19,000
2,700	46,000	10,600	5,500	66,000	19,000
2,800	46,000	10,600	5,700	66,000	19,000
2,900	46,000	10,600	5,800	66,000	19,000
3,000	46,000	10,600	5,900	66,000	19,000
3,100	49,000	11,200	6,000	66,000	19,000
3,200	49,000	11,200	6,300	70,000	21,200
3,300	49,000	11,200	6,500	70,000	21,200
3,400	52,000	12,500	7,500	74,000	23,600
3,500	52,000	12,500	8,000	79,000	25,000
3,600	52,000	12,500	8,500	79,000	25,000
3,800	55,000	14,000	9,000	84,000	25,000
3,900	55,000	14,000	9,500	84,000	25,000
4,000	55,000	14,000	10,000	89,000	25,000
4,100	55,000	14,000			
4,200	55,000	14,000			
4,500	58,000	15,500			
4,700	58,000	15,500			
4,800	62,000	17,000			

HARTNER

Punte con fori di refrigerazione

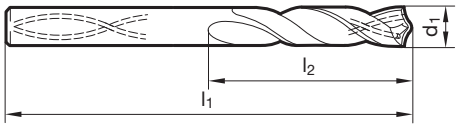
Articolo nr. 82710

P	M	K	N	S	H
●	○	●	●	○	

HSS | FN | ~10xD | WN | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • per forare con bussola di guida • specifiche per prof. di foro oltre 5xD

pacchi di lamierini • acciaio e ghisa acciaiosa, ghisa grigia • acciai austenitici a ca. 800 N/mm²



d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000	3,000	100,000	66,000	34,000
3,300	3,300	106,000	69,000	37,000
4,000	4,000	119,000	78,000	41,000
4,500	4,500	126,000	82,000	44,000
5,000	5,000	132,000	87,000	45,000
5,500	5,500	139,000	91,000	48,000
6,000	6,000	139,000	91,000	48,000
6,500	6,500	148,000	97,000	51,000
6,800	6,800	156,000	102,000	54,000
7,000	7,000	156,000	102,000	54,000
7,500	7,500	156,000	102,000	54,000
8,000	8,000	165,000	109,000	56,000

d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
8,500	8,500	165,000	109,000	56,000
9,000	9,000	175,000	115,000	60,000
9,500	9,500	175,000	115,000	60,000
10,000	10,000	184,000	121,000	63,000
10,200	10,200	184,000	121,000	63,000
10,500	10,500	184,000	121,000	63,000
11,000	11,000	195,000	128,000	67,000
11,500	11,500	195,000	128,000	67,000
12,000	12,000	205,000	134,000	71,000
13,000	13,000	205,000	134,000	71,000

Punte con fori di refrigerazione

Articolo nr. 82761

P	M	K	N	S	H
●	●	●	●	●	

HSS-E | FN | ~5xD | WN | 130° | h8 | R | HE

Assott. del nocc. ≥ Ø 5,000 • spoglia sul cono tagliente • acciaio HSS legato al Co

materiali a truciolo lungo con R fino a ca. 1000 N/mm² • acciai inossidabili • ghise • metalli non ferrosi

Articolo nr. 84461

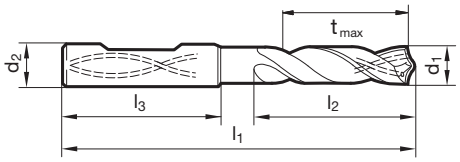
P	M	K	N	S	H
●	●	●	●	●	○

HSS-E | T | FN | ~5xD | WN | 130° | h8 | R | HE

Assott. del nocc. ≥ Ø 5,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura

materiali a truciolo lungo con R fino a ca. 1000 N/mm² • acciai inossidabili • ghise • metalli non ferrosi

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
5,000	6,000	82,000	44,000	36,000
5,500	6,000	82,000	44,000	36,000
6,000	6,000	82,000	44,000	36,000
6,500	8,000	91,000	53,000	36,000
6,800	8,000	91,000	53,000	36,000
7,000	8,000	91,000	53,000	36,000
7,500	8,000	91,000	53,000	36,000
7,800	8,000	91,000	53,000	36,000
8,000	8,000	91,000	53,000	36,000
8,500	10,000	103,000	61,000	40,000
9,000	10,000	103,000	61,000	40,000
9,500	10,000	103,000	61,000	40,000
10,000	10,000	103,000	61,000	40,000
10,200	12,000	118,000	71,000	45,000
10,500	12,000	118,000	71,000	45,000
11,000	12,000	118,000	71,000	45,000
11,500	12,000	118,000	71,000	45,000
12,000	12,000	118,000	71,000	45,000

d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
12,500	14,000	124,000	77,000	45,000
13,000	14,000	124,000	77,000	45,000
13,500	14,000	124,000	77,000	45,000
14,000	14,000	124,000	77,000	45,000
14,500	16,000	133,000	83,000	48,000
15,000	16,000	133,000	83,000	48,000
15,500	16,000	133,000	83,000	48,000
16,000	16,000	133,000	83,000	48,000
16,500	18,000	143,000	93,000	48,000
17,000	18,000	143,000	93,000	48,000
17,500	18,000	143,000	93,000	48,000
18,000	18,000	143,000	93,000	48,000
18,500	20,000	153,000	101,000	50,000
19,000	20,000	153,000	101,000	50,000
19,500	20,000	153,000	101,000	50,000
20,000	20,000	153,000	101,000	50,000

HARTNER

Punte per foratura con bussola di guida

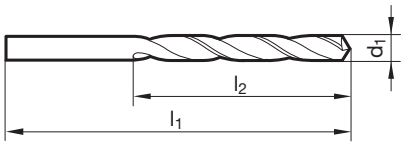
Articolo nr. 81210

P	M	K	N	S	H
•		•	○		

HSS | >Ø 2,36 | N | ~10xD | DIN 339 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • per forare con bussola di guida • con dente di trascinamento secondo DIN 1809

acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato, alpacca e grafite



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,800		42,000	22,000	4,600		102,000	69,000
0,900		45,000	24,000	4,700		102,000	69,000
0,950		45,000	24,000	4,800		108,000	74,000
1,000		48,000	26,000	4,900		108,000	74,000
1,200		52,000	30,000	5,000		108,000	74,000
1,250		52,000	30,000	5,100		108,000	74,000
1,350		55,000	33,000	5,200		108,000	74,000
1,400		55,000	33,000	5,300		108,000	74,000
1,450		55,000	33,000	5,350		116,000	80,000
1,500		55,000	33,000	5,400		116,000	80,000
1,620		58,000	35,000	5,500		116,000	80,000
1,700		58,000	35,000	5,550		116,000	80,000
1,800		62,000	38,000	5,600		116,000	80,000
1,900		62,000	38,000	5,700		116,000	80,000
1,990		66,000	41,000	5,750		116,000	80,000
2,000		66,000	41,000	5,800		116,000	80,000
2,100		66,000	41,000	5,900		116,000	80,000
2,350		70,000	44,000	5,950	15/64	116,000	80,000
2,400		74,000	47,000	6,000		116,000	80,000
2,450		74,000	47,000	6,100		124,000	86,000
2,500		74,000	47,000	6,200		124,000	86,000
2,600		74,000	47,000	6,400		124,000	86,000
2,900		79,000	51,000	6,500		124,000	86,000
3,000		79,000	51,000	6,600		124,000	86,000
3,050		84,000	55,000	6,700		124,000	86,000
3,100		84,000	55,000	6,750	17/64	133,000	93,000
3,200		84,000	55,000	6,900		133,000	93,000
3,250		84,000	55,000	7,000		133,000	93,000
3,300		84,000	55,000	7,100		133,000	93,000
3,400		91,000	60,000	7,200		133,000	93,000
3,500		91,000	60,000	7,300		133,000	93,000
3,600		91,000	60,000	7,400		133,000	93,000
3,700		91,000	60,000	7,500		133,000	93,000
3,750		91,000	60,000	7,600		142,000	100,000
3,800		96,000	64,000	7,700		142,000	100,000
3,900		96,000	64,000	7,800		142,000	100,000
4,000		96,000	64,000	7,900		142,000	100,000
4,050		96,000	64,000	8,000		142,000	100,000
4,200		96,000	64,000	8,200		142,000	100,000
4,300		102,000	69,000	8,250		142,000	100,000
4,400		102,000	69,000	8,300		142,000	100,000
4,500		102,000	69,000	8,400		142,000	100,000

Punte per foratura con bussola di guida

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
8,500		142,000	100,000	10,600		162,000	116,000
8,600		151,000	107,000	10,800		173,000	125,000
8,700		151,000	107,000	11,000		173,000	125,000
8,800		151,000	107,000	11,500		173,000	125,000
8,900		151,000	107,000	11,750		173,000	125,000
9,000		151,000	107,000	12,000		184,000	134,000
9,100		151,000	107,000	12,200		184,000	134,000
9,200		151,000	107,000	12,400		184,000	134,000
9,300		151,000	107,000	12,500		184,000	134,000
9,400		151,000	107,000	13,000		184,000	134,000
9,500		151,000	107,000	13,500		194,000	142,000
9,600		162,000	116,000	14,000		194,000	142,000
9,700		162,000	116,000	14,200		202,000	147,000
9,800		162,000	116,000	14,500		202,000	147,000
9,900		162,000	116,000	15,500		211,000	153,000
10,000		162,000	116,000	16,500		218,000	159,000
10,200		162,000	116,000	18,000		226,000	165,000
10,500		162,000	116,000	19,000		234,000	171,000

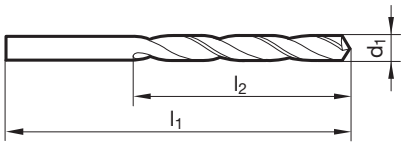
Punte elicoidali, lunghe

Articolo nr. 81310

P	M	K	N	S	H
●		●	○		

HSS | >Ø 2,36 | N | ~10xD | DIN 340 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • per fori profondi
acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato, alpacca e grafite



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,400		30,000	10,000	2,800		100,000	66,000
0,500		32,000	12,000	2,850		100,000	66,000
0,600		35,000	15,000	2,900		100,000	66,000
0,650		38,000	18,000	2,950		100,000	66,000
0,700		42,000	21,000	3,000		100,000	66,000
0,750		42,000	21,000	3,050		106,000	69,000
0,800		46,000	25,000	3,100		106,000	69,000
0,850		46,000	25,000	3,150		106,000	69,000
0,900		51,000	29,000	3,200		106,000	69,000
0,910		51,000	29,000	3,250		106,000	69,000
0,950		51,000	29,000	3,300		106,000	69,000
1,000		56,000	33,000	3,350		106,000	69,000
1,100		60,000	37,000	3,400		112,000	73,000
1,150		60,000	37,000	3,450		112,000	73,000
1,200		65,000	41,000	3,500		112,000	73,000
1,250		65,000	41,000	3,550		112,000	73,000
1,300		65,000	41,000	3,600		112,000	73,000
1,350		70,000	45,000	3,650		112,000	73,000
1,400		70,000	45,000	3,700		112,000	73,000
1,500		70,000	45,000	3,750		112,000	73,000
1,550		76,000	50,000	3,800		119,000	78,000
1,600		76,000	50,000	3,850		119,000	78,000
1,700		76,000	50,000	3,900		119,000	78,000
1,750		80,000	53,000	3,950		119,000	78,000
1,800		80,000	53,000	4,000		119,000	78,000
1,900		80,000	53,000	4,040		119,000	78,000
1,950		85,000	56,000	4,050		119,000	78,000
2,000		85,000	56,000	4,100		119,000	78,000
2,050		85,000	56,000	4,150		119,000	78,000
2,100		85,000	56,000	4,200		119,000	78,000
2,200		90,000	59,000	4,250		119,000	78,000
2,250		90,000	59,000	4,300		126,000	82,000
2,300		90,000	59,000	4,400		126,000	82,000
2,350		90,000	59,000	4,450		126,000	82,000
2,400		95,000	62,000	4,500		126,000	82,000
2,450		95,000	62,000	4,550		126,000	82,000
2,500		95,000	62,000	4,600		126,000	82,000
2,550		95,000	62,000	4,650		126,000	82,000
2,600		95,000	62,000	4,700		126,000	82,000
2,650		95,000	62,000	4,750		126,000	82,000
2,700		100,000	66,000	4,760	3/16	132,000	87,000
2,750		100,000	66,000	4,800		132,000	87,000

Punte elicoidali, lunghe

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
4,850		132,000	87,000	9,750		184,000	121,000
4,900		132,000	87,000	9,800		184,000	121,000
4,950		132,000	87,000	9,900		184,000	121,000
5,000		132,000	87,000	9,920	25/64	184,000	121,000
5,050		132,000	87,000	10,000		184,000	121,000
5,100		132,000	87,000	10,100		184,000	121,000
5,150		132,000	87,000	10,200		184,000	121,000
5,200		132,000	87,000	10,250		184,000	121,000
5,250		132,000	87,000	10,400		184,000	121,000
5,300		132,000	87,000	10,500		184,000	121,000
5,350		139,000	91,000	10,600		184,000	121,000
5,400		139,000	91,000	10,700		195,000	128,000
5,450		139,000	91,000	10,720	27/64	195,000	128,000
5,500		139,000	91,000	10,750		195,000	128,000
5,600		139,000	91,000	10,900		195,000	128,000
5,650		139,000	91,000	11,000		195,000	128,000
5,700		139,000	91,000	11,200		195,000	128,000
5,750		139,000	91,000	11,250		195,000	128,000
5,800		139,000	91,000	11,500		195,000	128,000
5,900		139,000	91,000	11,600		195,000	128,000
5,950	15/64	139,000	91,000	11,700		195,000	128,000
6,000		139,000	91,000	11,750		195,000	128,000
6,100		148,000	97,000	11,800		195,000	128,000
6,200		148,000	97,000	12,000		205,000	134,000
6,250		148,000	97,000	12,100		205,000	134,000
6,300		148,000	97,000	12,200		205,000	134,000
6,350	1/4	148,000	97,000	12,300	31/64	205,000	134,000
6,400		148,000	97,000	12,500		205,000	134,000
6,500		148,000	97,000	12,600		205,000	134,000
6,600		148,000	97,000	12,700	1/2	205,000	134,000
6,700		148,000	97,000	12,800		205,000	134,000
6,750	17/64	156,000	102,000	13,000		205,000	134,000
6,800		156,000	102,000	13,200		205,000	134,000
6,900		156,000	102,000	13,490	17/32	214,000	140,000
7,000		156,000	102,000	13,500		214,000	140,000
7,100		156,000	102,000	14,000		214,000	140,000
7,200		156,000	102,000	14,200		220,000	144,000
7,250		156,000	102,000	14,250		220,000	144,000
7,300		156,000	102,000	14,500		220,000	144,000
7,400		156,000	102,000	14,900		220,000	144,000
7,500		156,000	102,000	15,000		220,000	144,000
7,600		165,000	109,000	15,200		227,000	149,000
7,700		165,000	109,000	15,250		227,000	149,000
7,750		165,000	109,000	15,500		227,000	149,000
7,800		165,000	109,000	15,600		227,000	149,000
7,900		165,000	109,000	16,000		227,000	149,000
7,940	5/16	165,000	109,000	17,000		235,000	154,000
8,000		165,000	109,000	17,500		241,000	158,000
8,100		165,000	109,000	18,000		241,000	158,000
8,200		165,000	109,000	18,500		247,000	162,000
8,250		165,000	109,000	19,000		247,000	162,000
8,300		165,000	109,000	20,000		254,000	166,000
8,400		165,000	109,000	20,500		261,000	171,000
8,500		165,000	109,000	21,000		261,000	171,000
8,600		175,000	115,000	21,500		268,000	176,000
8,700		175,000	115,000	22,000		268,000	176,000
8,800		175,000	115,000	23,500		275,000	180,000
8,900		175,000	115,000				
9,000		175,000	115,000				
9,100		175,000	115,000				
9,200		175,000	115,000				
9,300		175,000	115,000				
9,400		175,000	115,000				
9,500		175,000	115,000				
9,600		184,000	121,000				
9,700		184,000	121,000				

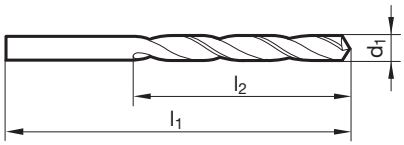
Punte elicoidali, lunghe

Articolo nr. 81315

P	M	K	N	S	H
●		●	○		

HSS | >Ø 6,00 | N | ~10xD | DIN 340 | 118° | h8 | L | Cyl

Assott. del nocc. ≥ Ø 15,000 • spoglia sul cono tagliente • per fori profondi • per forare con bussola di guida
acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato, alpacca e grafite



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
0,900	51,000	29,000	5,800	139,000	91,000
1,200	65,000	41,000	6,000	139,000	91,000
1,250	65,000	41,000	6,500	148,000	97,000
1,500	70,000	45,000	7,500	156,000	102,000
1,550	76,000	50,000	7,900	165,000	109,000
1,800	80,000	53,000	8,000	165,000	109,000
2,800	100,000	66,000	8,500	165,000	109,000
2,900	100,000	66,000	9,000	175,000	115,000
3,000	100,000	66,000	10,000	184,000	121,000
3,200	106,000	69,000	11,000	195,000	128,000
3,500	112,000	73,000	12,000	205,000	134,000
3,800	119,000	78,000	15,000	220,000	144,000
4,000	119,000	78,000			
4,200	119,000	78,000			
4,500	126,000	82,000			
5,000	132,000	87,000			
5,200	132,000	87,000			
5,700	139,000	91,000			

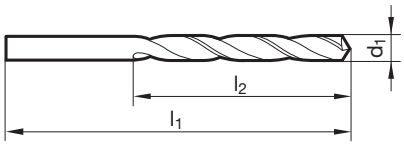
Punte elicoidali, lunghe

Articolo nr. 81317

P	M	K	N	S	H
●		●	○		

HSS | N | ~10xD | DIN 340 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 3,100 • spoglia sul cono tagliente • con dente di trascinamento
acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato, alpacca e grafite



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
3,100	106,000	69,000	7,400	156,000	102,000
3,400	112,000	73,000	7,500	156,000	102,000
3,600	112,000	73,000	7,900	165,000	109,000
3,700	112,000	73,000	8,000	165,000	109,000
4,000	119,000	78,000	8,250	165,000	109,000
4,300	126,000	82,000	8,400	165,000	109,000
4,500	126,000	82,000	9,900	184,000	121,000
5,000	132,000	87,000	10,000	184,000	121,000
5,500	139,000	91,000			
6,100	148,000	97,000			
6,600	148,000	97,000			
7,000	156,000	102,000			

HARTNER

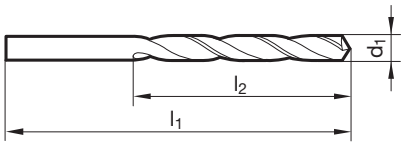
Punte elicoidali, lunghe

Articolo nr. 84418

P	M	K	N	S	H
●		●	○		

HSS | T | N | ~10xD | DIN 340 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • per fori profondi • per forare con bussola di guida
acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato, alpacca e grafite



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,500		32,000	12,000	5,800		139,000	91,000
0,700		42,000	21,000	5,900		139,000	91,000
0,800		46,000	25,000	6,000		139,000	91,000
1,000		56,000	33,000	6,100		148,000	97,000
1,100		60,000	37,000	6,200		148,000	97,000
1,200		65,000	41,000	6,300		148,000	97,000
1,400		70,000	45,000	6,400		148,000	97,000
1,500		70,000	45,000	6,500		148,000	97,000
1,600		76,000	50,000	6,600		148,000	97,000
1,700		76,000	50,000	6,700		148,000	97,000
1,800		80,000	53,000	6,800		156,000	102,000
1,900		80,000	53,000	6,900		156,000	102,000
2,000		85,000	56,000	7,000		156,000	102,000
2,200		90,000	59,000	7,200		156,000	102,000
2,400		95,000	62,000	7,300		156,000	102,000
2,500		95,000	62,000	7,500		156,000	102,000
2,700		100,000	66,000	7,600		165,000	109,000
2,800		100,000	66,000	7,700		165,000	109,000
2,900		100,000	66,000	7,800		165,000	109,000
3,000		100,000	66,000	7,900		165,000	109,000
3,100		106,000	69,000	8,000		165,000	109,000
3,300		106,000	69,000	8,100		165,000	109,000
3,400		112,000	73,000	8,200		165,000	109,000
3,500		112,000	73,000	8,500		165,000	109,000
3,800		119,000	78,000	8,600		175,000	115,000
3,900		119,000	78,000	8,700		175,000	115,000
4,000		119,000	78,000	8,800		175,000	115,000
4,100		119,000	78,000	8,900		175,000	115,000
4,200		119,000	78,000	9,000		175,000	115,000
4,300		126,000	82,000	9,100		175,000	115,000
4,500		126,000	82,000	9,200		175,000	115,000
4,600		126,000	82,000	9,400		175,000	115,000
4,700		126,000	82,000	9,500		175,000	115,000
4,800		132,000	87,000	9,800		184,000	121,000
4,900		132,000	87,000	9,900		184,000	121,000
5,000		132,000	87,000	10,000		184,000	121,000
5,200		132,000	87,000	10,200		184,000	121,000
5,300		132,000	87,000	10,800		195,000	128,000
5,400		139,000	91,000	11,000		195,000	128,000
5,500		139,000	91,000	11,500		195,000	128,000
5,600		139,000	91,000	12,000		205,000	134,000
5,700		139,000	91,000	12,500		205,000	134,000

Punte elicoidali, lunghe

d1 mm	 inch	l1 mm	l2 mm	d1 mm	 inch	l1 mm	l2 mm
12,700	1/2	205,000	134,000	15,000		220,000	144,000
13,000		205,000	134,000	15,500		227,000	149,000
13,500		214,000	140,000	16,000		227,000	149,000
14,000		214,000	140,000				
14,500		220,000	144,000				
14,800		220,000	144,000				

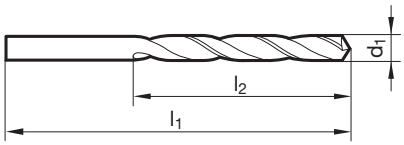
Punte elicoidali, lunghe

Articolo nr. 81320

P	M	K	N	S	H
			•		

HSS | H | ~10xD | DIN 340 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 14,500 • spoglia sul cono tagliente • per fori profondi
materiali duri e secchi • ottone, leghe di magnesio • bronze, bronzo fosforoso • ardesia, mica, pertinax



d1 mm	l1 mm	l2 mm
0,600	35,000	15,000
0,700	42,000	21,000
0,750	42,000	21,000
0,800	46,000	25,000
0,900	51,000	29,000
1,000	56,000	33,000
1,050	56,000	33,000
1,100	60,000	37,000
1,150	60,000	37,000
1,200	65,000	41,000
1,300	65,000	41,000
1,500	70,000	45,000
1,600	76,000	50,000
1,700	76,000	50,000
1,750	80,000	53,000
1,800	80,000	53,000
1,850	80,000	53,000
2,000	85,000	56,000
2,050	85,000	56,000
2,200	90,000	59,000
2,300	90,000	59,000
2,500	95,000	62,000
2,600	95,000	62,000
2,700	100,000	66,000
2,900	100,000	66,000
3,000	100,000	66,000
3,100	106,000	69,000
3,150	106,000	69,000
3,200	106,000	69,000
3,250	106,000	69,000
3,300	106,000	69,000
3,400	112,000	73,000
3,500	112,000	73,000
3,600	112,000	73,000
3,900	119,000	78,000
4,000	119,000	78,000
4,100	119,000	78,000
4,200	119,000	78,000
4,300	126,000	82,000
4,400	126,000	82,000
4,500	126,000	82,000
4,600	126,000	82,000

d1 mm	l1 mm	l2 mm
4,700	126,000	82,000
4,800	132,000	87,000
4,900	132,000	87,000
5,000	132,000	87,000
5,200	132,000	87,000
5,300	132,000	87,000
5,400	139,000	91,000
5,500	139,000	91,000
5,700	139,000	91,000
5,800	139,000	91,000
5,900	139,000	91,000
6,000	139,000	91,000
6,200	148,000	97,000
6,300	148,000	97,000
6,500	148,000	97,000
6,600	148,000	97,000
6,700	148,000	97,000
6,800	156,000	102,000
6,900	156,000	102,000
7,000	156,000	102,000
7,200	156,000	102,000
7,500	156,000	102,000
8,000	165,000	109,000
8,200	165,000	109,000
8,250	165,000	109,000
8,800	175,000	115,000
9,000	175,000	115,000
9,250	175,000	115,000
9,500	175,000	115,000
10,000	184,000	121,000
11,250	195,000	128,000
14,000	214,000	140,000
14,500	220,000	144,000
15,000	220,000	144,000

HARTNER

Punte elicoidali, lunghe

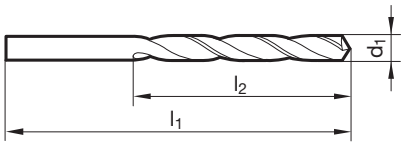
Articolo nr. 81330

P	M	K	N	S	H
			•		

HSS | W | ~10xD | DIN 340 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 14,250 • spoglia sul cono tagliente • per fori profondi

materiali teneri a truciolo lungo • alluminio, leghe di alluminio (a truciolo lungo) • zinco, rame affinato, silumin, elektron • materie sintetiche (tenere) e legno



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,500		32,000	12,000	3,500		112,000	73,000
0,600		35,000	15,000	3,600		112,000	73,000
0,700		42,000	21,000	3,650		112,000	73,000
0,800		46,000	25,000	3,700		112,000	73,000
0,900		51,000	29,000	3,750		112,000	73,000
0,950		51,000	29,000	3,800		119,000	78,000
1,000		56,000	33,000	3,900		119,000	78,000
1,050		56,000	33,000	4,000		119,000	78,000
1,100		60,000	37,000	4,100		119,000	78,000
1,200		65,000	41,000	4,150		119,000	78,000
1,250		65,000	41,000	4,200		119,000	78,000
1,300		65,000	41,000	4,250		119,000	78,000
1,350		70,000	45,000	4,300		126,000	82,000
1,500		70,000	45,000	4,400		126,000	82,000
1,600		76,000	50,000	4,500		126,000	82,000
1,780		80,000	53,000	4,600		126,000	82,000
1,800		80,000	53,000	4,700		126,000	82,000
1,850		80,000	53,000	4,800		132,000	87,000
1,900		80,000	53,000	4,900		132,000	87,000
1,950		85,000	56,000	5,000		132,000	87,000
2,000		85,000	56,000	5,100		132,000	87,000
2,050		85,000	56,000	5,200		132,000	87,000
2,100		85,000	56,000	5,250		132,000	87,000
2,150		90,000	59,000	5,300		132,000	87,000
2,200		90,000	59,000	5,400		139,000	91,000
2,300		90,000	59,000	5,500		139,000	91,000
2,500		95,000	62,000	5,600		139,000	91,000
2,550		95,000	62,000	5,700		139,000	91,000
2,700		100,000	66,000	5,800		139,000	91,000
2,800		100,000	66,000	6,000		139,000	91,000
2,850		100,000	66,000	6,100		148,000	97,000
2,900		100,000	66,000	6,200		148,000	97,000
2,950		100,000	66,000	6,300		148,000	97,000
3,000		100,000	66,000	6,400		148,000	97,000
3,050		106,000	69,000	6,500		148,000	97,000
3,100		106,000	69,000	6,600		148,000	97,000
3,200		106,000	69,000	6,700		148,000	97,000
3,250		106,000	69,000	6,750	17/64	156,000	102,000
3,300		106,000	69,000	6,800		156,000	102,000
3,350		106,000	69,000	6,900		156,000	102,000
3,400		112,000	73,000	7,000		156,000	102,000
3,450		112,000	73,000	7,100		156,000	102,000

Punte elicoidali, lunghe

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
7,200		156,000	102,000	9,700		184,000	121,000
7,300		156,000	102,000	9,750		184,000	121,000
7,400		156,000	102,000	9,800		184,000	121,000
7,500		156,000	102,000	10,000		184,000	121,000
7,600		165,000	109,000	10,200		184,000	121,000
7,700		165,000	109,000	10,300		184,000	121,000
7,750		165,000	109,000	11,000		195,000	128,000
7,800		165,000	109,000	11,300		195,000	128,000
7,900		165,000	109,000	11,500		195,000	128,000
8,000		165,000	109,000	12,000		205,000	134,000
8,100		165,000	109,000	13,500		214,000	140,000
8,200		165,000	109,000	14,000		214,000	140,000
8,300		165,000	109,000	14,250		220,000	144,000
8,400		165,000	109,000	14,500		220,000	144,000
8,500		165,000	109,000	15,500		227,000	149,000
8,600		175,000	115,000	17,000		235,000	154,000
8,700		175,000	115,000	20,000		254,000	166,000
8,800		175,000	115,000				
8,900		175,000	115,000				
9,000		175,000	115,000				
9,100		175,000	115,000				
9,200		175,000	115,000				
9,300		175,000	115,000				
9,500		175,000	115,000				

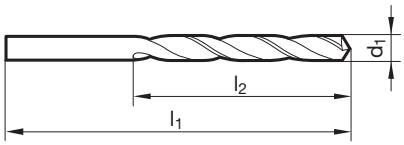
Punte elicoidali, lunghe

Articolo nr. 81340

P	M	K	N	S	H
•		•	•		

HSS | >Ø 2,36 | FN | ~10xD | DIN 340 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • scanalature larghe • in caso di scarico truciolo insufficiente ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
0,900		51,000	29,000	4,300		126,000	82,000
1,000		56,000	33,000	4,400		126,000	82,000
1,100		60,000	37,000	4,500		126,000	82,000
1,200		65,000	41,000	4,600		126,000	82,000
1,300		65,000	41,000	4,700		126,000	82,000
1,400		70,000	45,000	4,750		126,000	82,000
1,500		70,000	45,000	4,800		132,000	87,000
1,600		76,000	50,000	4,900		132,000	87,000
1,700		76,000	50,000	5,000		132,000	87,000
1,800		80,000	53,000	5,100		132,000	87,000
1,900		80,000	53,000	5,200		132,000	87,000
2,000		85,000	56,000	5,400		139,000	91,000
2,100		85,000	56,000	5,500		139,000	91,000
2,200		90,000	59,000	5,600		139,000	91,000
2,300		90,000	59,000	5,700		139,000	91,000
2,400		95,000	62,000	5,800		139,000	91,000
2,500		95,000	62,000	5,900		139,000	91,000
2,600		95,000	62,000	6,000		139,000	91,000
2,650		95,000	62,000	6,100		148,000	97,000
2,700		100,000	66,000	6,200		148,000	97,000
2,750		100,000	66,000	6,300		148,000	97,000
2,800		100,000	66,000	6,500		148,000	97,000
2,850		100,000	66,000	6,600		148,000	97,000
2,900		100,000	66,000	6,700		148,000	97,000
2,950		100,000	66,000	6,800		156,000	102,000
3,000		100,000	66,000	6,900		156,000	102,000
3,100		106,000	69,000	7,000		156,000	102,000
3,170	1/8	106,000	69,000	7,100		156,000	102,000
3,200		106,000	69,000	7,200		156,000	102,000
3,250		106,000	69,000	7,300		156,000	102,000
3,300		106,000	69,000	7,400		156,000	102,000
3,400		112,000	73,000	7,500		156,000	102,000
3,500		112,000	73,000	7,600		165,000	109,000
3,600		112,000	73,000	7,700		165,000	109,000
3,700		112,000	73,000	7,800		165,000	109,000
3,750		112,000	73,000	7,900		165,000	109,000
3,800		119,000	78,000	8,000		165,000	109,000
3,900		119,000	78,000	8,100		165,000	109,000
4,000		119,000	78,000	8,200		165,000	109,000
4,100		119,000	78,000	8,300		165,000	109,000
4,200		119,000	78,000	8,400		165,000	109,000
4,250		119,000	78,000	8,500		165,000	109,000

Punte elicoidali, lunghe

d1 mm	inch	l1 mm	l2 mm
8,600		175,000	115,000
8,700		175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,100		175,000	115,000
9,200		175,000	115,000
9,300		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,600		184,000	121,000
9,700		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
10,300		184,000	121,000
10,500		184,000	121,000
10,800		195,000	128,000

d1 mm	inch	l1 mm	l2 mm
11,000		195,000	128,000
11,200		195,000	128,000
11,250		195,000	128,000
11,500		195,000	128,000
11,800		195,000	128,000
12,000		205,000	134,000
12,200		205,000	134,000
12,500		205,000	134,000
12,800		205,000	134,000
13,000		205,000	134,000
14,000		214,000	140,000

Punte elicoidali, lunghe

Articolo nr. 84423

P	M	K	N	S	H
•		•	•		

HSS | T | FN | ~10xD | DIN 340 | 130° | h8 | R | Cyl

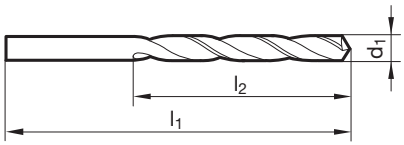
Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • scanalature larghe • in caso di scarico truciolo insufficiente ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili

Articolo nr. 84506

P	M	K	N	S	H
•		•	•		

HSS | F | FN | ~10xD | DIN 340 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • scanalature larghe • in caso di scarico truciolo insufficiente ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
1,000	56,000	33,000	4,000	119,000	78,000
1,100	60,000	37,000	4,100	119,000	78,000
1,200	65,000	41,000	4,200	119,000	78,000
1,300	65,000	41,000	4,300	126,000	82,000
1,400	70,000	45,000	4,400	126,000	82,000
1,500	70,000	45,000	4,500	126,000	82,000
1,600	76,000	50,000	4,600	126,000	82,000
1,700	76,000	50,000	4,700	126,000	82,000
1,800	80,000	53,000	4,800	132,000	87,000
1,900	80,000	53,000	4,900	132,000	87,000
2,000	85,000	56,000	5,000	132,000	87,000
2,100	85,000	56,000	5,100	132,000	87,000
2,200	90,000	59,000	5,200	132,000	87,000
2,300	90,000	59,000	5,300	132,000	87,000
2,400	95,000	62,000	5,400	139,000	91,000
2,500	95,000	62,000	5,500	139,000	91,000
2,600	95,000	62,000	5,600	139,000	91,000
2,700	100,000	66,000	5,700	139,000	91,000
2,800	100,000	66,000	5,800	139,000	91,000
2,900	100,000	66,000	5,900	139,000	91,000
3,000	100,000	66,000	6,000	139,000	91,000
3,100	106,000	69,000	6,100	148,000	97,000
3,200	106,000	69,000	6,200	148,000	97,000
3,300	106,000	69,000	6,300	148,000	97,000
3,400	112,000	73,000	6,400	148,000	97,000
3,500	112,000	73,000	6,500	148,000	97,000
3,600	112,000	73,000	6,600	148,000	97,000
3,700	112,000	73,000	6,700	148,000	97,000
3,800	119,000	78,000	6,800	156,000	102,000
3,900	119,000	78,000	6,900	156,000	102,000

Punte elicoidali, lunghe

d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
7,000	156,000	102,000	8,500	165,000	109,000
7,200	156,000	102,000	8,700	175,000	115,000
7,300	156,000	102,000	9,000	175,000	115,000
7,400	156,000	102,000	9,800	184,000	121,000
7,500	156,000	102,000	10,000	184,000	121,000
7,600	165,000	109,000	11,000	195,000	128,000
7,800	165,000	109,000	11,500	195,000	128,000
7,900	165,000	109,000	12,000	205,000	134,000
8,000	165,000	109,000	12,700	205,000	134,000
8,100	165,000	109,000	14,000	214,000	140,000
8,200	165,000	109,000			
8,300	165,000	109,000			

HARTNER

Punte elicoidali, lunghe

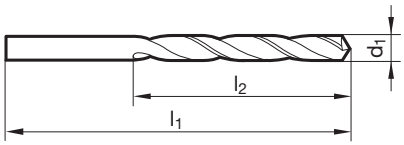
Articolo nr. 81350

P	M	K	N	S	H
○			●		

HSS | FW | ~10xD | DIN 340 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 2,400 • spoglia sul cono tagliente • scanalature particolarmente larghe

materiali teneri a truciolo lungo • fino a 500 N/mm² • acciai teneri automatici • alluminio, leghe di alluminio (a truciolo lungo) • zinco, rame affinato, silumin, elektron • zamak, argalium, materie sintetiche (tenere) e legno



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		56,000	33,000	6,000		139,000	91,000
1,400		70,000	45,000	6,100		148,000	97,000
1,500		70,000	45,000	6,200		148,000	97,000
2,000		85,000	56,000	6,300		148,000	97,000
2,100		85,000	56,000	6,400		148,000	97,000
2,200		90,000	59,000	6,500		148,000	97,000
2,300		90,000	59,000	6,600		148,000	97,000
2,400		95,000	62,000	6,700		148,000	97,000
2,500		95,000	62,000	6,800		156,000	102,000
2,700		100,000	66,000	6,900		156,000	102,000
2,800		100,000	66,000	7,000		156,000	102,000
2,900		100,000	66,000	7,100		156,000	102,000
3,000		100,000	66,000	7,200		156,000	102,000
3,100		106,000	69,000	7,300		156,000	102,000
3,200		106,000	69,000	7,500		156,000	102,000
3,250		106,000	69,000	7,600		165,000	109,000
3,300		106,000	69,000	7,700		165,000	109,000
3,400		112,000	73,000	7,800		165,000	109,000
3,500		112,000	73,000	7,900		165,000	109,000
3,600		112,000	73,000	8,000		165,000	109,000
3,700		112,000	73,000	8,100		165,000	109,000
3,800		119,000	78,000	8,200		165,000	109,000
3,900		119,000	78,000	8,400		165,000	109,000
4,000		119,000	78,000	8,500		165,000	109,000
4,100		119,000	78,000	8,600		175,000	115,000
4,200		119,000	78,000	8,700		175,000	115,000
4,300		126,000	82,000	8,800		175,000	115,000
4,400		126,000	82,000	8,900		175,000	115,000
4,500		126,000	82,000	9,000		175,000	115,000
4,600		126,000	82,000	9,100		175,000	115,000
4,700		126,000	82,000	9,200		175,000	115,000
4,800		132,000	87,000	9,300		175,000	115,000
4,900		132,000	87,000	9,400		175,000	115,000
5,000		132,000	87,000	9,500		175,000	115,000
5,100		132,000	87,000	9,600		184,000	121,000
5,200		132,000	87,000	9,700		184,000	121,000
5,400		139,000	91,000	9,800		184,000	121,000
5,500		139,000	91,000	10,000		184,000	121,000
5,600		139,000	91,000	10,100		184,000	121,000
5,700		139,000	91,000	10,500		184,000	121,000
5,800		139,000	91,000	10,700		195,000	128,000
5,900		139,000	91,000	10,800		195,000	128,000

Punte elicoidali, lunghe

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
11,200		195,000	128,000	12,400		205,000	134,000
11,500		195,000	128,000	12,500		205,000	134,000
11,800		195,000	128,000	12,800		205,000	134,000
12,000		205,000	134,000	13,000		205,000	134,000
12,200		205,000	134,000	13,500		214,000	140,000
12,300	31/64	205,000	134,000	14,000		214,000	140,000

HARTNER

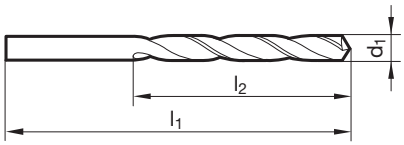
Punte elicoidali, lunghe

Articolo nr. 81311

P	M	K	N	S	H
●	○	●	●	○	

HSS-E | >Ø 2,36 | N | ~10xD | DIN 340 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura acciai legati e non legati e tipi di ghisa con R superiore a 800 N/mm² • acciai per lavorazioni a caldo e a freddo • acciai per cuscinetti • acciai legati in alta percentuale • acciai da bonifica e da cementazione



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
0,500	32,000	12,000	6,500	148,000	97,000
0,600	35,000	15,000	6,600	148,000	97,000
0,700	42,000	21,000	6,700	148,000	97,000
0,800	46,000	25,000	6,800	156,000	102,000
0,900	51,000	29,000	6,900	156,000	102,000
1,000	56,000	33,000	7,000	156,000	102,000
1,100	60,000	37,000	7,200	156,000	102,000
1,200	65,000	41,000	7,300	156,000	102,000
1,400	70,000	45,000	7,400	156,000	102,000
1,500	70,000	45,000	7,600	165,000	109,000
1,900	80,000	53,000	7,700	165,000	109,000
2,000	85,000	56,000	7,800	165,000	109,000
2,200	90,000	59,000	7,900	165,000	109,000
2,500	95,000	62,000	8,000	165,000	109,000
3,000	100,000	66,000	8,300	165,000	109,000
3,100	106,000	69,000	8,400	165,000	109,000
3,200	106,000	69,000	8,600	175,000	115,000
3,300	106,000	69,000	8,700	175,000	115,000
3,400	112,000	73,000	8,800	175,000	115,000
3,500	112,000	73,000	8,900	175,000	115,000
3,900	119,000	78,000	9,000	175,000	115,000
4,000	119,000	78,000	9,100	175,000	115,000
4,100	119,000	78,000	9,200	175,000	115,000
4,200	119,000	78,000	9,300	175,000	115,000
4,300	126,000	82,000	9,400	175,000	115,000
4,400	126,000	82,000	9,500	175,000	115,000
4,500	126,000	82,000	9,600	184,000	121,000
4,600	126,000	82,000	9,700	184,000	121,000
4,700	126,000	82,000	9,900	184,000	121,000
4,800	132,000	87,000	10,000	184,000	121,000
4,900	132,000	87,000	10,500	184,000	121,000
5,000	132,000	87,000	10,800	195,000	128,000
5,100	132,000	87,000	11,000	195,000	128,000
5,300	132,000	87,000	11,200	195,000	128,000
5,500	139,000	91,000	12,000	205,000	134,000
5,600	139,000	91,000	12,500	205,000	134,000
5,700	139,000	91,000			
5,800	139,000	91,000			
5,900	139,000	91,000			
6,000	139,000	91,000			
6,300	148,000	97,000			
6,400	148,000	97,000			

HARTNER

Punte elicoidali, lunghe

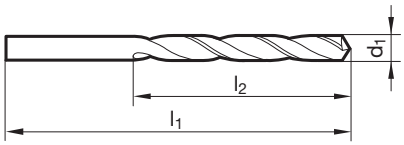
Articolo nr. 81341

P	M	K	N	S	H
•	•	•	•		

HSS-E | >Ø 2,36 | FN | ~10xD | DIN 340 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,100 • spoglia sul cono tagliente • acciaio HSS legato al Co • scanalature larghe • massima resistenza all'usura • in caso di scarico truciolo insufficiente

acciai legati e non legati e tipi di ghisa con R superiore a 800 N/mm² • acciai per lavorazioni a caldo e a freddo • acciai per cuscinetti • acciai legati in alta percentuale • acciai da bonifica e da cementazione



d1 mm	inch	l1 mm	l2 mm
1,000		56,000	33,000
1,100		60,000	37,000
1,200		65,000	41,000
1,250		65,000	41,000
1,300		65,000	41,000
1,400		70,000	45,000
1,500		70,000	45,000
1,600		76,000	50,000
1,700		76,000	50,000
1,800		80,000	53,000
1,900		80,000	53,000
2,000		85,000	56,000
2,100		85,000	56,000
2,200		90,000	59,000
2,300		90,000	59,000
2,400		95,000	62,000
2,440		95,000	62,000
2,500		95,000	62,000
2,600		95,000	62,000
2,700		100,000	66,000
2,800		100,000	66,000
2,900		100,000	66,000
3,000		100,000	66,000
3,050		106,000	69,000
3,100		106,000	69,000
3,200		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,600		112,000	73,000
3,700		112,000	73,000
3,800		119,000	78,000
3,900		119,000	78,000
4,000		119,000	78,000
4,050		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,300		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,600		126,000	82,000
4,700		126,000	82,000

d1 mm	inch	l1 mm	l2 mm
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,900		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,400		139,000	91,000
5,500		139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,150		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,200		156,000	102,000
7,300		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,600		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000
8,000		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,400		165,000	109,000
8,500		165,000	109,000

Punte elicoidali, lunghe

d1 mm	inch	l1 mm	l2 mm
8,600		175,000	115,000
8,700		175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,100		175,000	115,000
9,200		175,000	115,000
9,300		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,600		184,000	121,000
9,700		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,500		184,000	121,000
10,700		195,000	128,000

d1 mm	inch	l1 mm	l2 mm
10,800		195,000	128,000
10,900		195,000	128,000
11,000		195,000	128,000
11,500		195,000	128,000
11,800		195,000	128,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,500		205,000	134,000
13,000		205,000	134,000
16,000		227,000	149,000

Punte elicoidali, lunghe

Articolo nr. 81361

P	M	K	N	S	H
○	●			●	

HSS-E | S | ~10xD | DIN 340 | 130° | h8 | R | Cyl

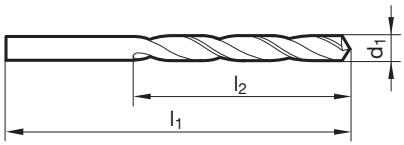
Assott. del nocc. ≥ Ø 1,400 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura titanio e leghe di titanio • acciai inossidabili, resistenti al calore ed austenitici • acciai molto tenaci ed a truciolo corto con R da ca. 900 N/mm² • acciai per cuscinetti • Hastelloy, Inconel, Nimonic

Articolo nr. 81362

P	M	K	N	S	H
○	●			●	

HSS-E | T | S | ~10xD | DIN 340 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura titanio e leghe di titanio • acciai inossidabili, resistenti al calore ed austenitici • acciai molto tenaci ed a truciolo corto con R da ca. 900 N/mm² • acciai per cuscinetti • Hastelloy, Inconel, Nimonic



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
1,000	56,000	33,000	4,000	119,000	78,000
1,100	60,000	37,000	4,100	119,000	78,000
1,200	65,000	41,000	4,200	119,000	78,000
1,300	65,000	41,000	4,300	126,000	82,000
1,400	70,000	45,000	4,400	126,000	82,000
1,500	70,000	45,000	4,500	126,000	82,000
1,600	76,000	50,000	4,600	126,000	82,000
1,700	76,000	50,000	4,700	126,000	82,000
1,800	80,000	53,000	4,800	132,000	87,000
1,900	80,000	53,000	4,900	132,000	87,000
2,000	85,000	56,000	5,000	132,000	87,000
2,100	85,000	56,000	5,100	132,000	87,000
2,200	90,000	59,000	5,200	132,000	87,000
2,300	90,000	59,000	5,300	132,000	87,000
2,400	95,000	62,000	5,400	139,000	91,000
2,500	95,000	62,000	5,500	139,000	91,000
2,600	95,000	62,000	5,600	139,000	91,000
2,700	100,000	66,000	5,700	139,000	91,000
2,800	100,000	66,000	5,800	139,000	91,000
2,900	100,000	66,000	5,900	139,000	91,000
3,000	100,000	66,000	6,000	139,000	91,000
3,100	106,000	69,000	6,100	148,000	97,000
3,200	106,000	69,000	6,200	148,000	97,000
3,300	106,000	69,000	6,300	148,000	97,000
3,400	112,000	73,000	6,400	148,000	97,000
3,500	112,000	73,000	6,500	148,000	97,000
3,600	112,000	73,000	6,600	148,000	97,000
3,700	112,000	73,000	6,700	148,000	97,000
3,800	119,000	78,000	6,800	156,000	102,000
3,900	119,000	78,000	6,900	156,000	102,000

Punte elicoidali, lunghe

d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
7,000	156,000	102,000	8,500	165,000	109,000
7,100	156,000	102,000	8,700	175,000	115,000
7,300	156,000	102,000	9,000	175,000	115,000
7,400	156,000	102,000	9,500	175,000	115,000
7,500	156,000	102,000	10,000	184,000	121,000
7,600	165,000	109,000	10,500	184,000	121,000
7,700	165,000	109,000	11,000	195,000	128,000
7,800	165,000	109,000	11,500	195,000	128,000
8,000	165,000	109,000	12,000	205,000	134,000
8,200	165,000	109,000	12,500	205,000	134,000
8,300	165,000	109,000	13,000	205,000	134,000
8,400	165,000	109,000			

Punte elicoidali, lunghe

Articolo nr. 84814

P	M	K	N	S	H
•	•	•	•		

HSS-E | FU 500 DZ | ~10xD | DIN 340 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • affilatura su piani • acciaio HSS legato al Co • è necess. una limitata forza di avanz. • è necess. un limitato momento torcente • massima resistenza all'usura • uso universale

acciai legati e non legati con R fino a 800 N/mm² • acciai per lav. a caldo e a freddo • acciai per cuscinetti • metalli non ferrosi • ghise • acciai inossidabili • plastica

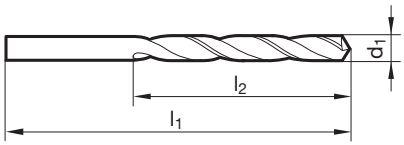
Articolo nr. 84812

P	M	K	N	S	H
•	•	•	•		

HSS-E | T | FU 500 DZ | ~10xD | DIN 340 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 1,000 • affilatura su piani • acciaio HSS legato al Co • è necess. un limitato momento torcente • è necess. una limitata forza di avanz. • massima resistenza all'usura • uso universale

acciai legati e non legati con R fino a 800 N/mm² • acciai per lav. a caldo e a freddo • acciai per cuscinetti • metalli non ferrosi • ghise • plastica • acciai inossidabili



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
1,000	56,000	33,000	4,000	119,000	78,000
1,100	60,000	37,000	4,100	119,000	78,000
1,200	65,000	41,000	4,200	119,000	78,000
1,300	65,000	41,000	4,300	126,000	82,000
1,400	70,000	45,000	4,400	126,000	82,000
1,500	70,000	45,000	4,500	126,000	82,000
1,600	76,000	50,000	4,600	126,000	82,000
1,700	76,000	50,000	4,700	126,000	82,000
1,800	80,000	53,000	4,800	132,000	87,000
1,900	80,000	53,000	4,900	132,000	87,000
2,000	85,000	56,000	5,000	132,000	87,000
2,100	85,000	56,000	5,100	132,000	87,000
2,200	90,000	59,000	5,200	132,000	87,000
2,300	90,000	59,000	5,300	132,000	87,000
2,400	95,000	62,000	5,400	139,000	91,000
2,500	95,000	62,000	5,500	139,000	91,000
2,600	95,000	62,000	5,600	139,000	91,000
2,700	100,000	66,000	5,700	139,000	91,000
2,800	100,000	66,000	5,800	139,000	91,000
2,900	100,000	66,000	5,900	139,000	91,000
3,000	100,000	66,000	6,000	139,000	91,000
3,100	106,000	69,000	6,100	148,000	97,000
3,200	106,000	69,000	6,200	148,000	97,000
3,300	106,000	69,000	6,300	148,000	97,000
3,400	112,000	73,000	6,400	148,000	97,000
3,500	112,000	73,000	6,500	148,000	97,000
3,600	112,000	73,000	6,600	148,000	97,000
3,700	112,000	73,000	6,700	148,000	97,000
3,800	119,000	78,000	6,800	156,000	102,000
3,900	119,000	78,000	6,900	156,000	102,000

Punte elicoidali, lunghe

d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
7,000	156,000	102,000	9,500	175,000	115,000
7,100	156,000	102,000	9,600	184,000	121,000
7,200	156,000	102,000	9,700	184,000	121,000
7,300	156,000	102,000	9,800	184,000	121,000
7,400	156,000	102,000	9,900	184,000	121,000
7,500	156,000	102,000	10,000	184,000	121,000
7,600	165,000	109,000	10,100	184,000	121,000
7,700	165,000	109,000	10,200	184,000	121,000
7,800	165,000	109,000	10,300	184,000	121,000
7,900	165,000	109,000	10,400	184,000	121,000
8,000	165,000	109,000	10,500	184,000	121,000
8,100	165,000	109,000	11,000	195,000	128,000
8,200	165,000	109,000	11,500	195,000	128,000
8,300	165,000	109,000	12,000	205,000	134,000
8,400	165,000	109,000	12,500	205,000	134,000
8,500	165,000	109,000	13,000	205,000	134,000
8,600	175,000	115,000	13,500	214,000	140,000
8,700	175,000	115,000	14,000	214,000	140,000
8,800	175,000	115,000			
9,000	175,000	115,000			
9,100	175,000	115,000			
9,200	175,000	115,000			
9,300	175,000	115,000			
9,400	175,000	115,000			

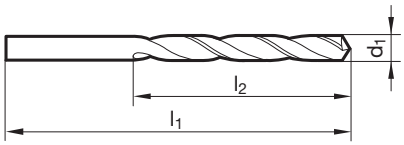
Punte elicoidali, lunghe

Articolo nr. 89286

P	M	K	N	S	H
○		○			○

VHM | N | ~10xD | WN | 130° | h7 | R | Cyl

affilatura su piani • forma dei taglienti principali diritta
materie sintetiche a fibre vetrose • altri materiali che esercitano un'azione abrasiva sui taglienti e sulle fasi della punta



d1 mm	l1 mm	l2 mm
0,500	38,000	8,500
0,600	38,000	9,500
0,650	38,000	10,500
0,700	38,000	10,500
0,750	38,000	12,500
0,800	38,000	12,500
0,850	38,000	14,500
0,900	38,000	14,500
1,000	38,000	17,000
1,050	38,000	17,000
1,100	38,000	17,000
1,200	38,000	17,000

d1 mm	l1 mm	l2 mm
1,300	38,000	17,000
1,400	38,000	17,000
1,450	38,000	17,000
1,500	38,000	17,000

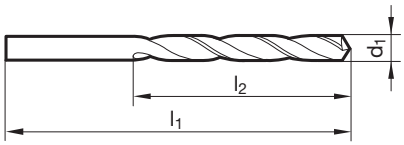
Punte elicoidali in lunghezze speciali, grandezza 1

Articolo nr. 81410

P	M	K	N	S	H
●		●	○		

HSS | >Ø 2,36 | N | ~15xD | DIN 1869 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 2,400 • spoglia sul cono tagliente • per fori estremamente profondi
acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato, alpacca e grafite



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
1,600	115,000	75,000	6,400	215,000	150,000
1,800	120,000	80,000	6,500	215,000	150,000
1,900	120,000	80,000	6,600	215,000	150,000
2,000	125,000	85,000	6,700	215,000	150,000
2,200	135,000	90,000	6,800	225,000	155,000
2,300	135,000	90,000	7,000	225,000	155,000
2,400	140,000	95,000	7,100	225,000	155,000
2,500	140,000	95,000	7,500	225,000	155,000
2,700	150,000	100,000	7,600	240,000	165,000
2,800	150,000	100,000	7,700	240,000	165,000
2,900	150,000	100,000	7,800	240,000	165,000
3,000	150,000	100,000	7,900	240,000	165,000
3,100	155,000	105,000	8,000	240,000	165,000
3,200	155,000	105,000	8,100	240,000	165,000
3,250	155,000	105,000	8,200	240,000	165,000
3,300	155,000	105,000	8,500	240,000	165,000
3,400	165,000	115,000	8,600	250,000	175,000
3,500	165,000	115,000	8,800	250,000	175,000
3,700	165,000	115,000	9,000	250,000	175,000
3,800	175,000	120,000	9,400	250,000	175,000
3,900	175,000	120,000	9,500	250,000	175,000
4,000	175,000	120,000	9,700	265,000	185,000
4,100	175,000	120,000	10,000	265,000	185,000
4,200	175,000	120,000	10,200	265,000	185,000
4,300	185,000	125,000	10,500	265,000	185,000
4,500	185,000	125,000	11,000	280,000	195,000
4,600	185,000	125,000	11,500	280,000	195,000
4,700	185,000	125,000	11,800	280,000	195,000
4,800	195,000	135,000	12,000	295,000	205,000
4,900	195,000	135,000	12,500	295,000	205,000
5,000	195,000	135,000	13,000	295,000	205,000
5,100	195,000	135,000			
5,200	195,000	135,000			
5,300	195,000	135,000			
5,400	205,000	140,000			
5,500	205,000	140,000			
5,700	205,000	140,000			
5,800	205,000	140,000			
5,900	205,000	140,000			
6,000	205,000	140,000			
6,200	215,000	150,000			
6,300	215,000	150,000			

HARTNER

Punte elicoidali in lunghezze speciali, grandezza 1

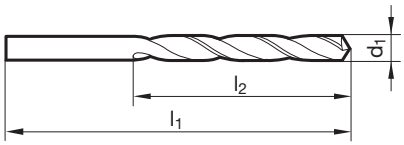
Articolo nr. 81440

P	M	K	N	S	H
•		•	•		

HSS | >Ø 2,36 | FN | ~15xD | DIN 1869 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • scanalature larghe • per fori estremamente profondi • in caso di scarico truciolo insufficiente

ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
2,000		125,000	85,000	6,500		215,000	150,000
2,200		135,000	90,000	6,600		215,000	150,000
2,300		135,000	90,000	6,800		225,000	155,000
2,400		140,000	95,000	7,000		225,000	155,000
2,500		140,000	95,000	7,100		225,000	155,000
2,600		140,000	95,000	7,300		225,000	155,000
2,700		150,000	100,000	7,500		225,000	155,000
2,850		150,000	100,000	7,800		240,000	165,000
2,900		150,000	100,000	7,900		240,000	165,000
2,950		150,000	100,000	8,000		240,000	165,000
3,000		150,000	100,000	8,100		240,000	165,000
3,100		155,000	105,000	8,200		240,000	165,000
3,170	1/8	155,000	105,000	8,400		240,000	165,000
3,200		155,000	105,000	8,500		240,000	165,000
3,300		155,000	105,000	8,800		250,000	175,000
3,400		165,000	115,000	9,000		250,000	175,000
3,500		165,000	115,000	9,200		250,000	175,000
3,600		165,000	115,000	9,300		250,000	175,000
3,700		165,000	115,000	9,400		250,000	175,000
3,750		165,000	115,000	9,500		250,000	175,000
3,800		175,000	120,000	9,600		265,000	185,000
3,900		175,000	120,000	9,700		265,000	185,000
4,000		175,000	120,000	9,800		265,000	185,000
4,200		175,000	120,000	9,900		265,000	185,000
4,500		185,000	125,000	10,000		265,000	185,000
4,600		185,000	125,000	10,200		265,000	185,000
4,700		185,000	125,000	10,500		265,000	185,000
4,800		195,000	135,000	11,000		280,000	195,000
5,000		195,000	135,000	11,500		280,000	195,000
5,100		195,000	135,000	11,750		280,000	195,000
5,200		195,000	135,000	11,800		280,000	195,000
5,300		195,000	135,000	12,000		295,000	205,000
5,400		205,000	140,000	12,500		295,000	205,000
5,500		205,000	140,000	12,700	1/2	295,000	205,000
5,600		205,000	140,000	13,000		295,000	205,000
5,700		205,000	140,000				
5,800		205,000	140,000				
5,900		205,000	140,000				
6,000		205,000	140,000				
6,200		215,000	150,000				
6,300		215,000	150,000				
6,400		215,000	150,000				

Punte elicoidali in lunghezze speciali, grandezza 1

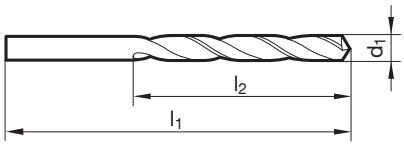
Articolo nr. 84425

P	M	K	N	S	H
•		•	•		

HSS | T | FN | ~15xD | DIN 1869 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • scanalature larghe • per fori estremamente profondi • in caso di scarico truciolo insufficiente

ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
2,000	125,000	85,000	5,500	205,000	140,000
2,100	125,000	85,000	5,800	205,000	140,000
2,500	140,000	95,000	6,000	205,000	140,000
3,000	150,000	100,000	6,500	215,000	150,000
3,200	155,000	105,000	6,600	215,000	150,000
3,500	165,000	115,000	7,000	225,000	155,000
4,000	175,000	120,000	7,500	225,000	155,000
4,200	175,000	120,000	8,000	240,000	165,000
4,500	185,000	125,000	9,000	250,000	175,000
4,600	185,000	125,000	10,000	265,000	185,000
5,000	195,000	135,000	11,000	280,000	195,000
5,100	195,000	135,000	12,000	295,000	205,000

Punte elicoidali in lunghezze speciali, grandezza 1

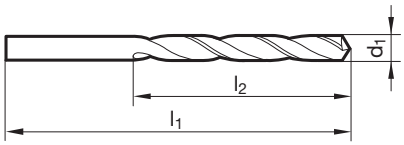
Articolo nr. 81450

P	M	K	N	S	H
○			●		

HSS | FW | ~15xD | DIN 1869 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 2,500 • spoglia sul cono tagliente • per fori estremamente profondi

materiali teneri a truciolo lungo con R fino a 500 N/mm² • acciai teneri automatici • alluminio, leghe di alluminio (a truciolo lungo) • zinco, rame affinato, silumin, elektron • zamak, argalium, materie sintetiche (tenere) e legno



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
2,000	125,000	85,000	7,000	225,000	155,000
2,500	140,000	95,000	9,500	250,000	175,000
2,600	140,000	95,000			
3,000	150,000	100,000			
3,200	155,000	105,000			
3,500	165,000	115,000			
4,000	175,000	120,000			
5,000	195,000	135,000			
5,500	205,000	140,000			
5,600	205,000	140,000			
6,000	205,000	140,000			
6,500	215,000	150,000			

Punte elicoidali in lunghezze speciali, grandezza 1

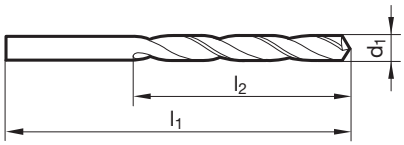
Articolo nr. 81441

P	M	K	N	S	H
●	●	●	●		○

HSS-E | FN | ~15xD | DIN 1869 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • scanalature larghe • massima resistenza all'usura • per fori estremamente profondi • in caso di scarico truciolo insufficiente

acciai legati e non legati e tipi di ghisa con R superiore a 800 N/mm² • acciai per lavorazioni a caldo e a freddo • acciai per cuscinetti • acciai legati in alta percentuale • acciai da bonifica e da cementazione



d1 mm	inch	l1 mm	l2 mm
3,000		150,000	100,000
3,500		165,000	115,000
4,000		175,000	120,000
4,300		185,000	125,000
4,500		185,000	125,000
4,760	3/16	195,000	135,000
5,000		195,000	135,000
5,400		205,000	140,000
5,500		205,000	140,000
6,000		205,000	140,000
6,500		215,000	150,000
7,000		225,000	155,000

d1 mm	inch	l1 mm	l2 mm
8,000		240,000	165,000
8,200		240,000	165,000
8,500		240,000	165,000
9,000		250,000	175,000
9,500		250,000	175,000
10,000		265,000	185,000

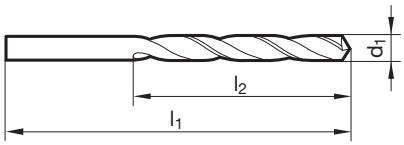
Punte elicoidali in lunghezze speciali, grandezza 2

Articolo nr. 81510

P	M	K	N	S	H
●		●	○		

HSS | N | ~20xD | DIN 1869 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • per fori estremamente profondi
acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato, alpacca e grafite



d1 mm	inch	l1 mm	l2 mm
3,000		190,000	130,000
3,170	1/8	200,000	135,000
3,300		200,000	135,000
3,500		210,000	145,000
4,000		220,000	150,000
4,200		220,000	150,000
4,500		235,000	160,000
4,800		245,000	170,000
5,000		245,000	170,000
5,200		245,000	170,000
5,500		260,000	180,000
5,800		260,000	180,000
6,000		260,000	180,000
6,500		275,000	190,000
6,800		290,000	200,000
7,000		290,000	200,000
8,000		305,000	210,000
8,500		305,000	210,000

d1 mm	inch	l1 mm	l2 mm
9,000		320,000	220,000
9,500		320,000	220,000
10,000		340,000	235,000
10,500		340,000	235,000
11,000		365,000	250,000
11,500		365,000	250,000
12,000		375,000	260,000

HARTNER

Punte elicoidali in lunghezze speciali, grandezza 2

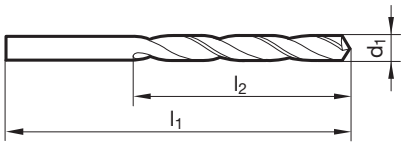
Articolo nr. 81540

P	M	K	N	S	H
•		•	•		

HSS | >Ø 2,36 | FN | ~20xD | DIN 1869 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • scanalature larghe • per fori estremamente profondi • in caso di scarico truciolo insufficiente

ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	inch	l1 mm	l2 mm
2,000		160,000	110,000
2,500		180,000	120,000
2,800		190,000	130,000
3,000		190,000	130,000
3,200		200,000	135,000
3,300		200,000	135,000
3,500		210,000	145,000
4,000		220,000	150,000
4,100		220,000	150,000
4,200		220,000	150,000
4,500		235,000	160,000
5,000		245,000	170,000
5,500		260,000	180,000
6,000		260,000	180,000
6,500		275,000	190,000
7,000		290,000	200,000
7,500		290,000	200,000
8,000		305,000	210,000

d1 mm	inch	l1 mm	l2 mm
8,200		305,000	210,000
8,500		305,000	210,000
9,000		320,000	220,000
9,500		320,000	220,000
9,800		340,000	235,000
10,000		340,000	235,000
10,200		340,000	235,000
10,500		340,000	235,000
10,720	27/64	365,000	250,000
11,000		365,000	250,000
11,500		365,000	250,000
12,000		375,000	260,000
12,500		375,000	260,000
12,700	1/2	375,000	260,000
13,000		375,000	260,000

Punte elicoidali in lunghezze speciali, grandezza 2

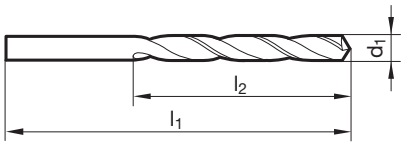
Articolo nr. 84426

P	M	K	N	S	H
●		●	●	○	

HSS | T | FN | ~20xD | DIN 1869 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • scanalature larghe • per fori estremamente profondi • in caso di scarico truciolo insufficiente

ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	l1 mm	l2 mm
3,000	190,000	130,000
4,000	220,000	150,000
4,200	220,000	150,000
4,500	235,000	160,000
5,000	245,000	170,000
6,000	260,000	180,000

d1 mm	l1 mm	l2 mm
6,800	290,000	200,000
7,000	290,000	200,000
8,000	305,000	210,000
8,500	305,000	210,000

Punte elicoidali in lunghezze speciali, grandezza 2

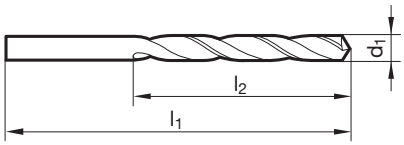
Articolo nr. 81541

P	M	K	N	S	H
●	●	●	●		○

HSS-E | FN | ~20xD | DIN 1869 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura • scanalature larghe • per fori estremamente profondi • in caso di scarico truciolo insufficiente

acciai legati e non legati e tipi di ghisa con R superiore a 800 N/mm² • acciai per lavorazioni a caldo e a freddo • acciai per cuscinetti • acciai legati in alta percentuale • acciai da bonifica e da cementazione



d1 mm	inch	l1 mm	l2 mm
3,000		190,000	130,000
3,170	1/8	200,000	135,000
3,200		200,000	135,000
3,500		210,000	145,000
4,000		220,000	150,000
4,200		220,000	150,000
5,000		245,000	170,000
6,000		260,000	180,000
6,200		275,000	190,000
6,350	1/4	275,000	190,000
6,500		275,000	190,000
7,000		290,000	200,000

d1 mm	inch	l1 mm	l2 mm
7,500		290,000	200,000
8,000		305,000	210,000
8,500		305,000	210,000
9,000		320,000	220,000
10,000		340,000	235,000

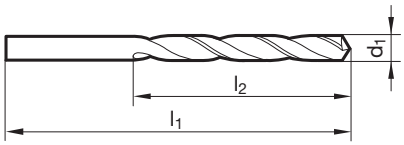
Punte elicoidali in lunghezze speciali, grandezza 3

Articolo nr. 81610

P	M	K	N	S	H
●		●	○		

HSS | N | ~25xD | DIN 1869 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 4,000 • spoglia sul cono tagliente • per fori estremamente profondi
acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato e grafite



d1 mm	l1 mm	l2 mm
4,000	280,000	190,000
5,000	315,000	210,000
5,500	330,000	225,000
5,800	330,000	225,000
5,900	330,000	225,000
6,000	330,000	225,000
7,000	370,000	250,000
7,500	370,000	250,000
7,800	390,000	265,000
8,000	390,000	265,000
9,000	410,000	280,000
9,500	410,000	280,000

d1 mm	l1 mm	l2 mm
10,000	430,000	295,000
10,500	430,000	295,000
11,000	455,000	310,000
12,000	480,000	330,000

Punte elicoidali in lunghezze speciali, grandezza 3

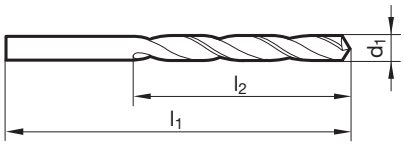
Articolo nr. 81640

P	M	K	N	S	H
•		•	•		

HSS | FN | ~25xD | DIN 1869 | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • scanalature larghe • per fori estremamente profondi • in caso di scarico truciolo insufficiente

ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	inch	l1 mm	l2 mm
3,000		240,000	160,000
3,170	1/8	250,000	170,000
3,300		250,000	170,000
3,500		265,000	180,000
3,700		265,000	180,000
4,000		280,000	190,000
4,200		280,000	190,000
4,500		295,000	200,000
5,000		315,000	210,000
5,100		315,000	210,000
5,500		330,000	225,000
6,000		330,000	225,000
6,350	1/4	350,000	235,000
6,500		350,000	235,000
6,800		370,000	250,000
7,000		370,000	250,000
7,500		370,000	250,000
8,000		390,000	265,000

d1 mm	inch	l1 mm	l2 mm
8,200		390,000	265,000
8,500		390,000	265,000
9,000		410,000	280,000
9,500		410,000	280,000
9,520	3/8	430,000	295,000
10,000		430,000	295,000
10,500		430,000	295,000
11,000		455,000	310,000
11,500		455,000	310,000
12,000		480,000	330,000
12,500		480,000	330,000
13,000		480,000	330,000

HARTNER

Punte elicoidali, extra lunghe

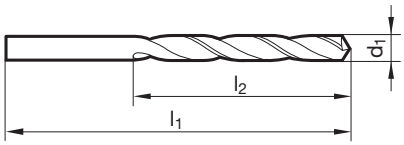
Articolo nr. 81740

P	M	K	N	S	H
•		•	•		

HSS | FN | >25xD | WN | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 6,000 • spoglia sul cono tagliente • scanalature larghe • per fori estremamente profondi • in caso di scarico truciolo insufficiente

ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	l1 mm	l2 mm
6,000	500,000	400,000
8,000	500,000	400,000
10,000	600,000	500,000
11,000	600,000	500,000
12,000	600,000	500,000

d1 mm	l1 mm	l2 mm

HARTNER

Punte elicoidali, extra lunghe

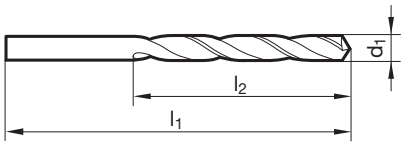
Articolo nr. 81750

P	M	K	N	S	H
•		•	•		

HSS | FN | >25xD | WN | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 8,000 • spoglia sul cono tagliente • scanalature larghe • per fori estremamente profondi • in caso di scarico truciolo insufficiente

ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	l1 mm	l2 mm
8,000	750,000	650,000
10,000	750,000	650,000
11,000	750,000	650,000
12,000	750,000	650,000

d1 mm	l1 mm	l2 mm

Punte elicoidali, extra lunghe

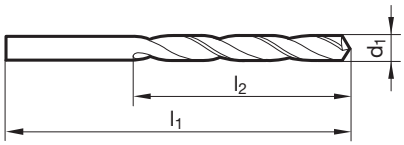
Articolo nr. 81760

P	M	K	N	S	H
•		•	•		

HSS | FN | >25xD | WN | 130° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 10,000 • spoglia sul cono tagliente • scanalature larghe • per fori estremamente profondi • in caso di scarico truciolo insufficiente

ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	l1 mm	l2 mm
10,000	1000,000	850,000
12,000	1000,000	850,000

d1 mm	l1 mm	l2 mm

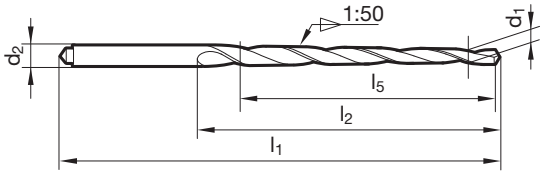
Punte per fori conici

Articolo nr. 81810

P	M	K	N	S	H
●	○	●	○		

HSS | >Ø 2,36 | N | DIN 1898 | 118° | R | Cyl

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • per fori conici • con dente di trascinamento secondo DIN 1809



d1 mm	d2 mm	l1 mm	l2 mm	l5 mm
2,000	3,150	86,000	52,000	48,000
2,500	3,150	86,000	52,000	48,000
3,000	4,000	100,000	63,000	58,000
4,000	5,000	112,000	74,000	68,000
5,000	6,300	122,000	81,000	73,000
6,000	8,000	160,000	114,000	105,000

d1 mm	d2 mm	l1 mm	l2 mm	l5 mm
8,000	10,000	207,000	157,000	145,000
10,000	12,500	245,000	190,000	175,000
12,000	16,000	290,000	228,000	228,500

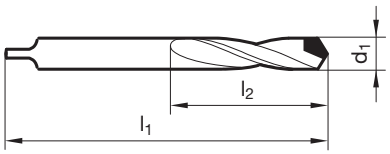
Punte speciali, con taglienti in MD

Articolo nr. 89303

P	M	K	N	S	H
○		○			○

HM | ◯ | N | DIN 8038 | 85° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 3,100 • affilatura su piani • con riporti in MD • con dente di trascinamento secondo DIN 1809
materie sintetiche a fibre vetrose • altri materiali che esercitano un'azione abrasiva sui taglienti e sulle fasi della punta



d1 mm	l1 mm	l2 mm
3,100	56,000	25,000
3,200	56,000	25,000
4,200	63,000	28,000
5,000	63,000	28,000
5,500	71,000	32,000
6,000	71,000	32,000

d1 mm	l1 mm	l2 mm
8,000	80,000	40,000

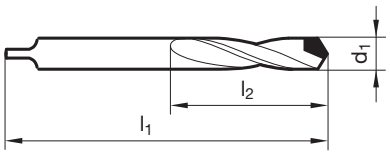
Punte speciali, con taglienti in MD

Articolo nr. 89301

P	M	K	N	S	H
○		○			○

HM | N | DIN 8037 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 2,600 • affilatura su piani • con riporti in MD • con dente di trascinamento secondo DIN 1809
acciaio per nastri per molle • ghisa conchigliata con oltre 300 HB • molibdeno puro • bronzi duri



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
2,600	50,000	20,000	7,700	80,000	40,000
3,000	50,000	20,000	7,800	80,000	40,000
3,100	56,000	25,000	8,000	80,000	40,000
3,200	56,000	25,000	8,200	90,000	50,000
3,300	56,000	25,000	8,400	90,000	50,000
3,500	56,000	25,000	8,500	90,000	50,000
3,700	56,000	25,000	8,600	90,000	50,000
3,800	56,000	25,000	8,800	90,000	50,000
3,900	56,000	25,000	9,000	90,000	50,000
4,000	56,000	25,000	9,500	90,000	50,000
4,100	63,000	28,000	9,600	100,000	56,000
4,200	63,000	28,000	9,700	100,000	56,000
4,300	63,000	28,000	9,800	100,000	56,000
4,400	63,000	28,000	10,000	100,000	56,000
4,500	63,000	28,000	10,200	100,000	56,000
4,800	63,000	28,000	10,500	100,000	56,000
4,900	63,000	28,000	11,000	100,000	56,000
5,000	63,000	28,000	11,500	112,000	63,000
5,100	71,000	32,000	12,000	112,000	63,000
5,200	71,000	32,000	12,500	112,000	63,000
5,300	71,000	32,000	13,000	112,000	63,000
5,400	71,000	32,000	13,500	125,000	71,000
5,500	71,000	32,000	14,000	125,000	71,000
5,800	71,000	32,000	14,500	125,000	71,000
6,000	71,000	32,000	15,000	125,000	71,000
6,200	71,000	32,000	15,500	140,000	80,000
6,300	71,000	32,000	16,000	140,000	80,000
6,400	71,000	32,000	16,500	140,000	80,000
6,500	71,000	32,000	17,000	140,000	80,000
6,700	80,000	40,000	17,500	160,000	90,000
6,800	80,000	40,000	18,000	160,000	90,000
7,000	80,000	40,000	18,500	160,000	90,000
7,100	80,000	40,000	19,000	160,000	90,000
7,200	80,000	40,000	19,500	160,000	90,000
7,400	80,000	40,000	20,000	160,000	90,000
7,500	80,000	40,000			

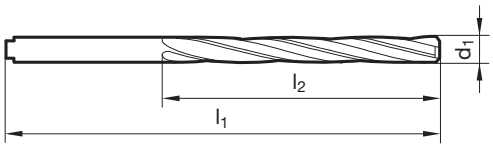
Allargatori cilindrici

Articolo nr. 86010

P	M	K	N	S	H
●	○	●	○		

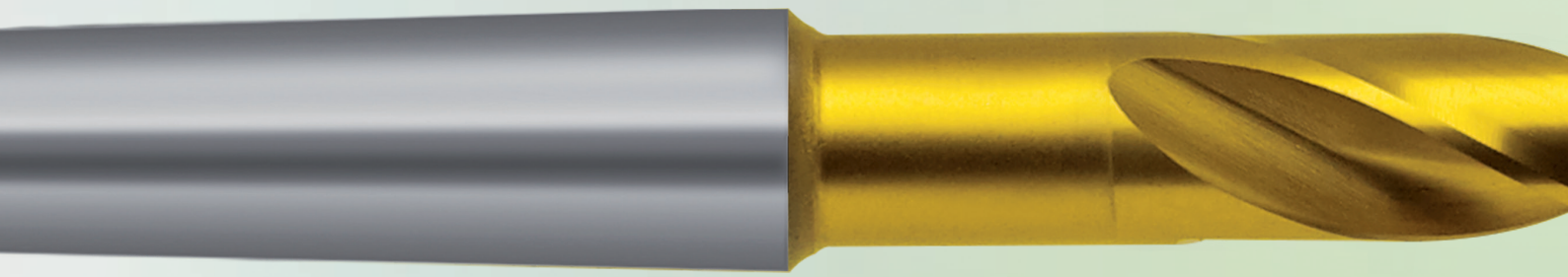
HSS | N | DIN 344 | 120° | R | Cyl

spoglia sul cono tagliente • stabilità elevata • con dente di trascinamento secondo DIN 1809 • per fori prefusi, precolati, preforati • corregge la precisione di allineamento • corregge la mancanza di rotondità • finitura di superf. del foro migliorata • ø imbocco < al foro da praticare • considerare la quota “d0” come misura più piccola del foro pilota



d1 mm	inch	d0 mm	l1 mm	l2 mm
3,800		2,8	96,000	64,000
4,000		2,8	96,000	64,000
4,750		3,2	102,000	69,000
4,800		3,5	108,000	74,000
4,900		3,5	108,000	74,000
5,000		3,5	108,000	74,000
5,800		4,2	116,000	80,000
6,000		4,2	116,000	80,000
6,200		4,2	124,000	86,000
6,400		4,2	124,000	86,000
6,800		4,9	133,000	93,000
7,500		4,9	133,000	93,000
7,700		5,6	142,000	100,000
7,800		5,6	142,000	100,000
7,850		5,6	142,000	100,000
8,000		5,6	142,000	100,000
8,050		5,6	142,000	100,000
8,200		5,6	142,000	100,000
8,300		5,6	142,000	100,000
8,600		6,3	151,000	107,000
9,400		6,3	151,000	107,000
9,600		7,0	162,000	116,000
9,800		7,0	162,000	116,000
10,000		7,0	162,000	116,000

d1 mm	inch	d0 mm	l1 mm	l2 mm
10,200		7,0	162,000	116,000
10,500		7,0	162,000	116,000
10,600		7,0	162,000	116,000
11,000		7,7	173,000	125,000
11,300		7,7	173,000	125,000
11,750		8,4	184,000	134,000
12,000		8,4	184,000	134,000
12,700		9,1	184,000	134,000
12,750		9,1	184,000	134,000
13,000		9,1	184,000	134,000
13,500		9,8	194,000	142,000
13,750		9,8	194,000	142,000
14,000		9,8	194,000	142,000
14,750		10,5	202,000	147,000
15,000		10,5	202,000	147,000



HARTNER

Precision Cutting Tools

PUNTE ELICOIDALI CON CODOLO CONO MORSE

in HSS, HSS-E, con riporti in MD
lucide e ricoperte

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina

Punte elicoidali

						DIN 345	N	HSS	●	destra	CM	~5xD	3,000 - 70,000	**82010**	158

						DIN 345	W	HSS	○	destra	CM	~5xD	6,800 - 30,500	**82030**	157

						DIN 345	N	HSS	T	destra	CM	~5xD	5,500 - 30,000	**84460**	160

						DIN 345	N	HSS-E	●	destra	CM	~5xD	5,000 - 50,000	**82011**	161

						DIN 345	IS	HSS-E	○	destra	CM	~5xD	11,500 - 32,000	**82012**	162

						DIN 345	FN	HSS-E	A	destra	CM	~5xD	14,200 - 28,000	**84660**	163

						DIN 345	N	HSS-E	T	destra	CM	~5xD	8,000 - 31,000	**84859**	164

Punte elicoidali, corte

						Norma di fab.	V	HSS-E	○	destra	CM	~3xD	10,000 - 38,000	**82971**	166

						Norma di fab.	IS	HSS-E	○	destra	CM	~3xD	10,000 - 29,000	**82972**	165

Punte per centri CN

						Norma di fab.	N	HSS	○	destra	CM		12,000 - 25,000	**82191**	167

						Norma di fab.	N	HSS	○	destra	CM		12,000 - 25,000	**82192**	167

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina
Punte elicoidali, lunghe															
●		●	○			DIN 341	N	**HSS**	⬤	destra	CM	~10xD	4,000 - 50,000	**82210**	168
●	○	●	●	○		DIN 341	N	**HSS-E**	⬤	destra	CM	~10xD	5,000 - 30,000	**82211**	169
Punte elicoidali in lunghezze speciali, grandezza 1															
●		●	○			DIN 1870	N	**HSS**	⬤	destra	CM	~15xD	8,500 - 33,000	**82310**	170
●		●	●			DIN 1870	FN	**HSS**	⬤ ≥Ø 16,0	destra	CM	~15xD	8,000 - 30,000	**82340**	171
●	●	●	●	●	○	DIN 1870	FN	**HSS-E**	⬤ ≥Ø 16,0	destra	CM	~15xD	10,000 - 17,000	**82341**	172
Punte elicoidali in lunghezze speciali, grandezza 2															
●		●	○			DIN 1870	N	**HSS**	⬤	destra	CM	~20xD	8,500 - 49,000	**82410**	173
●		●	●			DIN 1870	FN	**HSS**	⬤ ≥Ø 16,0	destra	CM	~20xD	8,000 - 30,000	**82440**	174
Punte elicoidali, extra lunghe															
●		●	●			Norma di fab.	FN	**HSS**	⬤ ≥Ø 16,0	destra	CM	>20xD	8,000 - 20,000	**82466**	175
●		●	●			Norma di fab.	FN	**HSS**	⬤ ≥Ø 16,0	destra	CM	>20xD	14,000 - 38,000	**82467**	176
●		●	●			Norma di fab.	FN	**HSS**	○	destra	CM	>20xD	14,000 - 18,000	**82468**	177
●		●	●			Norma di fab.	FN	**HSS**	○	destra	CM	>20xD	15,000 - 18,000	**82469**	178

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina

Punte con canali di lubrificazione tipo lungo

●	○	●	●	○		Norma di fab.	N	HSS	◯	destra	CM	~10xD	10,000 - 40,000	**82521**	180

●		●	●			Norma di fab.	FN	HSS	◯	destra	CM	~10xD	10,000 - 20,000	**82535**	179

●	●	●	●	●	○	Norma di fab.	FN	HSS-E	◯	destra	CM	~10xD	15,000 - 32,500	**82525**	181

Punte con canali di lubrificazione tipo extra-lungo

●	●	●	●	●	○	Norma di fab.	FN	HSS-E	◯	destra	CM	~15xD	14,000 - 29,000	**82515**	182

Punte speciali, con taglienti in MD

○		○			○	DIN 8041	N	Metallo duro	◯	destra	CM		8,500 - 40,000	**89302**	183

Allargatori con attacco cono morse

●	○	●	○			DIN 343	N	HSS	◯	destra	CM		8,600 - 40,000	**86110**	184

●	○	●	●	○		DIN 343	N	HSS-E	◯	destra	CM		12,000 - 22,000	**86111**	185

Punte per fori conici

●	○	●	○			DIN 1898	N	HSS	◯	destra	CM		5,000 - 20,000	**82810**	186

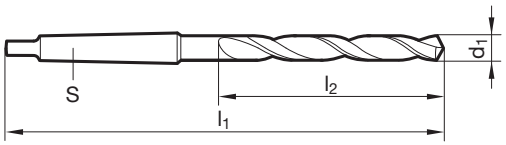
Punte elicoidali

Articolo nr. 82030

P	M	K	N	S	H
			•		

HSS | W | ~5xD | DIN 345 | 130° | h8 | R | MK

Assott. del nocc. ≥ Ø 15,000 • spoglia sul cono tagliente
materiali teneri a truciolo lungo • alluminio, leghe di alluminio (a truciolo lungo) • zinco, rame affinato, silumin, elektron



d1 mm	S	l1 mm	l2 mm
6,800	MK-1	150,000	69,000
9,000	MK-1	162,000	81,000
9,500	MK-1	162,000	81,000
10,000	MK-1	168,000	87,000
10,200	MK-1	168,000	87,000
12,000	MK-1	182,000	101,000

d1 mm	S	l1 mm	l2 mm
15,000	MK-2	212,000	114,000
19,000	MK-2	233,000	135,000
24,300	MK-3	281,000	160,000
30,500	MK-3	301,000	180,000

Punte elicoidali

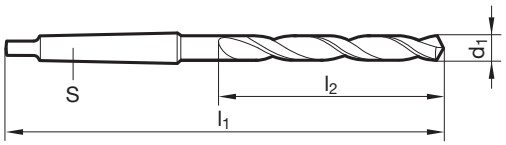
Articolo nr. 82010

P	M	K	N	S	H
•		•	○		

HSS | N | ~5xD | DIN 345 | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 14,100 • spoglia sul cono tagliente

acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato, alpacca e grafite



d1 mm	inch	S	l1 mm	l2 mm	d1 mm	inch	S	l1 mm	l2 mm
3,000		MK-1	114,000	33,000	10,200		MK-1	168,000	87,000
3,300		MK-1	117,000	36,000	10,250		MK-1	168,000	87,000
3,600		MK-1	120,000	39,000	10,300		MK-1	168,000	87,000
3,750		MK-1	120,000	39,000	10,500		MK-1	168,000	87,000
4,000		MK-1	124,000	43,000	10,600		MK-1	168,000	87,000
4,100		MK-1	124,000	43,000	10,700		MK-1	175,000	94,000
4,200		MK-1	124,000	43,000	10,750		MK-1	175,000	94,000
4,250		MK-1	124,000	43,000	10,800		MK-1	175,000	94,000
4,500		MK-1	128,000	47,000	11,000		MK-1	175,000	94,000
4,900		MK-1	133,000	52,000	11,100		MK-1	175,000	94,000
5,000		MK-1	133,000	52,000	11,200		MK-1	175,000	94,000
5,200		MK-1	133,000	52,000	11,250		MK-1	175,000	94,000
5,500		MK-1	138,000	57,000	11,500		MK-1	175,000	94,000
5,700		MK-1	138,000	57,000	11,750		MK-1	175,000	94,000
6,000		MK-1	138,000	57,000	11,800		MK-1	175,000	94,000
6,200		MK-1	144,000	63,000	12,000		MK-1	182,000	101,000
6,500		MK-1	144,000	63,000	12,100		MK-1	182,000	101,000
6,600		MK-1	144,000	63,000	12,200		MK-1	182,000	101,000
6,700		MK-1	144,000	63,000	12,250		MK-1	182,000	101,000
6,750	17/64	MK-1	150,000	69,000	12,500		MK-1	182,000	101,000
6,800		MK-1	150,000	69,000	12,750		MK-1	182,000	101,000
7,000		MK-1	150,000	69,000	12,800		MK-1	182,000	101,000
7,250		MK-1	150,000	69,000	13,000		MK-1	182,000	101,000
7,500		MK-1	150,000	69,000	13,200		MK-1	182,000	101,000
7,800		MK-1	156,000	75,000	13,250		MK-1	189,000	108,000
7,900		MK-1	156,000	75,000	13,490	17/32	MK-1	189,000	108,000
8,000		MK-1	156,000	75,000	13,500		MK-1	189,000	108,000
8,100		MK-1	156,000	75,000	13,750		MK-1	189,000	108,000
8,200		MK-1	156,000	75,000	13,800		MK-1	189,000	108,000
8,400		MK-1	156,000	75,000	14,000		MK-1	189,000	108,000
8,500		MK-1	156,000	75,000	14,100		MK-2	212,000	114,000
8,700		MK-1	162,000	81,000	14,200		MK-2	212,000	114,000
8,750		MK-1	162,000	81,000	14,250		MK-2	212,000	114,000
8,800		MK-1	162,000	81,000	14,300		MK-2	212,000	114,000
9,000		MK-1	162,000	81,000	14,500		MK-2	212,000	114,000
9,200		MK-1	162,000	81,000	14,600		MK-2	212,000	114,000
9,500		MK-1	162,000	81,000	14,750		MK-2	212,000	114,000
9,700		MK-1	168,000	87,000	15,000		MK-2	212,000	114,000
9,750		MK-1	168,000	87,000	15,200		MK-2	218,000	120,000
9,800		MK-1	168,000	87,000	15,250		MK-2	218,000	120,000
10,000		MK-1	168,000	87,000	15,500		MK-2	218,000	120,000
10,100		MK-1	168,000	87,000	15,750		MK-2	218,000	120,000

Punte elicoidali

d1 mm	inch	S	l1 mm	l2 mm
15,800		MK-2	218,000	120,000
16,000		MK-2	218,000	120,000
16,100		MK-2	223,000	125,000
16,200		MK-2	223,000	125,000
16,250		MK-2	223,000	125,000
16,500		MK-2	223,000	125,000
16,750		MK-2	223,000	125,000
17,000		MK-2	223,000	125,000
17,250		MK-2	228,000	130,000
17,500		MK-2	228,000	130,000
17,750		MK-2	228,000	130,000
18,000		MK-2	228,000	130,000
18,200		MK-2	233,000	135,000
18,250		MK-2	233,000	135,000
18,500		MK-2	233,000	135,000
18,750		MK-2	233,000	135,000
19,000		MK-2	233,000	135,000
19,250		MK-2	238,000	140,000
19,500		MK-2	238,000	140,000
19,700		MK-2	238,000	140,000
19,750		MK-2	238,000	140,000
20,000		MK-2	238,000	140,000
20,100		MK-2	243,000	145,000
20,200		MK-2	243,000	145,000
20,250		MK-2	243,000	145,000
20,400		MK-2	243,000	145,000
20,500		MK-2	243,000	145,000
20,750		MK-2	243,000	145,000
21,000		MK-2	243,000	145,000
21,250		MK-2	248,000	150,000
21,500		MK-2	248,000	150,000
21,750		MK-2	248,000	150,000
22,000		MK-2	248,000	150,000
22,100		MK-2	248,000	150,000
22,200		MK-2	248,000	150,000
22,250		MK-2	248,000	150,000
22,500		MK-2	253,000	155,000
22,750		MK-2	253,000	155,000
23,000		MK-2	253,000	155,000
23,250		MK-3	276,000	155,000
23,500		MK-3	276,000	155,000
23,750		MK-3	281,000	160,000
24,000		MK-3	281,000	160,000
24,250		MK-3	281,000	160,000
24,500		MK-3	281,000	160,000
24,750		MK-3	281,000	160,000
25,000	63/64	MK-3	281,000	160,000
25,200		MK-3	286,000	165,000
25,250		MK-3	286,000	165,000
25,400	1	MK-3	286,000	165,000
25,500		MK-3	286,000	165,000
25,750		MK-3	286,000	165,000
25,800	1 1/64	MK-3	286,000	165,000
26,000		MK-3	286,000	165,000
26,250		MK-3	286,000	165,000
26,500		MK-3	286,000	165,000
27,000		MK-3	291,000	170,000
27,250		MK-3	291,000	170,000
27,500		MK-3	291,000	170,000
27,750		MK-3	291,000	170,000
28,000		MK-3	291,000	170,000
28,250		MK-3	296,000	175,000
28,500		MK-3	296,000	175,000
28,750		MK-3	296,000	175,000
29,000		MK-3	296,000	175,000
29,250		MK-3	296,000	175,000
29,500		MK-3	296,000	175,000
29,750		MK-3	296,000	175,000
30,000		MK-3	296,000	175,000
30,250		MK-3	301,000	180,000
30,500		MK-3	301,000	180,000
30,600		MK-3	301,000	180,000
30,750		MK-3	301,000	180,000
31,000		MK-3	301,000	180,000
31,250		MK-3	301,000	180,000
31,500		MK-3	301,000	180,000
31,750	1 1/4	MK-3	306,000	185,000
32,000		MK-4	334,000	185,000
32,500		MK-4	334,000	185,000
33,000		MK-4	334,000	185,000
33,500		MK-4	334,000	185,000
34,000		MK-4	339,000	190,000
34,500		MK-4	339,000	190,000
35,000		MK-4	339,000	190,000
35,500		MK-4	339,000	190,000
36,000		MK-4	344,000	195,000
36,500		MK-4	344,000	195,000
37,000		MK-4	344,000	195,000
37,500		MK-4	344,000	195,000
38,000		MK-4	349,000	200,000
38,500	1 33/64	MK-4	349,000	200,000
39,000		MK-4	349,000	200,000
39,500		MK-4	349,000	200,000
40,000		MK-4	349,000	200,000
40,500		MK-4	354,000	205,000
41,000		MK-4	354,000	205,000
41,500		MK-4	354,000	205,000
42,000		MK-4	354,000	205,000
42,500		MK-4	354,000	205,000
43,000		MK-4	359,000	210,000
43,500		MK-4	359,000	210,000
44,000		MK-4	359,000	210,000
44,500		MK-4	359,000	210,000
45,000		MK-4	359,000	210,000
45,500		MK-4	364,000	215,000
46,000		MK-4	364,000	215,000
46,500		MK-4	364,000	215,000
47,000		MK-4	364,000	215,000
47,500		MK-4	364,000	215,000
48,000		MK-4	369,000	220,000
48,500		MK-4	369,000	220,000
49,000		MK-4	369,000	220,000
49,500		MK-4	369,000	220,000
50,000		MK-4	369,000	220,000
50,500		MK-4	374,000	225,000
50,800	2	MK-4	374,000	225,000
51,000		MK-5	412,000	225,000
52,000		MK-5	412,000	225,000
53,000		MK-5	412,000	225,000
54,000		MK-5	417,000	230,000
55,000		MK-5	417,000	230,000
56,000		MK-5	417,000	230,000
56,500		MK-5	422,000	235,000
57,000		MK-5	422,000	235,000
58,000		MK-5	422,000	235,000
59,000		MK-5	422,000	235,000
60,000		MK-5	422,000	235,000
63,000		MK-5	427,000	240,000
65,000		MK-5	432,000	245,000
70,000		MK-5	437,000	250,000

Punte elicoidali

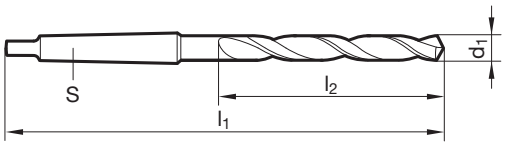
Articolo nr. 84460

P	M	K	N	S	H
•		•	○		

HSS | T | N | ~5xD | DIN 345 | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 5,500 • spoglia sul cono tagliente

acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato e grafite



d1 mm	inch	S	l1 mm	l2 mm	d1 mm	inch	S	l1 mm	l2 mm
5,500		MK-1	138,000	57,000	15,500		MK-2	218,000	120,000
6,000		MK-1	138,000	57,000	16,000		MK-2	218,000	120,000
6,800		MK-1	150,000	69,000	16,250		MK-2	223,000	125,000
8,000		MK-1	156,000	75,000	16,500		MK-2	223,000	125,000
8,200		MK-1	156,000	75,000	16,750		MK-2	223,000	125,000
8,500		MK-1	156,000	75,000	17,000		MK-2	223,000	125,000
8,800		MK-1	162,000	81,000	17,250		MK-2	228,000	130,000
9,000		MK-1	162,000	81,000	17,500		MK-2	228,000	130,000
9,200		MK-1	162,000	81,000	18,000		MK-2	228,000	130,000
9,500		MK-1	162,000	81,000	18,500		MK-2	233,000	135,000
9,800		MK-1	168,000	87,000	19,000		MK-2	233,000	135,000
10,000		MK-1	168,000	87,000	19,500		MK-2	238,000	140,000
10,200		MK-1	168,000	87,000	20,000		MK-2	238,000	140,000
10,250		MK-1	168,000	87,000	20,400		MK-2	243,000	145,000
10,500		MK-1	168,000	87,000	20,500		MK-2	243,000	145,000
10,750		MK-1	175,000	94,000	20,750		MK-2	243,000	145,000
11,000		MK-1	175,000	94,000	21,000		MK-2	243,000	145,000
11,250		MK-1	175,000	94,000	21,250		MK-2	248,000	150,000
11,500		MK-1	175,000	94,000	21,750		MK-2	248,000	150,000
11,750		MK-1	175,000	94,000	22,000		MK-2	248,000	150,000
12,000		MK-1	182,000	101,000	22,500		MK-2	253,000	155,000
12,250		MK-1	182,000	101,000	23,000		MK-2	253,000	155,000
12,500		MK-1	182,000	101,000	24,000		MK-3	281,000	160,000
12,750		MK-1	182,000	101,000	24,500		MK-3	281,000	160,000
12,800		MK-1	182,000	101,000	25,000	63/64	MK-3	281,000	160,000
13,000		MK-1	182,000	101,000	25,500		MK-3	286,000	165,000
13,250		MK-1	189,000	108,000	26,000		MK-3	286,000	165,000
13,500		MK-1	189,000	108,000	26,500		MK-3	286,000	165,000
13,750		MK-1	189,000	108,000	27,000		MK-3	291,000	170,000
14,000		MK-1	189,000	108,000	28,000		MK-3	291,000	170,000
14,200		MK-2	212,000	114,000	28,500		MK-3	296,000	175,000
14,250		MK-2	212,000	114,000	29,000		MK-3	296,000	175,000
14,500		MK-2	212,000	114,000	29,500		MK-3	296,000	175,000
14,750		MK-2	212,000	114,000	30,000		MK-3	296,000	175,000
15,000		MK-2	212,000	114,000					
15,250		MK-2	218,000	120,000					

Punte elicoidali

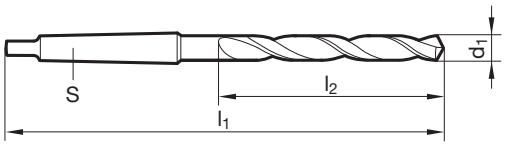
Articolo nr. 82011

P	M	K	N	S	H
●	○	●	○		

HSS-E | N | ~5xD | DIN 345 | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 5,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura

acciai legati e non legati e tipi di ghisa con R superiore a 800 N/mm² • acciai per lavorazioni a caldo e a freddo • acciai per cuscinetti • acciai legati in alta percentuale • acciai da bonifica e da cementazione



d1 mm	inch	S	l1 mm	l2 mm
5,000		MK-1	133,000	52,000
6,000		MK-1	138,000	57,000
7,000		MK-1	150,000	69,000
7,500		MK-1	150,000	69,000
8,000		MK-1	156,000	75,000
8,500		MK-1	156,000	75,000
9,000		MK-1	162,000	81,000
9,500		MK-1	162,000	81,000
10,000		MK-1	168,000	87,000
10,250		MK-1	168,000	87,000
10,500		MK-1	168,000	87,000
11,000		MK-1	175,000	94,000
11,200		MK-1	175,000	94,000
11,500		MK-1	175,000	94,000
12,000		MK-1	182,000	101,000
12,200		MK-1	182,000	101,000
12,250		MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
12,750		MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
13,500		MK-1	189,000	108,000
13,800		MK-1	189,000	108,000
14,000		MK-1	189,000	108,000
14,200		MK-2	212,000	114,000
14,290	9/16	MK-2	212,000	114,000
14,500		MK-2	212,000	114,000
14,750		MK-2	212,000	114,000
15,000		MK-2	212,000	114,000
15,250		MK-2	218,000	120,000
15,500		MK-2	218,000	120,000
15,750		MK-2	218,000	120,000
16,000		MK-2	218,000	120,000
16,250		MK-2	223,000	125,000
16,500		MK-2	223,000	125,000
16,750		MK-2	223,000	125,000
17,000		MK-2	223,000	125,000
17,250		MK-2	228,000	130,000
17,460	11/16	MK-2	228,000	130,000
17,500		MK-2	228,000	130,000
17,750		MK-2	228,000	130,000
18,000		MK-2	228,000	130,000
18,200		MK-2	233,000	135,000

d1 mm	inch	S	l1 mm	l2 mm
18,500		MK-2	233,000	135,000
19,000		MK-2	233,000	135,000
19,050	3/4	MK-2	238,000	140,000
19,500		MK-2	238,000	140,000
20,000		MK-2	238,000	140,000
20,250		MK-2	243,000	145,000
20,500		MK-2	243,000	145,000
20,750		MK-2	243,000	145,000
21,000		MK-2	243,000	145,000
21,500		MK-2	248,000	150,000
22,000		MK-2	248,000	150,000
22,500		MK-2	253,000	155,000
23,000		MK-2	253,000	155,000
23,500		MK-3	276,000	155,000
24,000		MK-3	281,000	160,000
24,500		MK-3	281,000	160,000
25,000	63/64	MK-3	281,000	160,000
25,250		MK-3	286,000	165,000
25,500		MK-3	286,000	165,000
26,000		MK-3	286,000	165,000
26,500		MK-3	286,000	165,000
27,000		MK-3	291,000	170,000
27,500		MK-3	291,000	170,000
28,000		MK-3	291,000	170,000
28,500		MK-3	296,000	175,000
28,570	1 1/8	MK-3	296,000	175,000
29,000		MK-3	296,000	175,000
29,500		MK-3	296,000	175,000
30,000		MK-3	296,000	175,000
31,000		MK-3	301,000	180,000
31,500		MK-3	301,000	180,000
32,000		MK-4	334,000	185,000
33,000		MK-4	334,000	185,000
34,000		MK-4	339,000	190,000
35,000		MK-4	339,000	190,000
36,000		MK-4	344,000	195,000
38,000		MK-4	349,000	200,000
40,000		MK-4	349,000	200,000
50,000		MK-4	369,000	220,000

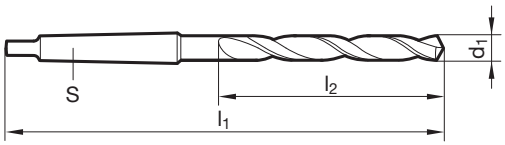
Punte elicoidali

Articolo nr. 82012

P	M	K	N	S	H
○	●		○	○	

HSS-E | IS | ~5xD | DIN 345 | 130° | h8 | R | MK

punta per INOX • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura
acciai inossidabili, resistenti al calore ed austenitici (V2A e V4A)



d1 mm	S	l1 mm	l2 mm
11,500	MK-1	175,000	94,000
12,000	MK-1	182,000	101,000
14,000	MK-1	189,000	108,000
15,000	MK-2	212,000	114,000
15,500	MK-2	218,000	120,000
16,000	MK-2	218,000	120,000
16,500	MK-2	223,000	125,000
17,000	MK-2	223,000	125,000
17,250	MK-2	228,000	130,000
17,500	MK-2	228,000	130,000
18,000	MK-2	228,000	130,000
18,500	MK-2	233,000	135,000
19,500	MK-2	238,000	140,000
20,000	MK-2	238,000	140,000
20,500	MK-2	243,000	145,000
21,000	MK-2	243,000	145,000
22,000	MK-2	248,000	150,000
22,500	MK-2	253,000	155,000

d1 mm	S	l1 mm	l2 mm
23,000	MK-2	253,000	155,000
26,000	MK-3	286,000	165,000
27,500	MK-3	291,000	170,000
28,000	MK-3	291,000	170,000
29,000	MK-3	296,000	175,000
29,500	MK-3	296,000	175,000
31,500	MK-3	301,000	180,000
32,000	MK-4	334,000	185,000

Punte elicoidali

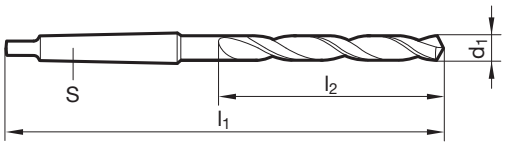
Articolo nr. 84660

P	M	K	N	S	H
○		●	○		

HSS-E | A | FN | ~5xD | DIN 345 | 130° | h8 | R | MK

Assott. del nocc. ≥ Ø 14,200 • spoglia sul cono tagliente • scanalature larghe • acciaio HSS legato al Co • massima resistenza all'usura • specifiche per prof. di foro oltre 3xD

acciai legati e non legati e tipi di ghisa con R superiore a 1000 N/mm² • acciai per lavorazioni a caldo e a freddo • acciai per cuscinetti • acciai legati in alta percentuale • acciai da bonifica e da cementazione



d1 mm	S	l1 mm	l2 mm
14,200	MK-2	212,000	114,000
14,500	MK-2	212,000	114,000
19,000	MK-2	233,000	135,000
19,500	MK-2	238,000	140,000
24,500	MK-3	281,000	160,000
28,000	MK-3	291,000	170,000

d1 mm	S	l1 mm	l2 mm

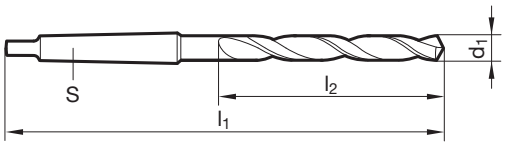
Punte elicoidali

Articolo nr. 84859

P	M	K	N	S	H
●	○	●	○		

HSS-E | T | N | ~5xD | DIN 345 | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 8,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura acciai legati e non legati e tipi di ghisa con R superiore a 800 N/mm² • acciai per lavorazioni a caldo e a freddo • acciai per cuscinetti • acciai legati in alta percentuale • acciai da bonifica e da cementazione



d1 mm	S	l1 mm	l2 mm	d1 mm	S	l1 mm	l2 mm
8,000	MK-1	156,000	75,000				
14,000	MK-1	189,000	108,000				
23,000	MK-2	253,000	155,000				
24,500	MK-3	281,000	160,000				
31,000	MK-3	301,000	180,000				

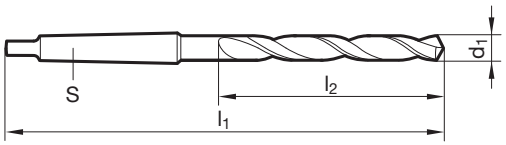
Punte elicoidali, corte

Articolo nr. 82972

P	M	K	N	S	H
○	●		○	○	

HSS-E | IS | ~3xD | WN | 130° | h8 | R | MK

punta per INOX • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura
acciai inossidabili, resistenti al calore ed austenitici (V2A e V4A)



d1 mm	S	l1 mm	l2 mm
10,000	MK-1	138,000	57,000
10,500	MK-1	138,000	57,000
10,800	MK-1	142,000	61,000
11,200	MK-1	142,000	61,000
12,500	MK-1	147,000	66,000
13,200	MK-1	147,000	66,000

d1 mm	S	l1 mm	l2 mm
21,500	MK-3	219,000	98,000
29,000	MK-4	263,000	114,000

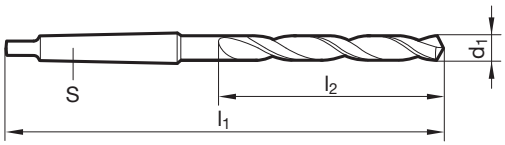
Punte elicoidali, corte

Articolo nr. 82971

P	M	K	N	S	H
●	●	●	○	●	○

HSS-E | V | ~3xD | WN | 130° | h8 | R | MK

Assott. del nocc. ≥ Ø 10,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura materiali difficili da lavorare • acciai inossidabili e resist. al calore • acciai per molle, acciai austenitici



d1 mm	S	l1 mm	l2 mm
10,000	MK-1	138,000	57,000
10,200	MK-1	138,000	57,000
10,500	MK-1	138,000	57,000
11,000	MK-1	142,000	61,000
11,500	MK-1	142,000	61,000
11,800	MK-1	142,000	61,000
12,000	MK-1	147,000	66,000
12,500	MK-1	147,000	66,000
13,000	MK-1	147,000	66,000
13,500	MK-2	168,000	70,000
14,000	MK-2	168,000	70,000
14,500	MK-2	172,000	74,000
15,000	MK-2	172,000	74,000
15,500	MK-2	176,000	78,000
16,000	MK-2	176,000	78,000
17,000	MK-2	179,000	81,000
17,500	MK-2	183,000	85,000
18,000	MK-2	183,000	85,000

d1 mm	S	l1 mm	l2 mm
18,500	MK-2	186,000	88,000
19,000	MK-2	186,000	88,000
20,000	MK-3	212,000	91,000
21,000	MK-3	216,000	95,000
21,500	MK-3	219,000	98,000
22,000	MK-3	219,000	98,000
23,000	MK-3	222,000	101,000
24,000	MK-3	225,000	104,000
25,000	MK-3	225,000	104,000
26,000	MK-4	256,000	107,000
26,500	MK-4	256,000	107,000
27,000	MK-4	259,000	110,000
28,000	MK-4	259,000	110,000
29,000	MK-4	263,000	114,000
38,000	MK-5	317,000	130,000

Punte per centri CN

Articolo nr. 82192

P	M	K	N	S	H
●	○	●	●	○	

HSS | N | WN | 90° | h6 | R | MK

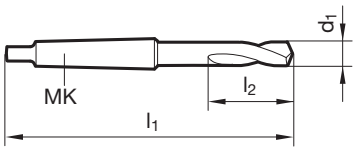
spoglia sul cono tagliente • adatte solo per centrare • stabilità elevata

Articolo nr. 82191

P	M	K	N	S	H
●	○	●	●	○	

HSS | N | WN | 120° | h6 | R | MK

spoglia sul cono tagliente • adatte solo per centrare • stabilità elevata



d1 mm	inch	S	l1 mm	l2 mm
12,000		MK-1	122,000	30,000
16,000		MK-2	148,000	37,500
20,000		MK-2	148,000	45,000
25,000		MK-3	171,000	53,000

d1 mm	inch	S	l1 mm	l2 mm

Punte elicoidali, lunghe

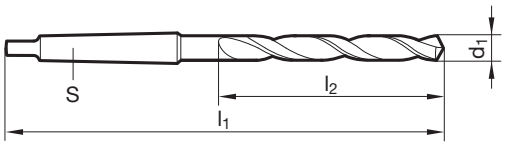
Articolo nr. 82210

P	M	K	N	S	H
●		●	○		

HSS | N | ~10xD | DIN 341 | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 14,500 • spoglia sul cono tagliente • per forare con bussola di guida

acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato, alpacca e grafite



d1 mm	inch	S	l1 mm	l2 mm
4,000		MK-1	145,000	64,000
4,200		MK-1	145,000	64,000
5,000		MK-1	155,000	74,000
5,200		MK-1	155,000	74,000
5,500		MK-1	161,000	80,000
5,800		MK-1	161,000	80,000
6,000		MK-1	161,000	80,000
6,800		MK-1	174,000	93,000
7,000		MK-1	174,000	93,000
7,800		MK-1	181,000	100,000
8,000		MK-1	181,000	100,000
8,200		MK-1	181,000	100,000
8,500		MK-1	181,000	100,000
9,000		MK-1	188,000	107,000
9,900		MK-1	197,000	116,000
10,000		MK-1	197,000	116,000
10,200		MK-1	197,000	116,000
10,500		MK-1	197,000	116,000
11,000		MK-1	206,000	125,000
11,500		MK-1	206,000	125,000
11,800		MK-1	206,000	125,000
12,000		MK-1	215,000	134,000
12,500		MK-1	215,000	134,000
13,000		MK-1	215,000	134,000
13,500		MK-1	223,000	142,000
13,750		MK-1	223,000	142,000
14,000		MK-1	223,000	142,000
14,500		MK-2	245,000	147,000
15,000		MK-2	245,000	147,000
15,500		MK-2	251,000	153,000
15,750		MK-2	251,000	153,000
16,000		MK-2	251,000	153,000
16,400		MK-2	257,000	159,000
16,500		MK-2	257,000	159,000
17,000		MK-2	257,000	159,000
17,500		MK-2	263,000	165,000
18,000		MK-2	263,000	165,000
18,750		MK-2	269,000	171,000
19,000		MK-2	269,000	171,000
19,500		MK-2	275,000	177,000
20,000		MK-2	275,000	177,000
20,500		MK-2	282,000	184,000
21,000		MK-2	282,000	184,000
21,400		MK-2	289,000	191,000
21,500		MK-2	289,000	191,000
22,000		MK-2	289,000	191,000
22,500		MK-2	296,000	198,000
23,000		MK-2	296,000	198,000
23,250		MK-3	319,000	198,000
24,000		MK-3	327,000	206,000
24,500		MK-3	327,000	206,000
25,000	63/64	MK-3	327,000	206,000
25,500		MK-3	335,000	214,000
26,000		MK-3	335,000	214,000
26,500		MK-3	335,000	214,000
27,000		MK-3	343,000	222,000
27,500		MK-3	343,000	222,000
28,000		MK-3	343,000	222,000
29,000		MK-3	351,000	230,000
29,500		MK-3	351,000	230,000
30,000		MK-3	351,000	230,000
31,000		MK-3	360,000	239,000
32,000		MK-4	397,000	248,000
33,000		MK-4	397,000	248,000
34,000		MK-4	406,000	257,000
35,000		MK-4	406,000	257,000
36,000		MK-4	416,000	267,000
38,000		MK-4	426,000	277,000
39,000		MK-4	426,000	277,000
39,500		MK-4	426,000	277,000
40,000		MK-4	426,000	277,000
41,000		MK-4	436,000	287,000
42,000		MK-4	436,000	287,000
44,000		MK-4	447,000	298,000
45,000		MK-4	447,000	298,000
48,000		MK-4	470,000	321,000
49,000		MK-4	470,000	321,000
50,000		MK-4	470,000	321,000

Punte elicoidali, lunghe

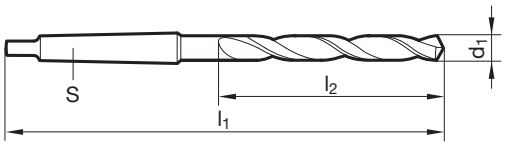
Articolo nr. 82211

P	M	K	N	S	H
●	○	●	●	○	

HSS-E | N | ~10xD | DIN 341 | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 5,000 • spoglia sul cono tagliente • acciaio HSS legato al Co • massima resistenza all'usura • per forare con bussola di guida

acciai legati e non legati e tipi di ghisa con R superiore a 800 N/mm² • acciai per lavorazioni a caldo e a freddo • acciai per cuscinetti • acciai legati in alta percentuale • acciai da bonifica e da cementazione



d1 mm	inch	S	l1 mm	l2 mm
5,000		MK-1	155,000	74,000
6,800		MK-1	174,000	93,000
8,500		MK-1	181,000	100,000
10,000		MK-1	197,000	116,000
10,200		MK-1	197,000	116,000
11,500		MK-1	206,000	125,000
12,000		MK-1	215,000	134,000
13,000		MK-1	215,000	134,000
14,000		MK-1	223,000	142,000
14,500		MK-2	245,000	147,000
16,000		MK-2	251,000	153,000
17,500		MK-2	263,000	165,000

d1 mm	inch	S	l1 mm	l2 mm
18,000		MK-2	263,000	165,000
20,000		MK-2	275,000	177,000
22,500		MK-2	296,000	198,000
23,000		MK-2	296,000	198,000
25,000	63/64	MK-3	327,000	206,000
30,000		MK-3	351,000	230,000

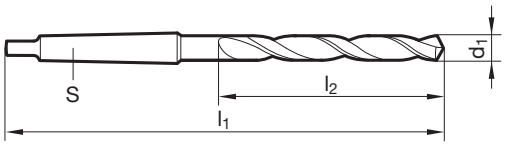
Punte elicoidali in lunghezze speciali, grandezza 1

Articolo nr. 82310

P	M	K	N	S	H
●		●	○		

HSS | N | ~15xD | DIN 1870 | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 8,500 • spoglia sul cono tagliente • per fori estremamente profondi
acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato e grafite



d1 mm	S	l1 mm	l2 mm
8,500	MK-1	265,000	165,000
9,000	MK-1	275,000	175,000
9,500	MK-1	275,000	175,000
10,000	MK-1	285,000	185,000
10,200	MK-1	285,000	185,000
11,000	MK-1	300,000	195,000
11,800	MK-1	300,000	195,000
12,500	MK-1	310,000	205,000
13,000	MK-1	310,000	205,000
14,000	MK-1	325,000	220,000
14,500	MK-2	340,000	220,000
15,000	MK-2	340,000	220,000
15,750	MK-2	355,000	230,000
15,800	MK-2	355,000	230,000
16,000	MK-2	355,000	230,000
16,250	MK-2	355,000	230,000
17,750	MK-2	370,000	245,000
18,000	MK-2	370,000	245,000

d1 mm	S	l1 mm	l2 mm
18,500	MK-2	370,000	245,000
20,000	MK-2	385,000	260,000
21,000	MK-2	385,000	260,000
22,500	MK-2	405,000	270,000
23,500	MK-3	425,000	270,000
24,000	MK-3	440,000	290,000
24,500	MK-3	440,000	290,000
25,000	MK-3	440,000	290,000
26,000	MK-3	440,000	290,000
26,500	MK-3	440,000	290,000
30,000	MK-3	460,000	305,000
30,500	MK-3	480,000	320,000
33,000	MK-4	505,000	320,000

Punte elicoidali in lunghezze speciali, grandezza 1

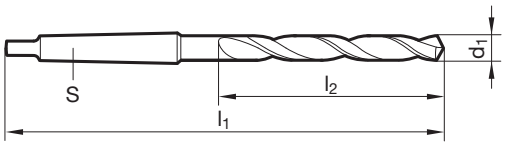
Articolo nr. 82340

P	M	K	N	S	H
•		•	•		

HSS | >Ø 16,0 | FN | ~15xD | DIN 1870 | 130° | h8 | R | MK

Assott. del nocc. ≥ Ø 8,000 • spoglia sul cono tagliente • scanalature larghe • per fori estremamente profondi • in caso di scarico truciolo insufficiente

ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	inch	S	l1 mm	l2 mm
8,000		MK-1	265,000	165,000
8,500		MK-1	265,000	165,000
8,700		MK-1	275,000	175,000
9,000		MK-1	275,000	175,000
10,000		MK-1	285,000	185,000
10,500		MK-1	285,000	185,000
11,000		MK-1	300,000	195,000
11,500		MK-1	300,000	195,000
12,000		MK-1	310,000	205,000
12,500		MK-1	310,000	205,000
13,000		MK-1	310,000	205,000
13,500		MK-1	325,000	220,000
14,000		MK-1	325,000	220,000
14,500		MK-2	340,000	220,000
15,000		MK-2	340,000	220,000
15,500		MK-2	355,000	230,000
16,000		MK-2	355,000	230,000
16,500		MK-2	355,000	230,000

d1 mm	inch	S	l1 mm	l2 mm
17,000		MK-2	355,000	230,000
17,500		MK-2	370,000	245,000
18,000		MK-2	370,000	245,000
19,000		MK-2	370,000	245,000
19,500		MK-2	385,000	260,000
20,000		MK-2	385,000	260,000
20,500		MK-2	385,000	260,000
21,000		MK-2	385,000	260,000
22,000		MK-2	405,000	270,000
23,000		MK-2	405,000	270,000
24,000		MK-3	440,000	290,000
25,000	63/64	MK-3	440,000	290,000
26,000		MK-3	440,000	290,000
28,000		MK-3	460,000	305,000
29,000		MK-3	460,000	305,000
30,000		MK-3	460,000	305,000

Punte elicoidali in lunghezze speciali, grandezza 1

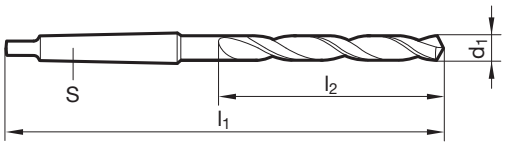
Articolo nr. 82341

P	M	K	N	S	H
●	●	●	●	●	○

HSS-E | >Ø 16,0 | FN | ~15xD | DIN 1870 | 130° | h8 | R | MK

Assott. del nocc. ≥ Ø 10,000 • spoglia sul cono tagliente • scanalature larghe • massima resistenza all'usura • acciaio HSS legato al Co • per fori estremamente profondi • in caso di scarico truciolo insufficiente

acciai e ghisa acciaiosa ad alta resistenza • ghisa grigia, ghisa malleabile, ghisa sferoidale



d1 mm	S	l1 mm	l2 mm
10,000	MK-1	285,000	185,000
14,000	MK-1	325,000	220,000
15,000	MK-2	340,000	220,000
16,500	MK-2	355,000	230,000
17,000	MK-2	355,000	230,000

d1 mm	S	l1 mm	l2 mm

Punte elicoidali in lunghezze speciali, grandezza 2

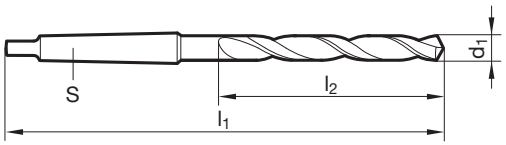
Articolo nr. 82410

P	M	K	N	S	H
•		•	○		

HSS | N | ~20xD | DIN 1870 | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 8,500 • spoglia sul cono tagliente • per fori estremamente profondi

acciaio e ghisa acciaiosa (legati e non legati) • ghisa grigia, ghisa malleabile, ghisa sferoidale • ferro sinterizzato e grafite



d1 mm	inch	S	l1 mm	l2 mm
8,500		MK-1	330,000	210,000
9,000		MK-1	345,000	220,000
9,500		MK-1	345,000	220,000
10,000		MK-1	360,000	235,000
10,500		MK-1	360,000	235,000
11,000		MK-1	375,000	250,000
13,000		MK-1	395,000	260,000
13,500		MK-1	410,000	275,000
14,000		MK-1	410,000	275,000
14,500		MK-2	425,000	275,000
15,000		MK-2	425,000	275,000
15,500		MK-2	445,000	295,000

d1 mm	inch	S	l1 mm	l2 mm
16,000		MK-2	445,000	295,000
18,000		MK-2	465,000	310,000
19,000		MK-2	465,000	310,000
20,000		MK-2	490,000	325,000
21,000		MK-2	490,000	325,000
21,500		MK-2	515,000	345,000
22,000		MK-2	515,000	345,000
23,000		MK-2	515,000	345,000
24,000		MK-3	555,000	365,000
25,000	63/64	MK-3	555,000	365,000
30,000		MK-3	580,000	385,000
49,000		MK-4	765,000	510,000

Punte elicoidali in lunghezze speciali, grandezza 2

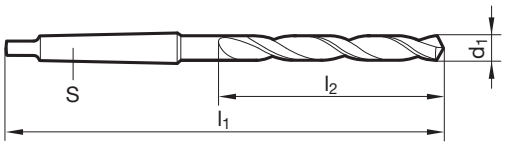
Articolo nr. 82440

P	M	K	N	S	H
•		•	•		

HSS | >Ø 16,0 | FN | ~20xD | DIN 1870 | 130° | h8 | R | MK

Assott. del nocc. ≥ Ø 8,000 • spoglia sul cono tagliente • scanalature larghe • per fori estremamente profondi • in caso di scarico truciolo insufficiente

ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	inch	S	l1 mm	l2 mm
8,000		MK-1	330,000	210,000
8,500		MK-1	330,000	210,000
9,000		MK-1	345,000	220,000
9,500		MK-1	345,000	220,000
9,800		MK-1	360,000	235,000
10,000		MK-1	360,000	235,000
10,500		MK-1	360,000	235,000
11,000		MK-1	375,000	250,000
12,000		MK-1	395,000	260,000
12,500		MK-1	395,000	260,000
13,000		MK-1	395,000	260,000
13,500		MK-1	410,000	275,000
14,000		MK-1	410,000	275,000
14,500		MK-2	425,000	275,000
15,000		MK-2	425,000	275,000
15,500		MK-2	445,000	295,000
16,000		MK-2	445,000	295,000
16,500		MK-2	445,000	295,000

d1 mm	inch	S	l1 mm	l2 mm
17,000		MK-2	445,000	295,000
17,500		MK-2	465,000	310,000
18,000		MK-2	465,000	310,000
18,500		MK-2	465,000	310,000
19,000		MK-2	465,000	310,000
19,500		MK-2	490,000	325,000
20,000		MK-2	490,000	325,000
20,500		MK-2	490,000	325,000
21,000		MK-2	490,000	325,000
22,000		MK-2	515,000	345,000
23,000		MK-2	515,000	345,000
24,000		MK-3	555,000	365,000
25,000	63/64	MK-3	555,000	365,000
26,000		MK-3	555,000	365,000
28,000		MK-3	580,000	385,000
29,000		MK-3	580,000	385,000
30,000		MK-3	580,000	385,000

Punte elicoidali, extra lunghe

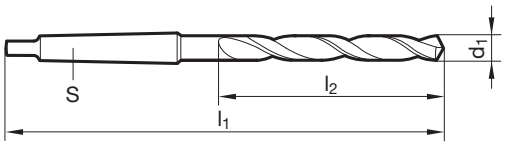
Articolo nr. 82466

P	M	K	N	S	H
•		•	•		

HSS | >Ø 16,0 | FN | >20xD | WN | 130° | h8 | R | MK

Assott. del nocc. ≥ Ø 8,000 • spoglia sul cono tagliente • scanalature larghe • per fori estremamente profondi • in caso di scarico truciolo insufficiente

ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	S	l1 mm	l2 mm
8,000	MK-1	500,000	420,000
8,500	MK-1	500,000	420,000
9,000	MK-1	500,000	420,000
10,000	MK-1	500,000	420,000
12,000	MK-1	500,000	420,000
13,000	MK-1	500,000	420,000
14,000	MK-1	500,000	420,000
15,000	MK-2	500,000	400,000
16,000	MK-2	500,000	400,000
17,000	MK-2	500,000	400,000
18,000	MK-2	500,000	400,000
19,000	MK-2	500,000	400,000
20,000	MK-2	500,000	400,000

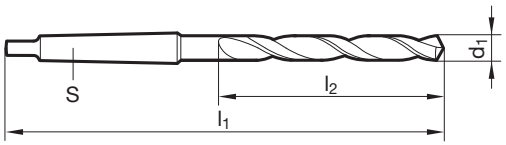
Punte elicoidali, extra lunghe

Articolo nr. 82467

P	M	K	N	S	H
•		•	•		

Assott. del nocc. ≥ Ø 14,000 • spoglia sul cono tagliente • scanalature larghe • per fori estremamente profondi • in caso di scarico truciolo insufficiente

ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	S	l1 mm	l2 mm
14,000	MK-1	600,000	500,000
15,000	MK-2	600,000	500,000
16,000	MK-2	600,000	500,000
18,000	MK-2	600,000	500,000
19,000	MK-2	600,000	500,000
20,000	MK-2	600,000	500,000
21,000	MK-2	600,000	500,000
22,000	MK-2	600,000	500,000
23,000	MK-2	600,000	500,000
24,000	MK-3	600,000	475,000
25,000	MK-3	600,000	475,000
30,000	MK-3	600,000	475,000

d1 mm	S	l1 mm	l2 mm
32,000	MK-4	600,000	450,000
38,000	MK-4	600,000	450,000

Punte elicoidali, extra lunghe

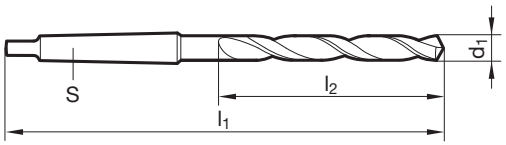
Articolo nr. 82468

P	M	K	N	S	H
•		•	•		

HSS | FN | >20xD | WN | 130° | h8 | R | MK

Assott. del nocc. ≥ Ø 14,000 • spoglia sul cono tagliente • scanalature larghe • per fori estremamente profondi • in caso di scarico truciolo insufficiente

ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	S	l1 mm	l2 mm
14,000	MK-1	750,000	650,000
15,000	MK-2	750,000	650,000
16,000	MK-2	750,000	650,000
18,000	MK-2	750,000	650,000

d1 mm	S	l1 mm	l2 mm

HARTNER

Punte elicoidali, extra lunghe

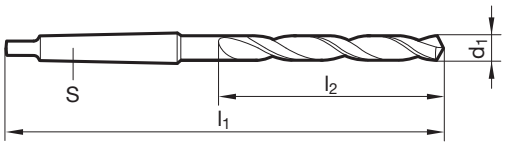
Articolo nr. 82469

P	M	K	N	S	H
•		•	•		

HSS | FN | >20xD | WN | 130° | h8 | R | MK

Assott. del nocc. ≥ Ø 15,000 • spoglia sul cono tagliente • scanalature larghe • per fori estremamente profondi • in caso di scarico truciolo insufficiente

ghisa grigia ed acciai con R max. 1000 N/mm² • Ad eccezione di: acciai al CrNi, al VA e materiali simili



d1 mm	S	l1 mm	l2 mm
15,000	MK-2	1000,000	850,000
18,000	MK-2	1000,000	850,000

d1 mm	S	l1 mm	l2 mm

Punte con canali di lubrificazione tipo lungo

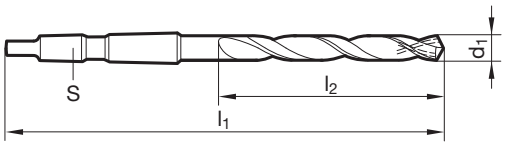
Articolo nr. 82535

P	M	K	N	S	H
•		•	•		

HSS | FN | ~10xD | WN | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 10,000 • spoglia sul cono tagliente • refrigerazione assiale attraverso l'attacco CM • per forare con bussola di guida

pacchi di lamierini • acciaio e ghisa acciaiosa, ghisa grigia • acciai austenitici a ca. 800 N/mm²



d1 mm	S	l1 mm	l2 mm
10,000	MK-2	224,000	116,000
10,500	MK-2	224,000	116,000
11,000	MK-2	233,000	125,000
11,500	MK-2	233,000	125,000
12,000	MK-2	242,000	134,000
12,500	MK-2	242,000	134,000
15,000	MK-2	255,000	147,000
16,000	MK-2	261,000	153,000
16,500	MK-2	267,000	159,000
17,000	MK-2	267,000	159,000
17,500	MK-2	273,000	165,000
18,000	MK-2	273,000	165,000

d1 mm	S	l1 mm	l2 mm
18,500	MK-3	303,000	171,000
19,000	MK-3	303,000	171,000
19,500	MK-3	309,000	177,000
20,000	MK-3	309,000	177,000

Punte con canali di lubrificazione tipo lungo

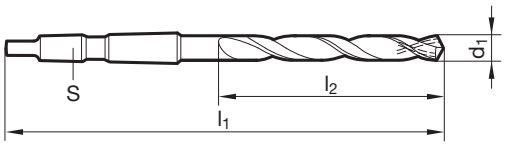
Articolo nr. 82521

P	M	K	N	S	H
●	○	●	●	○	

HSS | N | ~10xD | WN | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 10,000 • spoglia sul cono tagliente • refrigerazione assiale attraverso l'attacco CM • per forare con bussola di guida

pacchi di lamierini • acciaio e ghisa acciaiosa, ghisa grigia • acciai austenitici a ca. 800 N/mm²



d1 mm	S	l1 mm	l2 mm
10,000	MK-2	233,000	116,000
11,000	MK-2	242,000	125,000
12,000	MK-2	251,000	134,000
13,000	MK-2	251,000	134,000
13,200	MK-2	251,000	134,000
13,500	MK-2	259,000	142,000
13,800	MK-2	259,000	142,000
14,000	MK-2	259,000	142,000
15,000	MK-2	264,000	147,000
16,000	MK-2	270,000	153,000
16,250	MK-2	276,000	159,000
17,000	MK-2	276,000	159,000
18,000	MK-2	282,000	165,000
18,500	MK-3	307,000	171,000
18,750	MK-3	307,000	171,000
19,000	MK-3	307,000	171,000
19,500	MK-3	313,000	177,000
20,000	MK-3	313,000	177,000

d1 mm	S	l1 mm	l2 mm
21,000	MK-3	320,000	184,000
22,000	MK-3	327,000	191,000
23,000	MK-3	334,000	198,000
24,000	MK-3	342,000	206,000
25,000	MK-3	342,000	206,000
26,000	MK-3	350,000	214,000
26,500	MK-3	350,000	214,000
27,000	MK-4	385,000	222,000
28,000	MK-4	385,000	222,000
29,000	MK-4	393,000	230,000
30,000	MK-4	393,000	230,000
32,000	MK-4	421,000	248,000
33,000	MK-4	421,000	248,000
35,000	MK-4	430,000	257,000
40,000	MK-4	450,000	277,000

Punte con canali di lubrificazione tipo lungo

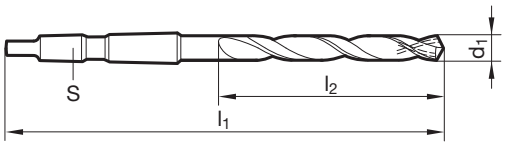
Articolo nr. 82525

P	M	K	N	S	H
●	●	●	●	●	○

HSS-E | FN | ~10xD | WN | 130° | h8 | R | MK

Assott. del nocc. ≥ Ø 15,000 • spoglia sul cono tagliente • refrigerazione assiale attraverso l'attacco CM • acciaio HSS legato al Co • massima resistenza all'usura • per forare con bussola di guida

acciai ad alta resistenza • acciaio e ghisa acciaiosa • acciai inossidabili e resistenti al calore • con R superiore fino a 1300 N/mm²



d1 mm	S	l1 mm	l2 mm	d1 mm	S	l1 mm	l2 mm
15,000	MK-2	264,000	147,000				
17,000	MK-2	276,000	159,000				
18,000	MK-2	282,000	165,000				
21,000	MK-3	320,000	184,000				
22,000	MK-3	327,000	191,000				
32,500	MK-4	421,000	248,000				

Punte con canali di lubrificazione tipo extra-lungo

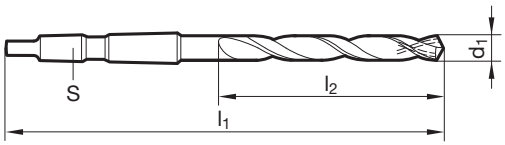
Articolo nr. 82515

P	M	K	N	S	H
●	●	●	●	●	○

HSS-E | FN | ~15xD | WN | 130° | h8 | R | MK

Assott. del nocc. ≥ Ø 14,000 • spoglia sul cono tagliente • refrigerazione assiale attraverso l'attacco CM • acciaio HSS legato al Co • massima resistenza all'usura • per forare con bussola di guida

acciai ad alta resistenza • acciaio e ghisa acciaiosa • acciai inossidabili e resistenti al calore • con R superiore fino a 1300 N/mm²



d1 mm	S	l1 mm	l2 mm
14,000	MK-2	337,000	220,000
15,000	MK-2	337,000	220,000
16,000	MK-2	347,000	230,000
17,500	MK-2	362,000	245,000
18,000	MK-2	362,000	245,000
20,000	MK-3	396,000	260,000

d1 mm	S	l1 mm	l2 mm
29,000	MK-4	468,000	305,000

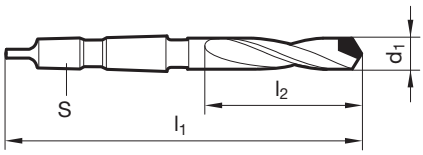
Punte speciali, con taglienti in MD

Articolo nr. 89302

P	M	K	N	S	H
○		○			○

HM | ◯ | N | DIN 8041 | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 8,500 • affilatura su piani • con riporti in MD
acciaio per nastri per molle • ghisa conchigliata con oltre 300 HB • molibdeno puro • bronzi duri



d1 mm	S	l1 mm	l2 mm
8,500	MK-1	135,000	45,000
10,000	MK-1	140,000	50,000
10,200	MK-1	140,000	50,000
10,500	MK-1	140,000	50,000
11,000	MK-1	140,000	50,000
11,500	MK-1	146,000	56,000
12,000	MK-1	146,000	56,000
12,500	MK-1	146,000	56,000
13,000	MK-1	146,000	56,000
13,500	MK-2	168,000	63,000
14,000	MK-2	168,000	63,000
14,500	MK-2	168,000	63,000
15,000	MK-2	168,000	63,000
15,500	MK-2	175,000	70,000
16,000	MK-2	175,000	70,000
16,500	MK-2	175,000	70,000
17,000	MK-2	175,000	70,000
17,500	MK-2	185,000	80,000

d1 mm	S	l1 mm	l2 mm
18,000	MK-2	185,000	80,000
19,000	MK-2	185,000	80,000
20,000	MK-3	215,000	90,000
21,500	MK-3	215,000	90,000
22,000	MK-3	215,000	90,000
25,000	MK-3	225,000	100,000
26,500	MK-4	260,000	110,000
27,000	MK-4	260,000	110,000
30,000	MK-4	275,000	125,000
32,000	MK-4	275,000	125,000
33,000	MK-4	290,000	140,000
40,000	MK-4	310,000	160,000

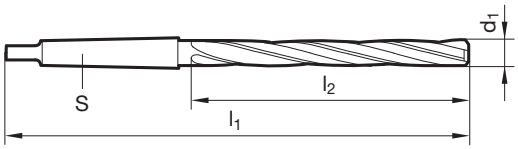
Allargatori con attacco cono morse

Articolo nr. 86110

P	M	K	N	S	H
●	○	●	○		

HSS | N | DIN 343 | 120° | R | MK

spoglia sul cono tagliente • a tre taglienti • stabilità elevata • per fori prefusi, precolati, preforati • corregge la precisione di allineamento • corregge la mancanza di rotondità • finitura di superf. del foro migliorata • ø imbocco < al foro da praticare • considerare la quota “d0” come misura più piccola del foro pilota • dopo l’allargatura, finire con alesatura



d1 mm	d0 mm	S	l1 mm	l2 mm
8,600	6,3	MK-1	162,000	81,000
9,000	6,3	MK-1	162,000	81,000
9,800	7,0	MK-1	168,000	87,000
10,000	7,0	MK-1	168,000	87,000
10,100	7,0	MK-1	168,000	87,000
11,000	7,7	MK-1	175,000	94,000
11,500	7,7	MK-1	175,000	94,000
11,600	7,7	MK-1	175,000	94,000
11,750	8,4	MK-1	182,000	101,000
13,000	9,1	MK-1	182,000	101,000
13,750	9,8	MK-1	189,000	108,000
14,000	9,8	MK-1	189,000	108,000
14,100	10,5	MK-2	212,000	114,000
14,750	10,5	MK-2	212,000	114,000
15,000	10,5	MK-2	212,000	114,000
15,750	11,2	MK-2	218,000	120,000
16,000	11,2	MK-2	218,000	120,000
16,250	11,9	MK-2	223,000	125,000
16,750	11,9	MK-2	223,000	125,000
17,000	11,9	MK-2	223,000	125,000
17,750	12,6	MK-2	228,000	130,000
18,000	12,6	MK-2	228,000	130,000
18,700	13,3	MK-2	233,000	135,000
19,000	13,3	MK-2	233,000	135,000
19,700	14,0	MK-2	238,000	140,000
19,750	14,0	MK-2	238,000	140,000
20,000	14,0	MK-2	238,000	140,000
20,700	14,6	MK-2	243,000	145,000
21,000	14,6	MK-2	243,000	145,000
21,700	15,3	MK-2	248,000	150,000

d1 mm	d0 mm	S	l1 mm	l2 mm
22,000	15,3	MK-2	248,000	150,000
22,700	16,0	MK-2	253,000	155,000
23,000	16,0	MK-2	253,000	155,000
24,000	16,6	MK-3	281,000	160,000
25,000	17,3	MK-3	281,000	160,000
25,700	18,0	MK-3	286,000	165,000
26,000	18,0	MK-3	286,000	165,000
26,700	18,6	MK-3	291,000	170,000
27,000	18,6	MK-3	291,000	170,000
27,700	19,3	MK-3	291,000	170,000
28,000	19,3	MK-3	291,000	170,000
29,000	20,0	MK-3	296,000	175,000
29,700	20,5	MK-3	296,000	175,000
30,000	20,5	MK-3	296,000	175,000
31,000	21,0	MK-3	301,000	180,000
31,600	22,0	MK-4	334,000	185,000
32,000	22,0	MK-4	334,000	185,000
32,600	23,0	MK-4	334,000	185,000
33,000	23,0	MK-4	334,000	185,000
34,000	24,0	MK-4	339,000	190,000
35,000	25,0	MK-4	339,000	190,000
35,600	25,5	MK-4	344,000	195,000
36,000	25,5	MK-4	344,000	195,000
36,600	26,0	MK-4	344,000	195,000
37,600	26,5	MK-4	349,000	200,000
38,000	26,5	MK-4	349,000	200,000
39,000	27,0	MK-4	349,000	200,000
40,000	28,0	MK-4	349,000	200,000

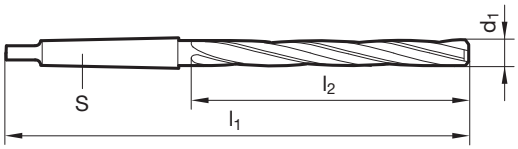
Allargatori con attacco cono morse

Articolo nr. 86111

P	M	K	N	S	H
●	○	●	●	○	

HSS-E | N | DIN 343 | 120° | R | MK

spoglia sul cono tagliente • a tre taglienti • stabilità elevata • per fori prefusi, precolati, preforati • corregge la precisione di allineamento • corregge la mancanza di rotondità • finitura di superf. del foro migliorata • ø imbocco < al foro da praticare • considerare la quota “d0” come misura più piccola del foro pilota • dopo l’allargatura, finire con alesatura



d1 mm	d0 mm	S	l1 mm	l2 mm
12,000	8,400	MK-1	182,000	101,000
14,000	9,800	MK-1	189,000	108,000
22,000	15,300	MK-2	248,000	150,000

d1 mm	d0 mm	S	l1 mm	l2 mm

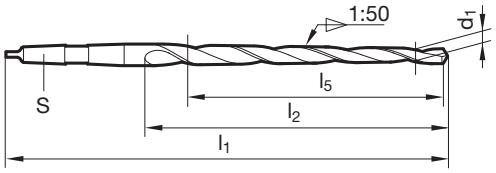
Punte per fori conici

Articolo nr. 82810

P	M	K	N	S	H
●	○	●	○		

HSS | N | DIN 1898 | 118° | R | MK

Assott. del nocc. ≥ Ø 13,000 • spoglia sul cono tagliente • per fori sferici su attacchi di perni sferici secondo DIN 1 (nuovo: DIN EN 22339), DIN 7978 (nuovo: DIN EN 28736), DIN 7977 (nuovo: DIN EN 28737) e DIN 258



d1 mm	S	l1 mm	l2 mm	l5 mm
5,000	MK-1	155,000	81,000	75,000
6,000	MK-1	187,000	108,000	105,000
8,000	MK-1	227,000	149,000	145,000
10,000	MK-1	257,000	180,000	175,000
13,000	MK-2	325,000	229,000	220,000
14,000	MK-2	325,000	229,000	220,000

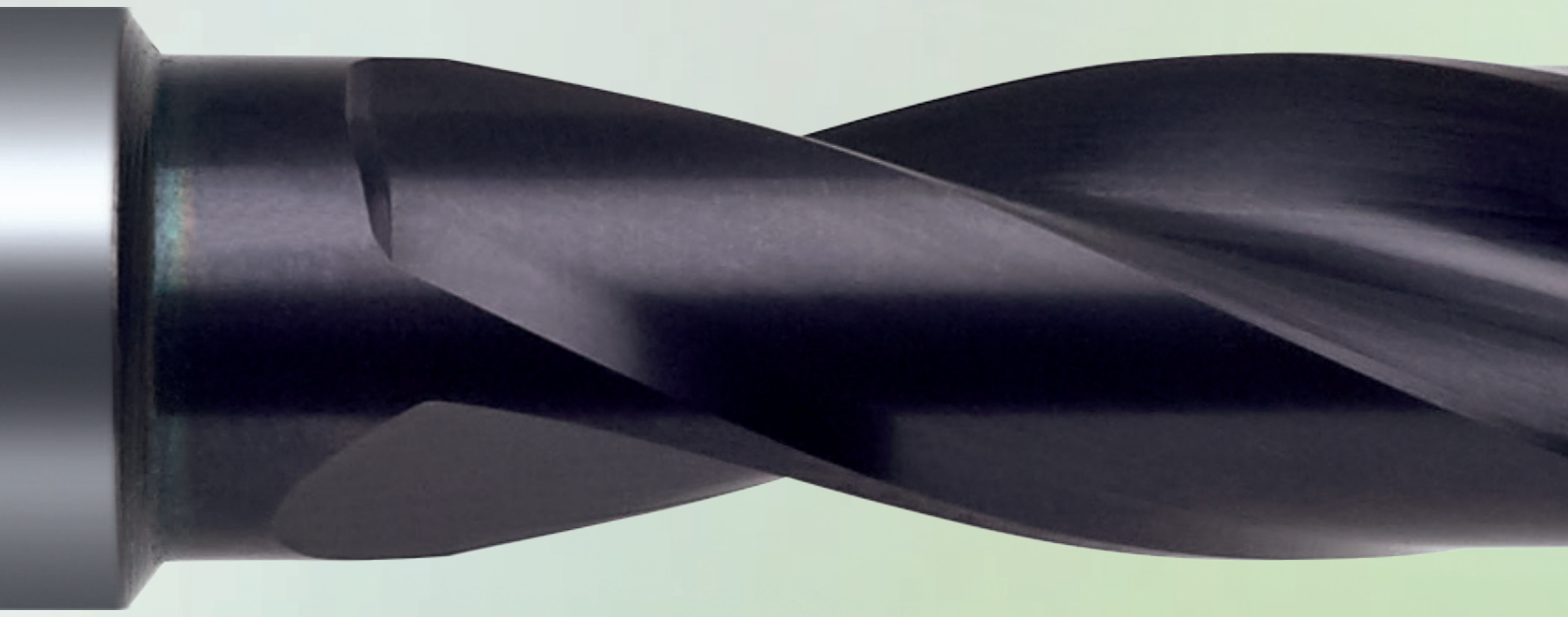
d1 mm	S	l1 mm	l2 mm	l5 mm
20,000	MK-3	377,000	263,000	250,000

HARTNER

Precision Cutting Tools

TS-DRILLS

15/20/25/30/40xD

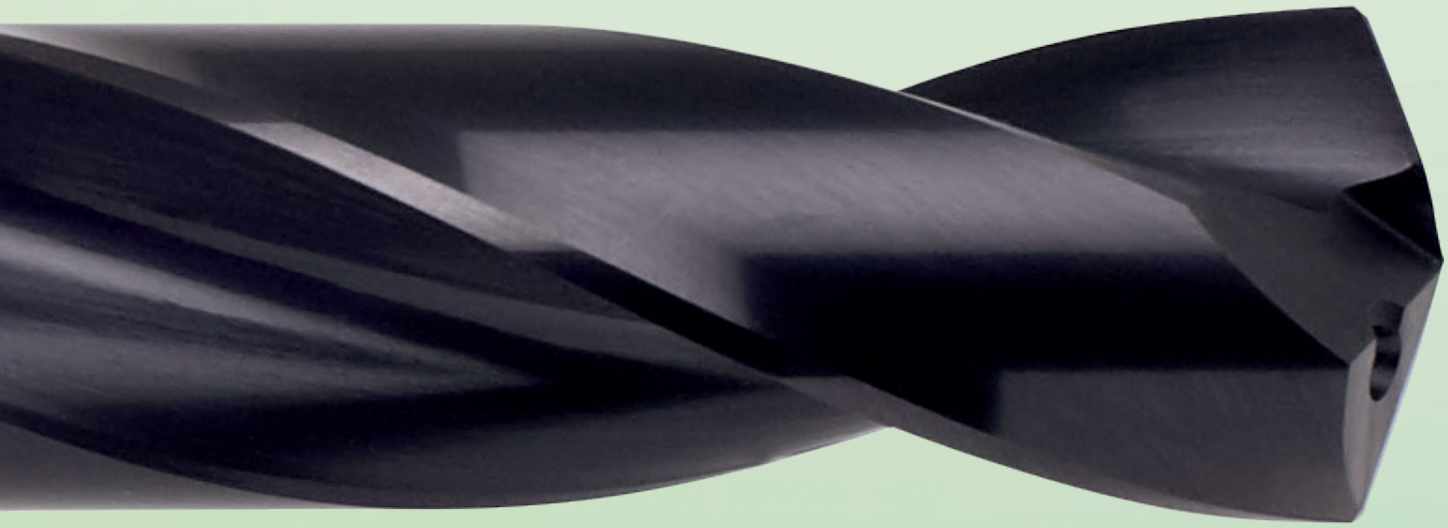


HARTNER

Precision Cutting Tools

TS-DRILLS

Utensili high-tech in metallo duro integrale
lucidi e ricoperti



Punte TS senza canali di lubrificazione

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina
●	○	●	○	○	○	DIN 6537K	TS 100 U	Metallo duro	T	destra	HE	3xD	3,000 - 20,000	**89264**	196
●	○	●	○	○	○	DIN 6537K	TS 100 U	Metallo duro	F	destra	HE	3xD	3,000 - 20,000	**89402**	194
●	○	●	○	○	○	DIN 6537K	TS 100 U	Metallo duro	F	destra	HA	3xD	3,000 - 20,000	**89413**	194
●				●	○	DIN 6537K	TS 100 H	Metallo duro	Y	destra	HA	3xD	3,000 - 20,000	**89422**	198
●	○	●	○	○	○	DIN 6539	TS 100 U	Metallo duro	T	destra	cil.	3xD	3,000 - 16,000	**89237**	200
●	○	●	○	○	○	DIN 6539	TS 100 U	Metallo duro	F	destra	cil.	3xD	3,000 - 16,000	**89401**	200
●	○	●	○	○	○	DIN 6537L	TS 100 U	Metallo duro	F	destra	HA	5xD	3,000 - 20,000	**89414**	202
●	○	●	○	○	○	DIN 6537L	TS 100 U	Metallo duro	F	destra	HE	5xD	3,000 - 20,000	**89417**	202
●	○	●	○	○	○	Norma di fab.	TS 100 U	Metallo duro	T	destra	cil.	5xD	5,000 - 16,000	**89275**	204

Punte TS con canali di lubrificazione

●	○	○	○			DIN 6538K	TS 80 U	Metallo duro	T	destra	HE	3xD	10,000 - 25,000	**89306**	208
●	○	●	○	○	○	DIN 6537K	TS 100 U	Metallo duro	T	destra	HE	3xD	4,000 - 20,000	**89266**	207
●	○	●	○	○	○	DIN 6537K	TS 100 U	Metallo duro	F	destra	HA	3xD	3,000 - 20,000	**89410**	205
●	○	●	○	○	○	DIN 6537K	TS 100 U	Metallo duro	F	destra	HE	3xD	3,000 - 20,000	**89415**	205

Punte TS con canali di lubrificazione

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina
●				●	○	DIN 6537K	TS 100 H	Metallo duro	Y	destra	HA	3xD	3,000 - 20,000	**89423**	211
●				●	○	DIN 6537K	TS 100 H	Metallo duro	Y	destra	HE	3xD	3,000 - 20,000	**89424**	211
	●			●		DIN 6537K	TS 100 INOX	Metallo duro	a	destra	HA	3xD	3,000 - 20,000	**89450**	209
	●			●		DIN 6537K	TS 100 INOX	Metallo duro	a	destra	HE	3xD	3,000 - 20,000	**89550**	209
		○	●			Norma di fab.	TS 150 GG	Metallo duro	○	destra	HA	4xD	3,000 - 20,000	**89292**	213
●	○	○	○			DIN 6538M	TS 80 U	Metallo duro	T	destra	HE	5xD	9,800 - 25,500	**89307**	217
●	○	●	○	○	○	DIN 6537L	TS 100 U	Metallo duro	T	destra	HE	5xD	3,700 - 19,500	**89272**	214
●	○	●	○	○	○	DIN 6537L	TS 100 U	Metallo duro	F	destra	HE	5xD	3,000 - 20,000	**89408**	215
●	○	●	○	○	○	DIN 6537L	TS 100 U	Metallo duro	F	destra	HA	5xD	3,000 - 20,000	**89411**	215
		●				DIN 6537L	TS 100 R	Metallo duro	F	destra	HA	5xD	3,000 - 20,000	**89420**	222
●				●	○	DIN 6537L	TS 100 H	Metallo duro	Y	destra	HA	5xD	3,000 - 20,000	**89425**	220
●				●	○	DIN 6537L	TS 100 H	Metallo duro	Y	destra	HE	5xD	3,000 - 20,000	**89426**	220
	●			●		DIN 6537L	TS 100 INOX	Metallo duro	a	destra	HA	5xD	3,000 - 20,000	**89451**	218
	●			●		DIN 6537L	TS 100 INOX	Metallo duro	a	destra	HE	5xD	3,000 - 20,000	**89551**	218

Punte TS con canali di lubrificazione

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina
●	○	○	○			DIN 6538L	TS 80 U	**Metallo duro**	T	destra	HE	7xD	10,000 - 22,000	**89308**	226
		○	●			Norma di fab.	TS 150 GG	**Metallo duro**	○	destra	HA	7xD	3,000 - 20,000	**89294**	230
●	○	●	○	○	○	Norma di fab.	TS 100 U	**Metallo duro**	F	destra	HA	7xD	3,000 - 20,000	**89412**	224
●	○	●	○	○	○	Norma di fab.	TS 100 U	**Metallo duro**	F	destra	HE	7xD	3,000 - 20,000	**89416**	224
		●				Norma di fab.	TS 100 R	**Metallo duro**	F	destra	HA	7xD	4,000 - 20,000	**89421**	228
●				●	○	Norma di fab.	TS 100 H	**Metallo duro**	Y	destra	HA	7xD	3,000 - 16,000	**89427**	227
		○	●			Norma di fab.	TS 150 GG	**Metallo duro**	○	destra	HA	10xD	3,000 - 20,000	**89293**	231
		●	○			Norma di fab.	TS 150 GG	**Metallo duro**	○	destra	HA	10xD	3,000 - 20,000	**89295**	231
●	○	●	○	○	○	Norma di fab.	TS 100 U	**Metallo duro**	F	destra	HA	12xD	3,000 - 20,000	**89418**	233
●	●	●	○	○	○	Norma di fab.	TS 100 T	**Metallo duro**	A	destra	HA	15xD	3,000 - 14,000	**86509**	235
●	●	●	○	○	○	Norma di fab.	TS 100 T	**Metallo duro**	A	destra	HA	20xD	3,000 - 14,000	**86511**	236
●	●	●	○	○	○	Norma di fab.	TS 100 T	**Metallo duro**	A	destra	HA	25xD	3,000 - 12,000	**86512**	237
●	●	●	○	○	○	Norma di fab.	TS 100 T	**Metallo duro**	A	destra	HA	30xD	3,000 - 10,000	**86513**	238
●	●	●	○	○	○	Norma di fab.	TS 100 T	**Metallo duro**	A	destra	HA	40xD	3,000 - 8,000	**86514**	239

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina

Punte TS a 3 taglienti

		•	•			DIN 6537L	TS 3 G	**Metallo duro**	◯	destra	HA	5xD	3,000 - 20,000	**89247**	240

		•	•			DIN 6539	TS 3 G	**Metallo duro**	◯	destra	cil.	5xD	3,000 - 20,000	**89239**	241

Utensili sbavatori

•	•	•	○	•	○	Norma di fab.	TS 100 EG	**Metallo duro**	◯	destra	cil.			**84100**	243

•	•	•	○	•	○	Norma di fab.	TS 100 EG	**Metallo duro**	◯	destra	HA			**84101**	244

Sbavatori a 90° ad avanzamento ed estrazione

•	•	•	○	•	○	Norma di fab.	TS 100 VR	**Metallo duro**	a	destra	HA		3,000 - 12,000	**80495**	245

Punte TS senza canali di lubrificazione

Articolo nr. 89413

P	M	K	N	S	H
●	○	●	○	○	○

VHM | F | TS 100 U | 3xD | DIN 6537 K | 140° | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata
acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise
• bronzo/ottone • leghe di alluminio con elevato contenuto di silicio

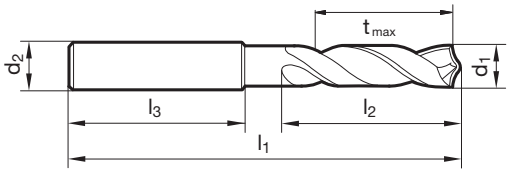
Articolo nr. 89402

P	M	K	N	S	H
●	○	●	○	○	○

VHM | F | TS 100 U | 3xD | DIN 6537 K | 140° | m7 | R | HE

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata
acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise
• bronzo/ottone • leghe di alluminio con elevato contenuto di silicio

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	62,000	20,000	36,000
3,100		6,000	62,000	20,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000
3,200		6,000	62,000	20,000	36,000
3,250		6,000	62,000	20,000	36,000
3,300		6,000	62,000	20,000	36,000
3,400		6,000	62,000	20,000	36,000
3,500		6,000	62,000	20,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000
3,600		6,000	62,000	20,000	36,000
3,700		6,000	62,000	20,000	36,000
3,800		6,000	66,000	24,000	36,000
3,900		6,000	66,000	24,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000
4,000		6,000	66,000	24,000	36,000
4,100		6,000	66,000	24,000	36,000
4,200		6,000	66,000	24,000	36,000
4,300		6,000	66,000	24,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000
4,400		6,000	66,000	24,000	36,000
4,500		6,000	66,000	24,000	36,000
4,600		6,000	66,000	24,000	36,000
4,650		6,000	66,000	24,000	36,000
4,700		6,000	66,000	24,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000
4,800		6,000	66,000	28,000	36,000
4,900		6,000	66,000	28,000	36,000
5,000		6,000	66,000	28,000	36,000
5,100		6,000	66,000	28,000	36,000
5,160	13/64	6,000	66,000	28,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
5,200		6,000	66,000	28,000	36,000
5,300		6,000	66,000	28,000	36,000
5,400		6,000	66,000	28,000	36,000
5,500		6,000	66,000	28,000	36,000
5,550		6,000	66,000	28,000	36,000
5,560	7/32	6,000	66,000	28,000	36,000
5,600		6,000	66,000	28,000	36,000
5,700		6,000	66,000	28,000	36,000
5,800		6,000	66,000	28,000	36,000
5,900		6,000	66,000	28,000	36,000
5,950	15/64	6,000	66,000	28,000	36,000
6,000		6,000	66,000	28,000	36,000
6,100		8,000	79,000	34,000	36,000
6,200		8,000	79,000	34,000	36,000
6,300		8,000	79,000	34,000	36,000
6,350	1/4	8,000	79,000	34,000	36,000
6,400		8,000	79,000	34,000	36,000
6,500		8,000	79,000	34,000	36,000
6,600		8,000	79,000	34,000	36,000
6,700		8,000	79,000	34,000	36,000
6,750	17/64	8,000	79,000	34,000	36,000
6,800		8,000	79,000	34,000	36,000
6,900		8,000	79,000	34,000	36,000
7,000		8,000	79,000	34,000	36,000
7,100		8,000	79,000	41,000	36,000
7,140	9/32	8,000	79,000	41,000	36,000
7,200		8,000	79,000	41,000	36,000
7,300		8,000	79,000	41,000	36,000
7,400		8,000	79,000	41,000	36,000
7,500		8,000	79,000	41,000	36,000

Punte TS senza canali di lubrificazione

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,540	19/64	8,000	79,000	41,000	36,000
7,600		8,000	79,000	41,000	36,000
7,700		8,000	79,000	41,000	36,000
7,800		8,000	79,000	41,000	36,000
7,900		8,000	79,000	41,000	36,000
7,940	5/16	8,000	79,000	41,000	36,000
8,000		8,000	79,000	41,000	36,000
8,100		10,000	89,000	47,000	40,000
8,200		10,000	89,000	47,000	40,000
8,300		10,000	89,000	47,000	40,000
8,330	21/64	10,000	89,000	47,000	40,000
8,400		10,000	89,000	47,000	40,000
8,500		10,000	89,000	47,000	40,000
8,600		10,000	89,000	47,000	40,000
8,700		10,000	89,000	47,000	40,000
8,730	11/32	10,000	89,000	47,000	40,000
8,800		10,000	89,000	47,000	40,000
8,900		10,000	89,000	47,000	40,000
9,000		10,000	89,000	47,000	40,000
9,100		10,000	89,000	47,000	40,000
9,130	23/64	10,000	89,000	47,000	40,000
9,200		10,000	89,000	47,000	40,000
9,250		10,000	89,000	47,000	40,000
9,300		10,000	89,000	47,000	40,000
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,100		14,000	107,000	60,000	45,000
12,200		14,000	107,000	60,000	45,000
12,300	31/64	14,000	107,000	60,000	45,000
12,400		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,600		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000
13,000		14,000	107,000	60,000	45,000
13,100	33/64	14,000	107,000	60,000	45,000
13,200		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
13,800		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,100		16,000	115,000	65,000	48,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,100		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
15,800		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,200		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000

Punte TS senza canali di lubrificazione

Articolo nr. 89264

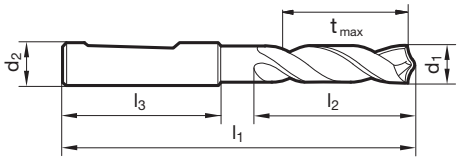
P	M	K	N	S	H
●	○	●	○	○	○

VHM | T | TS 100 U | 3xD | DIN 6537 K | 140° | m7 | R | HE

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise • bronzo/ottone • leghe di alluminio con elevato contenuto di silicio

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	62,000	20,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
3,100		6,000	62,000	20,000	36,000	7,400		8,000	79,000	41,000	36,000
3,200		6,000	62,000	20,000	36,000	7,500		8,000	79,000	41,000	36,000
3,300		6,000	62,000	20,000	36,000	7,600		8,000	79,000	41,000	36,000
3,400		6,000	62,000	20,000	36,000	7,700		8,000	79,000	41,000	36,000
3,500		6,000	62,000	20,000	36,000	7,800		8,000	79,000	41,000	36,000
3,600		6,000	62,000	20,000	36,000	7,900		8,000	79,000	41,000	36,000
3,700		6,000	62,000	20,000	36,000	8,000		8,000	79,000	41,000	36,000
3,800		6,000	66,000	24,000	36,000	8,100		10,000	89,000	47,000	40,000
3,900		6,000	66,000	24,000	36,000	8,200		10,000	89,000	47,000	40,000
4,000		6,000	66,000	24,000	36,000	8,300		10,000	89,000	47,000	40,000
4,100		6,000	66,000	24,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
4,200		6,000	66,000	24,000	36,000	8,400		10,000	89,000	47,000	40,000
4,300		6,000	66,000	24,000	36,000	8,500		10,000	89,000	47,000	40,000
4,500		6,000	66,000	24,000	36,000	8,700		10,000	89,000	47,000	40,000
4,600		6,000	66,000	24,000	36,000	8,730	11/32	10,000	89,000	47,000	40,000
4,700		6,000	66,000	24,000	36,000	8,800		10,000	89,000	47,000	40,000
4,760	3/16	6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
4,800		6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	9,400		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	9,500		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	9,600		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	9,700		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	9,800		10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	9,900		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	9,920	25/64	10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	10,000		10,000	89,000	47,000	40,000
5,800		6,000	66,000	28,000	36,000	10,100		12,000	102,000	55,000	45,000
5,900		6,000	66,000	28,000	36,000	10,200		12,000	102,000	55,000	45,000
6,000		6,000	66,000	28,000	36,000	10,300		12,000	102,000	55,000	45,000
6,100		8,000	79,000	34,000	36,000	10,500		12,000	102,000	55,000	45,000
6,200		8,000	79,000	34,000	36,000	10,600		12,000	102,000	55,000	45,000
6,300		8,000	79,000	34,000	36,000	10,800		12,000	102,000	55,000	45,000
6,400		8,000	79,000	34,000	36,000	11,000		12,000	102,000	55,000	45,000
6,500		8,000	79,000	34,000	36,000	11,100		12,000	102,000	55,000	45,000
6,600		8,000	79,000	34,000	36,000	11,200		12,000	102,000	55,000	45,000
6,700		8,000	79,000	34,000	36,000	11,400		12,000	102,000	55,000	45,000
6,750	17/64	8,000	79,000	34,000	36,000	11,500		12,000	102,000	55,000	45,000
6,800		8,000	79,000	34,000	36,000	11,600		12,000	102,000	55,000	45,000
7,000		8,000	79,000	34,000	36,000	11,700		12,000	102,000	55,000	45,000

Punte TS senza canali di lubrificazione

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,100		14,000	107,000	60,000	45,000
12,200		14,000	107,000	60,000	45,000
12,300	31/64	14,000	107,000	60,000	45,000
12,400		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
13,000		14,000	107,000	60,000	45,000
13,200		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,800		14,000	107,000	60,000	45,000
13,890	35/64	14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
14,400		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,800		16,000	115,000	65,000	48,000
15,870	5/8	16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,100		18,000	123,000	73,000	48,000
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,300		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,200		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000

Punte TS senza canali di lubrificazione

Articolo nr. 89422

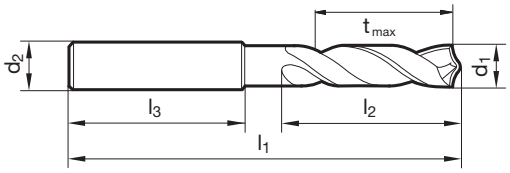
P	M	K	N	S	H
●				●	○

VHM | TS 100 H | 3xD | DIN 6537 K | 140° | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • il tagliente principale è leggermente concavo • geometria dei taglienti ottimizzata

per acciai legati e altamente legati fino a 1400 N/mm² • Inconel, Hastelloy, Monel • titanio e leghe di titanio

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	62,000	20,000	36,000	6,100		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,200		8,000	79,000	34,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	6,300		8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
3,250		6,000	62,000	20,000	36,000	6,400		8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	6,500		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	6,600		8,000	79,000	34,000	36,000
3,500		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,600		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,700		6,000	62,000	20,000	36,000	6,900		8,000	79,000	34,000	36,000
3,800		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
3,900		6,000	66,000	24,000	36,000	7,100		8,000	79,000	41,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,200		8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	7,300		8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	7,400		8,000	79,000	41,000	36,000
4,300		6,000	66,000	24,000	36,000	7,500		8,000	79,000	41,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	7,600		8,000	79,000	41,000	36,000
4,500		6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
4,600		6,000	66,000	24,000	36,000	7,800		8,000	79,000	41,000	36,000
4,650		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,700		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	8,000		8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	8,100		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	8,200		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	8,300		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	8,400		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	8,600		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	8,700		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	8,730	11/32	10,000	89,000	47,000	40,000
5,550		6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,800		6,000	66,000	28,000	36,000	9,130	23/64	10,000	89,000	47,000	40,000
5,900		6,000	66,000	28,000	36,000	9,200		10,000	89,000	47,000	40,000
5,950	15/64	6,000	66,000	28,000	36,000	9,250		10,000	89,000	47,000	40,000
6,000		6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000

Punte TS senza canali di lubrificazione

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,200		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
13,000		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
18,900		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,050	3/4	20,000	131,000	79,000	50,000
19,300		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000

Punte TS senza canali di lubrificazione

Articolo nr. 89237

P	M	K	N	S	H
●	○	●	○	○	○

VHM | T | TS 100 U | 3xD | DIN 6539 | 140° | m7 | R | Cyl

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata
acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise
• bronzo/ottone • leghe di alluminio con elevato contenuto di silicio

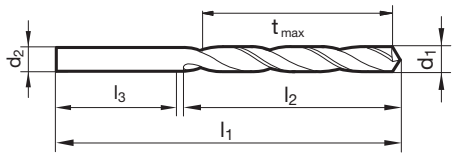
Articolo nr. 89401

P	M	K	N	S	H
●	○	●	○	○	○

VHM | F | TS 100 U | 3xD | DIN 6539 | 140° | m7 | R | Cyl

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata
acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise
• bronzo/ottone • leghe di alluminio con elevato contenuto di silicio

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		3,000	46,000	16,000	30,000	7,000		7,000	74,000	34,000	40,000
3,100		3,100	49,000	18,000	31,000	7,100		7,100	74,000	34,000	40,000
3,200		3,200	49,000	18,000	31,000	7,140	9/32	7,140	74,000	34,000	40,000
3,300		3,300	49,000	18,000	31,000	7,200		7,200	74,000	34,000	40,000
3,400		3,400	52,000	20,000	32,000	7,400		7,400	74,000	34,000	40,000
3,500		3,500	52,000	20,000	32,000	7,500		7,500	74,000	34,000	40,000
3,600		3,600	52,000	20,000	32,000	7,800		7,800	79,000	37,000	42,000
3,700		3,700	52,000	20,000	32,000	8,000		8,000	79,000	37,000	42,000
3,800		3,800	55,000	22,000	33,000	8,200		8,200	79,000	37,000	42,000
3,900		3,900	55,000	22,000	33,000	8,400		8,400	79,000	37,000	42,000
4,000		4,000	55,000	22,000	33,000	8,500		8,500	79,000	37,000	42,000
4,100		4,100	55,000	22,000	33,000	8,600		8,600	84,000	40,000	44,000
4,200		4,200	55,000	22,000	33,000	8,700		8,700	84,000	40,000	44,000
4,500		4,500	58,000	24,000	34,000	8,800		8,800	84,000	40,000	44,000
4,800		4,800	62,000	26,000	36,000	9,000		9,000	84,000	40,000	44,000
5,000		5,000	62,000	26,000	36,000	9,500		9,500	84,000	40,000	44,000
5,100		5,100	62,000	26,000	36,000	9,800		9,800	89,000	43,000	46,000
5,200		5,200	62,000	26,000	36,000	10,000		10,000	89,000	43,000	46,000
5,300		5,300	62,000	26,000	36,000	10,100		10,100	89,000	43,000	46,000
5,500		5,500	66,000	28,000	38,000	10,200		10,200	89,000	43,000	46,000
5,600		5,600	66,000	28,000	38,000	10,300		10,300	89,000	43,000	46,000
5,700		5,700	66,000	28,000	38,000	10,500		10,500	89,000	43,000	46,000
5,800		5,800	66,000	28,000	38,000	10,600		10,600	89,000	43,000	46,000
6,000		6,000	66,000	28,000	38,000	10,800		10,800	95,000	47,000	48,000
6,100		6,100	70,000	31,000	39,000	11,000		11,000	95,000	47,000	48,000
6,200		6,200	70,000	31,000	39,000	11,110	7/16	11,110	95,000	47,000	48,000
6,400		6,400	70,000	31,000	39,000	11,500		11,500	95,000	47,000	48,000
6,500		6,500	70,000	31,000	39,000	11,800		11,800	95,000	47,000	48,000
6,700		6,700	70,000	31,000	39,000	12,000		12,000	102,000	51,000	51,000
6,800		6,800	74,000	34,000	40,000	12,500		12,500	102,000	51,000	51,000

Punte TS senza canali di lubrificazione

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
12,700	1/2	12,700	102,000	51,000	51,000
13,000		13,000	102,000	51,000	51,000
13,500		13,500	107,000	54,000	53,000
14,000		14,000	107,000	54,000	53,000
14,500		14,500	111,000	56,000	55,000
15,000		15,000	111,000	56,000	55,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
15,500		15,500	115,000	58,000	57,000
16,000		16,000	115,000	58,000	57,000

Punte TS senza canali di lubrificazione

Articolo nr. 89414

P	M	K	N	S	H
●	○	●	○	○	○

VHM | F | TS 100 U | 5xD | DIN 6537 L | 140° | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata
acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise
• bronzo/ottone • leghe di alluminio con elevato contenuto di silicio

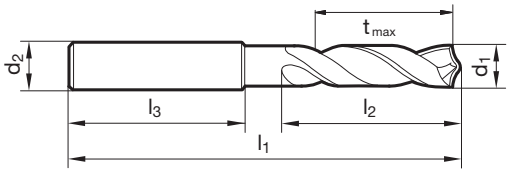
Articolo nr. 89417

P	M	K	N	S	H
●	○	●	○	○	○

VHM | F | TS 100 U | 5xD | DIN 6537 L | 140° | m7 | R | HE

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata
acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise
• bronzo/ottone • leghe di alluminio con elevato contenuto di silicio

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	66,000	28,000	36,000
3,100		6,000	66,000	28,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000
3,200		6,000	66,000	28,000	36,000
3,250		6,000	66,000	28,000	36,000
3,300		6,000	66,000	28,000	36,000
3,400		6,000	66,000	28,000	36,000
3,500		6,000	66,000	28,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000
3,600		6,000	66,000	28,000	36,000
3,700		6,000	66,000	28,000	36,000
3,800		6,000	74,000	36,000	36,000
3,900		6,000	74,000	36,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000
4,000		6,000	74,000	36,000	36,000
4,100		6,000	74,000	36,000	36,000
4,200		6,000	74,000	36,000	36,000
4,300		6,000	74,000	36,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000
4,400		6,000	74,000	36,000	36,000
4,500		6,000	74,000	36,000	36,000
4,600		6,000	74,000	36,000	36,000
4,650		6,000	74,000	36,000	36,000
4,700		6,000	74,000	36,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000
4,800		6,000	82,000	44,000	36,000
4,900		6,000	82,000	44,000	36,000
5,000		6,000	82,000	44,000	36,000
5,100		6,000	82,000	44,000	36,000
5,160	13/64	6,000	82,000	44,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
5,200		6,000	82,000	44,000	36,000
5,300		6,000	82,000	44,000	36,000
5,400		6,000	82,000	44,000	36,000
5,500		6,000	82,000	44,000	36,000
5,550		6,000	82,000	44,000	36,000
5,560	7/32	6,000	82,000	44,000	36,000
5,600		6,000	82,000	44,000	36,000
5,700		6,000	82,000	44,000	36,000
5,800		6,000	82,000	44,000	36,000
5,900		6,000	82,000	44,000	36,000
5,950	15/64	6,000	82,000	44,000	36,000
6,000		6,000	82,000	44,000	36,000
6,100		8,000	91,000	53,000	36,000
6,200		8,000	91,000	53,000	36,000
6,300		8,000	91,000	53,000	36,000
6,350	1/4	8,000	91,000	53,000	36,000
6,400		8,000	91,000	53,000	36,000
6,500		8,000	91,000	53,000	36,000
6,600		8,000	91,000	53,000	36,000
6,700		8,000	91,000	53,000	36,000
6,750	17/64	8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
6,900		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,100		8,000	91,000	53,000	36,000
7,140	9/32	8,000	91,000	53,000	36,000
7,200		8,000	91,000	53,000	36,000
7,300		8,000	91,000	53,000	36,000
7,400		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000

Punte TS senza canali di lubrificazione

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,540	19/64	8,000	91,000	53,000	36,000
7,600		8,000	91,000	53,000	36,000
7,700		8,000	91,000	53,000	36,000
7,800		8,000	91,000	53,000	36,000
7,900		8,000	91,000	53,000	36,000
7,940	5/16	8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
8,100		10,000	103,000	61,000	40,000
8,200		10,000	103,000	61,000	40,000
8,300		10,000	103,000	61,000	40,000
8,330	21/64	10,000	103,000	61,000	40,000
8,400		10,000	103,000	61,000	40,000
8,500		10,000	103,000	61,000	40,000
8,600		10,000	103,000	61,000	40,000
8,700		10,000	103,000	61,000	40,000
8,730	11/32	10,000	103,000	61,000	40,000
8,800		10,000	103,000	61,000	40,000
8,900		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,100		10,000	103,000	61,000	40,000
9,130	23/64	10,000	103,000	61,000	40,000
9,200		10,000	103,000	61,000	40,000
9,250		10,000	103,000	61,000	40,000
9,300		10,000	103,000	61,000	40,000
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,100		14,000	124,000	77,000	45,000
12,200		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,100	33/64	14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
13,800		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,100		16,000	133,000	83,000	48,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,100		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000

Punte TS senza canali di lubrificazione

Articolo nr. 89275

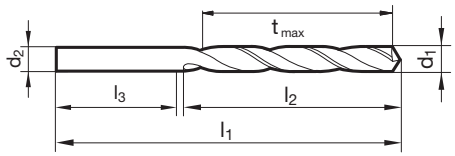
P	M	K	N	S	H
●	○	●	○	○	○

VHM | T | TS 100 U | 5xD | WN | 140° | m7 | R | Cyl

Assott. del nocc. ≥ Ø 5,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise • bronzo/ottone • leghe di alluminio con elevato contenuto di silicio

$t_{max} = l_2\text{-}1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
5,000		5,000	73,000	34,000	39,000
5,160	13/64	5,160	76,000	38,000	38,000
5,200		5,200	76,000	38,000	38,000
5,500		5,500	76,000	38,000	38,000
5,560	7/32	5,560	81,000	41,000	40,000
5,700		5,700	81,000	41,000	40,000
5,800		5,800	81,000	41,000	40,000
6,000		6,000	81,000	41,000	40,000
6,350	1/4	6,350	81,000	41,000	40,000
6,400		6,400	81,000	41,000	40,000
6,500		6,500	81,000	41,000	40,000
6,750	17/64	6,750	83,000	43,000	40,000
6,800		6,800	83,000	43,000	40,000
7,000		7,000	83,000	43,000	40,000
7,500		7,500	87,000	45,000	42,000
7,800		7,800	90,000	48,000	42,000
7,940	5/16	7,940	90,000	48,000	42,000
8,000		8,000	90,000	48,000	42,000
8,100		8,100	96,000	53,000	43,000
8,330	21/64	8,330	96,000	53,000	43,000
8,400		8,400	96,000	53,000	43,000
8,500		8,500	96,000	53,000	43,000
8,600		8,600	98,000	55,000	43,000
8,730	11/32	8,730	98,000	55,000	43,000
8,800		8,800	98,000	55,000	43,000
9,000		9,000	98,000	55,000	43,000
9,130	23/64	9,130	102,000	58,000	44,000
9,500		9,500	102,000	58,000	44,000
9,520	3/8	9,520	105,000	60,000	45,000
9,800		9,800	105,000	60,000	45,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
10,000		10,000	105,000	60,000	45,000
10,200		10,200	112,000	66,000	46,000
10,300		10,300	112,000	66,000	46,000
10,320	13/32	10,320	112,000	66,000	46,000
10,500		10,500	112,000	66,000	46,000
10,720	27/64	10,720	114,000	68,000	46,000
10,800		10,800	114,000	68,000	46,000
11,000		11,000	114,000	68,000	46,000
11,110	7/16	11,110	118,000	71,000	47,000
11,500		11,500	118,000	71,000	47,000
11,800		11,800	121,000	73,000	48,000
11,910	15/32	11,910	121,000	73,000	48,000
12,000		12,000	121,000	73,000	48,000
12,500		12,500	135,000	76,000	59,000
12,700	1/2	12,700	137,000	78,000	59,000
13,000		13,000	137,000	78,000	59,000
13,500		13,500	144,000	84,000	60,000
14,000		14,000	147,000	86,000	61,000
14,500		14,500	151,000	89,000	62,000
15,000		15,000	153,000	91,000	62,000
15,500		15,500	157,000	94,000	63,000
16,000		16,000	160,000	96,000	64,000

Punte TS con canali di lubrificazione

Articolo nr. 89410

P	M	K	N	S	H
●	○	●	○	○	○

VHM | F | TS 100 U | 3xD | DIN 6537 K | 140° | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata
acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise
• bronzo/ottone • leghe di alluminio con elevato contenuto di silicio

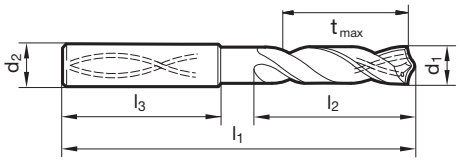
Articolo nr. 89415

P	M	K	N	S	H
●	○	●	○	○	○

VHM | F | TS 100 U | 3xD | DIN 6537 K | 140° | m7 | R | HE

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata
acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise
• bronzo/ottone • leghe di alluminio con elevato contenuto di silicio

$t_{max} = l_2\text{-}1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	62,000	20,000	36,000
3,100		6,000	62,000	20,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000
3,200		6,000	62,000	20,000	36,000
3,250		6,000	62,000	20,000	36,000
3,300		6,000	62,000	20,000	36,000
3,400		6,000	62,000	20,000	36,000
3,500		6,000	62,000	20,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000
3,600		6,000	62,000	20,000	36,000
3,700		6,000	62,000	20,000	36,000
3,800		6,000	66,000	24,000	36,000
3,900		6,000	66,000	24,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000
4,000		6,000	66,000	24,000	36,000
4,100		6,000	66,000	24,000	36,000
4,200		6,000	66,000	24,000	36,000
4,300		6,000	66,000	24,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000
4,400		6,000	66,000	24,000	36,000
4,500		6,000	66,000	24,000	36,000
4,600		6,000	66,000	24,000	36,000
4,650		6,000	66,000	24,000	36,000
4,700		6,000	66,000	24,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000
4,800		6,000	66,000	28,000	36,000
4,900		6,000	66,000	28,000	36,000
5,000		6,000	66,000	28,000	36,000
5,100		6,000	66,000	28,000	36,000
5,160	13/64	6,000	66,000	28,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
5,200		6,000	66,000	28,000	36,000
5,300		6,000	66,000	28,000	36,000
5,400		6,000	66,000	28,000	36,000
5,500		6,000	66,000	28,000	36,000
5,550		6,000	66,000	28,000	36,000
5,560	7/32	6,000	66,000	28,000	36,000
5,600		6,000	66,000	28,000	36,000
5,700		6,000	66,000	28,000	36,000
5,800		6,000	66,000	28,000	36,000
5,900		6,000	66,000	28,000	36,000
5,950	15/64	6,000	66,000	28,000	36,000
6,000		6,000	66,000	28,000	36,000
6,100		8,000	79,000	34,000	36,000
6,200		8,000	79,000	34,000	36,000
6,300		8,000	79,000	34,000	36,000
6,350	1/4	8,000	79,000	34,000	36,000
6,400		8,000	79,000	34,000	36,000
6,500		8,000	79,000	34,000	36,000
6,600		8,000	79,000	34,000	36,000
6,700		8,000	79,000	34,000	36,000
6,750	17/64	8,000	79,000	34,000	36,000
6,800		8,000	79,000	34,000	36,000
6,900		8,000	79,000	34,000	36,000
7,000		8,000	79,000	34,000	36,000
7,100		8,000	79,000	41,000	36,000
7,140	9/32	8,000	79,000	41,000	36,000
7,200		8,000	79,000	41,000	36,000
7,300		8,000	79,000	41,000	36,000
7,400		8,000	79,000	41,000	36,000
7,500		8,000	79,000	41,000	36,000

Punte TS con canali di lubrificazione

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,540	19/64	8,000	79,000	41,000	36,000
7,600		8,000	79,000	41,000	36,000
7,700		8,000	79,000	41,000	36,000
7,800		8,000	79,000	41,000	36,000
7,900		8,000	79,000	41,000	36,000
7,940	5/16	8,000	79,000	41,000	36,000
8,000		8,000	79,000	41,000	36,000
8,100		10,000	89,000	47,000	40,000
8,200		10,000	89,000	47,000	40,000
8,300		10,000	89,000	47,000	40,000
8,330	21/64	10,000	89,000	47,000	40,000
8,400		10,000	89,000	47,000	40,000
8,500		10,000	89,000	47,000	40,000
8,600		10,000	89,000	47,000	40,000
8,700		10,000	89,000	47,000	40,000
8,730	11/32	10,000	89,000	47,000	40,000
8,800		10,000	89,000	47,000	40,000
8,900		10,000	89,000	47,000	40,000
9,000		10,000	89,000	47,000	40,000
9,100		10,000	89,000	47,000	40,000
9,130	23/64	10,000	89,000	47,000	40,000
9,200		10,000	89,000	47,000	40,000
9,250		10,000	89,000	47,000	40,000
9,300		10,000	89,000	47,000	40,000
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,100		14,000	107,000	60,000	45,000
12,200		14,000	107,000	60,000	45,000
12,300	31/64	14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
13,000		14,000	107,000	60,000	45,000
13,200		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,400		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,600		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,100		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
18,900		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000

Punte TS con canali di lubrificazione

Articolo nr. 89266

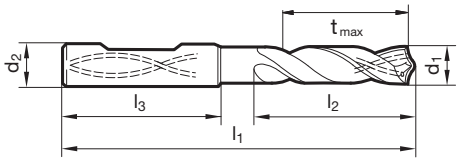
P	M	K	N	S	H
●	○	●	○	○	○

VHM | T | TS 100 U | 3xD | DIN 6537 K | 140° | m7 | R | HE

Assott. del nocc. ≥ Ø 4,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise • bronzo/ottone • leghe di alluminio con elevato contenuto di silicio

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
4,000		6,000	66,000	24,000	36,000
5,000		6,000	66,000	28,000	36,000
5,500		6,000	66,000	28,000	36,000
5,800		6,000	66,000	28,000	36,000
6,000		6,000	66,000	28,000	36,000
6,400		8,000	79,000	34,000	36,000
6,800		8,000	79,000	34,000	36,000
7,000		8,000	79,000	34,000	36,000
7,400		8,000	79,000	41,000	36,000
7,500		8,000	79,000	41,000	36,000
7,800		8,000	79,000	41,000	36,000
7,940	5/16	8,000	79,000	41,000	36,000
8,000		8,000	79,000	41,000	36,000
8,100		10,000	89,000	47,000	40,000
8,400		10,000	89,000	47,000	40,000
8,500		10,000	89,000	47,000	40,000
8,700		10,000	89,000	47,000	40,000
8,800		10,000	89,000	47,000	40,000
9,000		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,200		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
10,720	27/64	12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,500		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
13,000		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,500		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
16,200		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000

HARTNER

Punte TS con canali di lubrificazione

Articolo nr. 89306

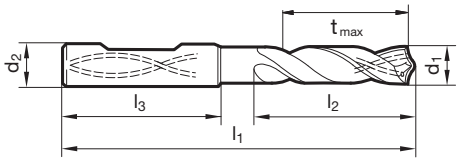
P	M	K	N	S	H
●	○	○	○		

HM | T | TS 80 U | 3xD | DIN 6538 K | 140° | h8 | R | HE

Assott. del nocc. ≥ Ø 10,000 • spoglia sul cono tagliente • smorza vibrazioni e colpi • supporto in HSS con riporti in MD

acciai non legati o legati in bassa percentuale • ghisa grigia, ghisa grafitica sferoidale • ottone, bronzi, materie sintetiche, grafite

$t_{max} = l_2\text{-}1{,}5 \times d_1$



d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
10,000	16,000	103,000	51,000	48,000
10,500	16,000	103,000	51,000	48,000
10,600	16,000	103,000	51,000	48,000
11,000	16,000	103,000	51,000	48,000
12,000	16,000	103,000	51,000	48,000
12,200	16,000	111,000	59,000	48,000
12,500	16,000	111,000	59,000	48,000
13,000	16,000	111,000	59,000	48,000
13,700	16,000	111,000	59,000	48,000
14,000	16,000	111,000	59,000	48,000
14,200	20,000	122,000	68,000	50,000
14,400	20,000	122,000	68,000	50,000
14,600	20,000	122,000	68,000	50,000
15,000	20,000	122,000	68,000	50,000
15,300	20,000	122,000	68,000	50,000
15,800	20,000	122,000	68,000	50,000
16,000	20,000	122,000	68,000	50,000
16,500	20,000	130,000	76,000	50,000

d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
17,000	20,000	130,000	76,000	50,000
17,500	20,000	130,000	76,000	50,000
17,700	20,000	130,000	76,000	50,000
18,000	20,000	130,000	76,000	50,000
18,500	25,000	144,000	84,000	56,000
19,000	25,000	144,000	84,000	56,000
19,700	25,000	144,000	84,000	56,000
20,000	25,000	144,000	84,000	56,000
20,500	25,000	153,000	93,000	56,000
21,000	25,000	153,000	93,000	56,000
21,500	25,000	153,000	93,000	56,000
22,000	25,000	153,000	93,000	56,000
22,500	25,000	161,000	101,000	56,000
23,500	25,000	161,000	101,000	56,000
25,000	32,000	174,000	110,000	60,000

Punte TS con canali di lubrificazione

Articolo nr. 89450

P	M	K	N	S	H
	•			•	

VHM | a | TS 100 INOX | 3xD | DIN 6537 K | 140° | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata acciai inossidabili e resistenti al calore • titanio e leghe di titanio • Inconel, Hastelloy, Monel

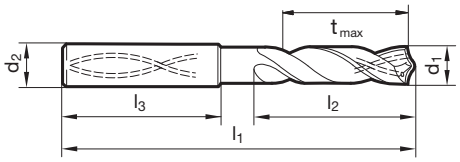
Articolo nr. 89550

P	M	K	N	S	H
	•			•	

VHM | a | TS 100 INOX | 3xD | DIN 6537 K | 140° | m7 | R | HE

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata acciai inossidabili e resistenti al calore • titanio e leghe di titanio • Inconel, Hastelloy, Monel

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	62,000	20,000	36,000
3,100		6,000	62,000	20,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000
3,200		6,000	62,000	20,000	36,000
3,250		6,000	62,000	20,000	36,000
3,300		6,000	62,000	20,000	36,000
3,400		6,000	62,000	20,000	36,000
3,500		6,000	62,000	20,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000
3,600		6,000	62,000	20,000	36,000
3,700		6,000	62,000	20,000	36,000
3,800		6,000	66,000	24,000	36,000
3,900		6,000	66,000	24,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000
4,000		6,000	66,000	24,000	36,000
4,100		6,000	66,000	24,000	36,000
4,200		6,000	66,000	24,000	36,000
4,300		6,000	66,000	24,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000
4,400		6,000	66,000	24,000	36,000
4,500		6,000	66,000	24,000	36,000
4,600		6,000	66,000	24,000	36,000
4,650		6,000	66,000	24,000	36,000
4,700		6,000	66,000	24,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000
4,800		6,000	66,000	28,000	36,000
4,900		6,000	66,000	28,000	36,000
5,000		6,000	66,000	28,000	36,000
5,100		6,000	66,000	28,000	36,000
5,160	13/64	6,000	66,000	28,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
5,200		6,000	66,000	28,000	36,000
5,300		6,000	66,000	28,000	36,000
5,400		6,000	66,000	28,000	36,000
5,500		6,000	66,000	28,000	36,000
5,550		6,000	66,000	28,000	36,000
5,560	7/32	6,000	66,000	28,000	36,000
5,600		6,000	66,000	28,000	36,000
5,700		6,000	66,000	28,000	36,000
5,800		6,000	66,000	28,000	36,000
5,900		6,000	66,000	28,000	36,000
5,950	15/64	6,000	66,000	28,000	36,000
6,000		6,000	66,000	28,000	36,000
6,100		8,000	79,000	34,000	36,000
6,200		8,000	79,000	34,000	36,000
6,300		8,000	79,000	34,000	36,000
6,350	1/4	8,000	79,000	34,000	36,000
6,400		8,000	79,000	34,000	36,000
6,500		8,000	79,000	34,000	36,000
6,600		8,000	79,000	34,000	36,000
6,700		8,000	79,000	34,000	36,000
6,750	17/64	8,000	79,000	34,000	36,000
6,800		8,000	79,000	34,000	36,000
6,900		8,000	79,000	34,000	36,000
7,000		8,000	79,000	34,000	36,000
7,100		8,000	79,000	41,000	36,000
7,140	9/32	8,000	79,000	41,000	36,000
7,200		8,000	79,000	41,000	36,000
7,300		8,000	79,000	41,000	36,000
7,400		8,000	79,000	41,000	36,000
7,500		8,000	79,000	41,000	36,000

Punte TS con canali di lubrificazione

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,540	19/64	8,000	79,000	41,000	36,000
7,600		8,000	79,000	41,000	36,000
7,700		8,000	79,000	41,000	36,000
7,800		8,000	79,000	41,000	36,000
7,900		8,000	79,000	41,000	36,000
7,940	5/16	8,000	79,000	41,000	36,000
8,000		8,000	79,000	41,000	36,000
8,100		10,000	89,000	47,000	40,000
8,200		10,000	89,000	47,000	40,000
8,300		10,000	89,000	47,000	40,000
8,330	21/64	10,000	89,000	47,000	40,000
8,400		10,000	89,000	47,000	40,000
8,500		10,000	89,000	47,000	40,000
8,600		10,000	89,000	47,000	40,000
8,700		10,000	89,000	47,000	40,000
8,730	11/32	10,000	89,000	47,000	40,000
8,800		10,000	89,000	47,000	40,000
8,900		10,000	89,000	47,000	40,000
9,000		10,000	89,000	47,000	40,000
9,100		10,000	89,000	47,000	40,000
9,130	23/64	10,000	89,000	47,000	40,000
9,200		10,000	89,000	47,000	40,000
9,250		10,000	89,000	47,000	40,000
9,300		10,000	89,000	47,000	40,000
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,200		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000
13,000		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
18,900		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,300		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000

Punte TS con canali di lubrificazione

Articolo nr. 89423

P	M	K	N	S	H
●				●	○

VHM | TS 100 H | 3xD | DIN 6537 K | 140° | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • il tagliente principale è leggermente concavo • geometria dei taglienti ottimizzata

per acciai legati e altamente legati fino a 1400 N/mm² • Inconel, Hastelloy, Monel • titanio e leghe di titanio

Articolo nr. 89424

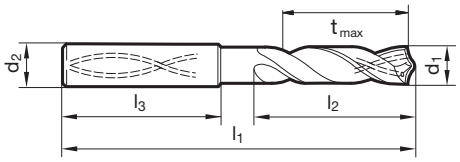
P	M	K	N	S	H
●				●	○

VHM | TS 100 H | 3xD | DIN 6537 K | 140° | m7 | R | HE

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • il tagliente principale è leggermente concavo • geometria dei taglienti ottimizzata

per acciai legati e altamente legati fino a 1400 N/mm² • Inconel, Hastelloy, Monel • titanio e leghe di titanio

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	62,000	20,000	36,000
3,100		6,000	62,000	20,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000
3,200		6,000	62,000	20,000	36,000
3,250		6,000	62,000	20,000	36,000
3,300		6,000	62,000	20,000	36,000
3,400		6,000	62,000	20,000	36,000
3,500		6,000	62,000	20,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000
3,600		6,000	62,000	20,000	36,000
3,700		6,000	62,000	20,000	36,000
3,800		6,000	66,000	24,000	36,000
3,900		6,000	66,000	24,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000
4,000		6,000	66,000	24,000	36,000
4,100		6,000	66,000	24,000	36,000
4,200		6,000	66,000	24,000	36,000
4,300		6,000	66,000	24,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000
4,400		6,000	66,000	24,000	36,000
4,500		6,000	66,000	24,000	36,000
4,600		6,000	66,000	24,000	36,000
4,650		6,000	66,000	24,000	36,000
4,700		6,000	66,000	24,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000
4,800		6,000	66,000	28,000	36,000
4,900		6,000	66,000	28,000	36,000
5,000		6,000	66,000	28,000	36,000
5,100		6,000	66,000	28,000	36,000
5,160	13/64	6,000	66,000	28,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
5,200		6,000	66,000	28,000	36,000
5,300		6,000	66,000	28,000	36,000
5,400		6,000	66,000	28,000	36,000
5,500		6,000	66,000	28,000	36,000
5,550		6,000	66,000	28,000	36,000
5,560	7/32	6,000	66,000	28,000	36,000
5,600		6,000	66,000	28,000	36,000
5,700		6,000	66,000	28,000	36,000
5,800		6,000	66,000	28,000	36,000
5,900		6,000	66,000	28,000	36,000
5,950	15/64	6,000	66,000	28,000	36,000
6,000		6,000	66,000	28,000	36,000
6,100		8,000	79,000	34,000	36,000
6,200		8,000	79,000	34,000	36,000
6,300		8,000	79,000	34,000	36,000
6,350	1/4	8,000	79,000	34,000	36,000
6,400		8,000	79,000	34,000	36,000
6,500		8,000	79,000	34,000	36,000
6,600		8,000	79,000	34,000	36,000
6,700		8,000	79,000	34,000	36,000
6,750	17/64	8,000	79,000	34,000	36,000
6,800		8,000	79,000	34,000	36,000
6,900		8,000	79,000	34,000	36,000
7,000		8,000	79,000	34,000	36,000
7,100		8,000	79,000	41,000	36,000
7,140	9/32	8,000	79,000	41,000	36,000
7,200		8,000	79,000	41,000	36,000
7,300		8,000	79,000	41,000	36,000
7,400		8,000	79,000	41,000	36,000
7,500		8,000	79,000	41,000	36,000

Punte TS con canali di lubrificazione

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,540	19/64	8,000	79,000	41,000	36,000
7,600		8,000	79,000	41,000	36,000
7,700		8,000	79,000	41,000	36,000
7,800		8,000	79,000	41,000	36,000
7,900		8,000	79,000	41,000	36,000
7,940	5/16	8,000	79,000	41,000	36,000
8,000		8,000	79,000	41,000	36,000
8,100		10,000	89,000	47,000	40,000
8,200		10,000	89,000	47,000	40,000
8,300		10,000	89,000	47,000	40,000
8,330	21/64	10,000	89,000	47,000	40,000
8,400		10,000	89,000	47,000	40,000
8,500		10,000	89,000	47,000	40,000
8,600		10,000	89,000	47,000	40,000
8,700		10,000	89,000	47,000	40,000
8,730	11/32	10,000	89,000	47,000	40,000
8,800		10,000	89,000	47,000	40,000
8,900		10,000	89,000	47,000	40,000
9,000		10,000	89,000	47,000	40,000
9,100		10,000	89,000	47,000	40,000
9,130	23/64	10,000	89,000	47,000	40,000
9,200		10,000	89,000	47,000	40,000
9,250		10,000	89,000	47,000	40,000
9,300		10,000	89,000	47,000	40,000
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,200		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000
13,000		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
18,900		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,050	3/4	20,000	131,000	79,000	50,000
19,300		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000

Punte TS con canali di lubrificazione

Articolo nr. 89292

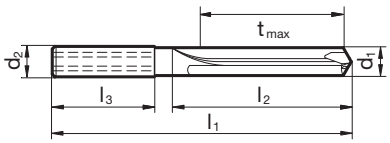
P	M	K	N	S	H
		○	●		

VHM | TS 150 GG | 4xD | WN | 120° | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • strette tolleranze sul diametro • ottima finitura di superf. del foro • attenzione alla press. del refrig.

alluminio e leghe di alluminio • leghe di alluminio con elevato contenuto di silicio

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	66,000	24,000	36,000
3,100		6,000	66,000	24,000	36,000
3,200		6,000	66,000	24,000	36,000
3,300		6,000	66,000	24,000	36,000
3,400		6,000	66,000	24,000	36,000
3,500		6,000	66,000	24,000	36,000
3,600		6,000	66,000	24,000	36,000
3,700		6,000	66,000	24,000	36,000
3,800		6,000	74,000	30,000	36,000
3,900		6,000	74,000	30,000	36,000
4,000		6,000	74,000	30,000	36,000
4,200		6,000	74,000	30,000	36,000
5,000		6,000	74,000	36,000	36,000
5,100		6,000	74,000	36,000	36,000
5,300		6,000	74,000	36,000	36,000
5,900		6,000	74,000	36,000	36,000
6,000		6,000	74,000	36,000	36,000
6,200		8,000	91,000	53,000	36,000
6,300		8,000	91,000	53,000	36,000
6,400		8,000	91,000	53,000	36,000
6,600		8,000	91,000	53,000	36,000
6,700		8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,400		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
8,100		10,000	103,000	61,000	40,000
8,200		10,000	103,000	61,000	40,000
8,300		10,000	103,000	61,000	40,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
8,400		10,000	103,000	61,000	40,000
8,500		10,000	103,000	61,000	40,000
8,700		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,400		10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,200		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,300	31/64	14,000	124,000	74,000	45,000
12,500		14,000	124,000	74,000	45,000
12,700	1/2	14,000	124,000	74,000	45,000
13,000		14,000	124,000	74,000	45,000
14,000		14,000	124,000	74,000	45,000
15,000		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
19,000		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000

Punte TS con canali di lubrificazione

Articolo nr. 89272

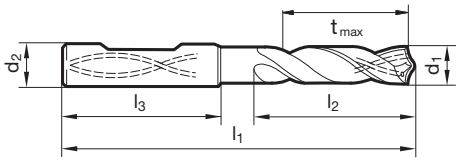
P	M	K	N	S	H
●	○	●	○	○	○

VHM | T | TS 100 U | 5xD | DIN 6537 L | 140° | m7 | R | HE

Assott. del nocc. ≥ Ø 3,700 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise • bronzo/ottone • leghe di alluminio con elevato contenuto di silicio

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,700		6,000	66,000	28,000	36,000
5,000		6,000	82,000	44,000	36,000
5,160	13/64	6,000	82,000	44,000	36,000
5,500		6,000	82,000	44,000	36,000
5,560	7/32	6,000	82,000	44,000	36,000
5,800		6,000	82,000	44,000	36,000
6,000		6,000	82,000	44,000	36,000
6,350	1/4	8,000	91,000	53,000	36,000
6,400		8,000	91,000	53,000	36,000
6,500		8,000	91,000	53,000	36,000
6,750	17/64	8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,140	9/32	8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000
7,540	19/64	8,000	91,000	53,000	36,000
7,700		8,000	91,000	53,000	36,000
7,800		8,000	91,000	53,000	36,000
7,940	5/16	8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
8,500		10,000	103,000	61,000	40,000
8,600		10,000	103,000	61,000	40,000
8,730	11/32	10,000	103,000	61,000	40,000
8,800		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,300		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,200		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,720	27/64	12,000	118,000	71,000	45,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
10,800		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,510	29/64	12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,500		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,290	9/16	16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,870	5/8	16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
19,500		20,000	153,000	101,000	50,000

Punte TS con canali di lubrificazione

Articolo nr. 89411

P	M	K	N	S	H
●	○	●	○	○	○

VHM | F | TS 100 U | 5xD | DIN 6537 L | 140° | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata
acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise
• bronzo/ottone • leghe di alluminio con elevato contenuto di silicio

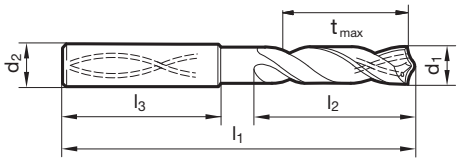
Articolo nr. 89408

P	M	K	N	S	H
●	○	●	○	○	○

VHM | F | TS 100 U | 5xD | DIN 6537 L | 140° | m7 | R | HE

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata
acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise
• bronzo/ottone • leghe di alluminio con elevato contenuto di silicio

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	66,000	28,000	36,000
3,100		6,000	66,000	28,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000
3,200		6,000	66,000	28,000	36,000
3,250		6,000	66,000	28,000	36,000
3,300		6,000	66,000	28,000	36,000
3,400		6,000	66,000	28,000	36,000
3,500		6,000	66,000	28,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000
3,600		6,000	66,000	28,000	36,000
3,700		6,000	66,000	28,000	36,000
3,800		6,000	74,000	36,000	36,000
3,900		6,000	74,000	36,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000
4,000		6,000	74,000	36,000	36,000
4,100		6,000	74,000	36,000	36,000
4,200		6,000	74,000	36,000	36,000
4,300		6,000	74,000	36,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000
4,400		6,000	74,000	36,000	36,000
4,500		6,000	74,000	36,000	36,000
4,600		6,000	74,000	36,000	36,000
4,650		6,000	74,000	36,000	36,000
4,700		6,000	74,000	36,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000
4,800		6,000	82,000	44,000	36,000
4,900		6,000	82,000	44,000	36,000
5,000		6,000	82,000	44,000	36,000
5,100		6,000	82,000	44,000	36,000
5,160	13/64	6,000	82,000	44,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
5,200		6,000	82,000	44,000	36,000
5,300		6,000	82,000	44,000	36,000
5,400		6,000	82,000	44,000	36,000
5,500		6,000	82,000	44,000	36,000
5,550		6,000	82,000	44,000	36,000
5,560	7/32	6,000	82,000	44,000	36,000
5,600		6,000	82,000	44,000	36,000
5,700		6,000	82,000	44,000	36,000
5,800		6,000	82,000	44,000	36,000
5,900		6,000	82,000	44,000	36,000
5,950	15/64	6,000	82,000	44,000	36,000
6,000		6,000	82,000	44,000	36,000
6,100		8,000	91,000	53,000	36,000
6,200		8,000	91,000	53,000	36,000
6,300		8,000	91,000	53,000	36,000
6,350	1/4	8,000	91,000	53,000	36,000
6,400		8,000	91,000	53,000	36,000
6,500		8,000	91,000	53,000	36,000
6,600		8,000	91,000	53,000	36,000
6,700		8,000	91,000	53,000	36,000
6,750	17/64	8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
6,900		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,100		8,000	91,000	53,000	36,000
7,140	9/32	8,000	91,000	53,000	36,000
7,200		8,000	91,000	53,000	36,000
7,300		8,000	91,000	53,000	36,000
7,400		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000

Punte TS con canali di lubrificazione

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,540	19/64	8,000	91,000	53,000	36,000
7,600		8,000	91,000	53,000	36,000
7,700		8,000	91,000	53,000	36,000
7,800		8,000	91,000	53,000	36,000
7,900		8,000	91,000	53,000	36,000
7,940	5/16	8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
8,100		10,000	103,000	61,000	40,000
8,200		10,000	103,000	61,000	40,000
8,300		10,000	103,000	61,000	40,000
8,330	21/64	10,000	103,000	61,000	40,000
8,400		10,000	103,000	61,000	40,000
8,500		10,000	103,000	61,000	40,000
8,600		10,000	103,000	61,000	40,000
8,700		10,000	103,000	61,000	40,000
8,730	11/32	10,000	103,000	61,000	40,000
8,800		10,000	103,000	61,000	40,000
8,900		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,100		10,000	103,000	61,000	40,000
9,130	23/64	10,000	103,000	61,000	40,000
9,200		10,000	103,000	61,000	40,000
9,250		10,000	103,000	61,000	40,000
9,300		10,000	103,000	61,000	40,000
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,100		14,000	124,000	77,000	45,000
12,200		14,000	124,000	77,000	45,000
12,300	31/64	14,000	124,000	77,000	45,000
12,400		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,600		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,100	33/64	14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
13,800		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,100		16,000	133,000	83,000	48,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
14,800		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,100		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
15,800		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
16,900		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000

Punte TS con canali di lubrificazione

Articolo nr. 89307

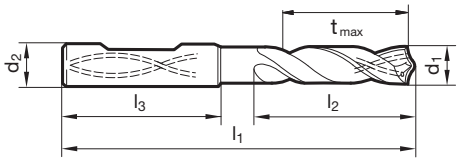
P	M	K	N	S	H
●	○	○	○		

HM | T | TS 80 U | 5xD | DIN 6538M | 140° | h7 | R | HE

Assott. del nocc. ≥ Ø 9,800 • spoglia sul cono tagliente • supporto in HSS con riporti in MD • smorza vibrazioni e colpi

acciai non legati o legati in bassa percentuale • ghisa grigia, ghisa grafitica sferoidale • ottone, bronzi, materie sintetiche, grafite

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
9,800	16,000	127,000	75,000	48,000
10,000	16,000	127,000	75,000	48,000
10,200	16,000	127,000	75,000	48,000
10,500	16,000	127,000	75,000	48,000
10,600	16,000	127,000	75,000	48,000
10,700	16,000	127,000	75,000	48,000
10,800	16,000	127,000	75,000	48,000
11,000	16,000	127,000	75,000	48,000
11,800	16,000	127,000	75,000	48,000
11,900	16,000	127,000	75,000	48,000
12,000	16,000	127,000	75,000	48,000
12,300	16,000	139,000	87,000	48,000
12,500	16,000	139,000	87,000	48,000
12,700	16,000	139,000	87,000	48,000
12,900	16,000	139,000	87,000	48,000
13,000	16,000	139,000	87,000	48,000
13,100	16,000	139,000	87,000	48,000
13,500	16,000	139,000	87,000	48,000
13,600	16,000	139,000	87,000	48,000
13,700	16,000	139,000	87,000	48,000
13,900	16,000	139,000	87,000	48,000
14,000	16,000	139,000	87,000	48,000
14,500	20,000	154,000	100,000	50,000
14,600	20,000	154,000	100,000	50,000
15,000	20,000	154,000	100,000	50,000
15,200	20,000	154,000	100,000	50,000
15,500	20,000	154,000	100,000	50,000
15,700	20,000	154,000	100,000	50,000
16,000	20,000	154,000	100,000	50,000
16,200	20,000	166,000	112,000	50,000

d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
16,500	20,000	166,000	112,000	50,000
16,800	20,000	166,000	112,000	50,000
17,000	20,000	166,000	112,000	50,000
17,200	20,000	166,000	112,000	50,000
17,300	20,000	166,000	112,000	50,000
17,500	20,000	166,000	112,000	50,000
18,000	20,000	166,000	112,000	50,000
18,300	25,000	184,000	124,000	56,000
18,500	25,000	184,000	124,000	56,000
19,000	25,000	184,000	124,000	56,000
19,500	25,000	184,000	124,000	56,000
19,700	25,000	184,000	124,000	56,000
20,000	25,000	184,000	124,000	56,000
20,500	25,000	197,000	137,000	56,000
21,000	25,000	197,000	137,000	56,000
22,000	25,000	197,000	137,000	56,000
22,220	25,000	209,000	149,000	56,000
22,500	25,000	209,000	149,000	56,000
23,000	25,000	209,000	149,000	56,000
23,500	25,000	209,000	149,000	56,000
24,000	25,000	209,000	149,000	56,000
24,500	32,000	226,000	162,000	60,000
25,000	32,000	226,000	162,000	60,000
25,500	32,000	226,000	162,000	60,000

Punte TS con canali di lubrificazione

Articolo nr. 89451

P	M	K	N	S	H
	•			•	

VHM | a | TS 100 INOX | 5xD | DIN 6537 L | 140° | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata acciai inossidabili e resistenti al calore • titanio e leghe di titanio • Inconel, Hastelloy, Monel

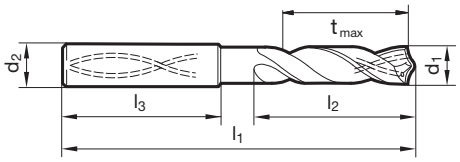
Articolo nr. 89551

P	M	K	N	S	H
	•			•	

VHM | a | TS 100 INOX | 5xD | DIN 6537 L | 140° | m7 | R | HE

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata acciai inossidabili e resistenti al calore • titanio e leghe di titanio • Inconel, Hastelloy, Monel

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	66,000	28,000	36,000
3,100		6,000	66,000	28,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000
3,200		6,000	66,000	28,000	36,000
3,250		6,000	66,000	28,000	36,000
3,300		6,000	66,000	28,000	36,000
3,400		6,000	66,000	28,000	36,000
3,500		6,000	66,000	28,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000
3,600		6,000	66,000	28,000	36,000
3,700		6,000	66,000	28,000	36,000
3,800		6,000	74,000	36,000	36,000
3,900		6,000	74,000	36,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000
4,000		6,000	74,000	36,000	36,000
4,100		6,000	74,000	36,000	36,000
4,200		6,000	74,000	36,000	36,000
4,300		6,000	74,000	36,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000
4,400		6,000	74,000	36,000	36,000
4,500		6,000	74,000	36,000	36,000
4,600		6,000	74,000	36,000	36,000
4,650		6,000	74,000	36,000	36,000
4,700		6,000	74,000	36,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000
4,800		6,000	82,000	44,000	36,000
4,900		6,000	82,000	44,000	36,000
5,000		6,000	82,000	44,000	36,000
5,100		6,000	82,000	44,000	36,000
5,160	13/64	6,000	82,000	44,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
5,200		6,000	82,000	44,000	36,000
5,300		6,000	82,000	44,000	36,000
5,400		6,000	82,000	44,000	36,000
5,500		6,000	82,000	44,000	36,000
5,550		6,000	82,000	44,000	36,000
5,560	7/32	6,000	82,000	44,000	36,000
5,600		6,000	82,000	44,000	36,000
5,700		6,000	82,000	44,000	36,000
5,800		6,000	82,000	44,000	36,000
5,900		6,000	82,000	44,000	36,000
5,950	15/64	6,000	82,000	44,000	36,000
6,000		6,000	82,000	44,000	36,000
6,100		8,000	91,000	53,000	36,000
6,200		8,000	91,000	53,000	36,000
6,300		8,000	91,000	53,000	36,000
6,350	1/4	8,000	91,000	53,000	36,000
6,400		8,000	91,000	53,000	36,000
6,500		8,000	91,000	53,000	36,000
6,600		8,000	91,000	53,000	36,000
6,700		8,000	91,000	53,000	36,000
6,750	17/64	8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
6,900		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,100		8,000	91,000	53,000	36,000
7,140	9/32	8,000	91,000	53,000	36,000
7,200		8,000	91,000	53,000	36,000
7,300		8,000	91,000	53,000	36,000
7,400		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000

Punte TS con canali di lubrificazione

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,540	19/64	8,000	91,000	53,000	36,000
7,600		8,000	91,000	53,000	36,000
7,700		8,000	91,000	53,000	36,000
7,800		8,000	91,000	53,000	36,000
7,900		8,000	91,000	53,000	36,000
7,940	5/16	8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
8,100		10,000	103,000	61,000	40,000
8,200		10,000	103,000	61,000	40,000
8,300		10,000	103,000	61,000	40,000
8,330	21/64	10,000	103,000	61,000	40,000
8,400		10,000	103,000	61,000	40,000
8,500		10,000	103,000	61,000	40,000
8,600		10,000	103,000	61,000	40,000
8,700		10,000	103,000	61,000	40,000
8,730	11/32	10,000	103,000	61,000	40,000
8,800		10,000	103,000	61,000	40,000
8,900		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,100		10,000	103,000	61,000	40,000
9,130	23/64	10,000	103,000	61,000	40,000
9,200		10,000	103,000	61,000	40,000
9,250		10,000	103,000	61,000	40,000
9,300		10,000	103,000	61,000	40,000
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,200		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,300		18,000	143,000	93,000	48,000
16,500		18,000	143,000	93,000	48,000
16,900		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,300		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,300		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000

Punte TS con canali di lubrificazione

Articolo nr. 89425

P	M	K	N	S	H
●				●	○

VHM | TS 100 H | 5xD | DIN 6537 L | 140° | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • il tagliente principale è leggermente concavo • geometria dei taglienti ottimizzata

per acciai legati e altamente legati fino a 1400 N/mm² • Inconel, Hastelloy, Monel • titanio e leghe di titanio

Articolo nr. 89426

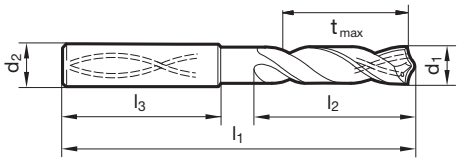
P	M	K	N	S	H
●				●	○

VHM | TS 100 H | 5xD | DIN 6537 L | 140° | m7 | R | HE

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • il tagliente principale è leggermente concavo • geometria dei taglienti ottimizzata

per acciai legati e altamente legati fino a 1400 N/mm² • Inconel, Hastelloy, Monel • titanio e leghe di titanio

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	66,000	28,000	36,000	5,200		6,000	82,000	44,000	36,000
3,100		6,000	66,000	28,000	36,000	5,300		6,000	82,000	44,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	5,400		6,000	82,000	44,000	36,000
3,200		6,000	66,000	28,000	36,000	5,500		6,000	82,000	44,000	36,000
3,250		6,000	66,000	28,000	36,000	5,550		6,000	82,000	44,000	36,000
3,300		6,000	66,000	28,000	36,000	5,560	7/32	6,000	82,000	44,000	36,000
3,400		6,000	66,000	28,000	36,000	5,600		6,000	82,000	44,000	36,000
3,500		6,000	66,000	28,000	36,000	5,700		6,000	82,000	44,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	5,800		6,000	82,000	44,000	36,000
3,600		6,000	66,000	28,000	36,000	5,900		6,000	82,000	44,000	36,000
3,700		6,000	66,000	28,000	36,000	5,950	15/64	6,000	82,000	44,000	36,000
3,800		6,000	74,000	36,000	36,000	6,000		6,000	82,000	44,000	36,000
3,900		6,000	74,000	36,000	36,000	6,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	6,200		8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	6,300		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	6,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	6,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	6,600		8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	6,700		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	6,800		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	6,900		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	7,100		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,900		6,000	82,000	44,000	36,000	7,200		8,000	91,000	53,000	36,000
5,000		6,000	82,000	44,000	36,000	7,300		8,000	91,000	53,000	36,000
5,100		6,000	82,000	44,000	36,000	7,400		8,000	91,000	53,000	36,000
5,160	13/64	6,000	82,000	44,000	36,000	7,500		8,000	91,000	53,000	36,000

Punte TS con canali di lubrificazione

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,540	19/64	8,000	91,000	53,000	36,000
7,600		8,000	91,000	53,000	36,000
7,700		8,000	91,000	53,000	36,000
7,800		8,000	91,000	53,000	36,000
7,900		8,000	91,000	53,000	36,000
7,940	5/16	8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
8,100		10,000	103,000	61,000	40,000
8,200		10,000	103,000	61,000	40,000
8,300		10,000	103,000	61,000	40,000
8,330	21/64	10,000	103,000	61,000	40,000
8,400		10,000	103,000	61,000	40,000
8,500		10,000	103,000	61,000	40,000
8,600		10,000	103,000	61,000	40,000
8,700		10,000	103,000	61,000	40,000
8,730	11/32	10,000	103,000	61,000	40,000
8,800		10,000	103,000	61,000	40,000
8,900		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,100		10,000	103,000	61,000	40,000
9,130	23/64	10,000	103,000	61,000	40,000
9,200		10,000	103,000	61,000	40,000
9,250		10,000	103,000	61,000	40,000
9,300		10,000	103,000	61,000	40,000
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,200		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,300		18,000	143,000	93,000	48,000
16,500		18,000	143,000	93,000	48,000
16,900		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,300		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,300		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000

Punte TS con canali di lubrificazione

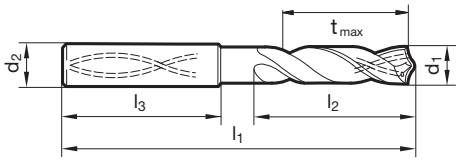
Articolo nr. 89420

P	M	K	N	S	H
		•			

VHM | F | TS 100 R | 5xD | DIN 6537 L | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • affilatura raggiata brevettata • tagliente dritto (con la correzione del labbro)
ghisa verimicolare GGV e ADI, CDI • ghisa grigia, ghisa malleabile, ghisa sferoidale

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	66,000	28,000	36,000
3,100		6,000	66,000	28,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000
3,200		6,000	66,000	28,000	36,000
3,250		6,000	66,000	28,000	36,000
3,300		6,000	66,000	28,000	36,000
3,400		6,000	66,000	28,000	36,000
3,500		6,000	66,000	28,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000
3,600		6,000	66,000	28,000	36,000
3,700		6,000	66,000	28,000	36,000
3,800		6,000	74,000	36,000	36,000
3,900		6,000	74,000	36,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000
4,000		6,000	74,000	36,000	36,000
4,100		6,000	74,000	36,000	36,000
4,200		6,000	74,000	36,000	36,000
4,300		6,000	74,000	36,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000
4,400		6,000	74,000	36,000	36,000
4,500		6,000	74,000	36,000	36,000
4,600		6,000	74,000	36,000	36,000
4,650		6,000	74,000	36,000	36,000
4,700		6,000	74,000	36,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000
4,800		6,000	82,000	44,000	36,000
4,900		6,000	82,000	44,000	36,000
5,000		6,000	82,000	44,000	36,000
5,100		6,000	82,000	44,000	36,000
5,160	13/64	6,000	82,000	44,000	36,000
5,200		6,000	82,000	44,000	36,000
5,300		6,000	82,000	44,000	36,000
5,400		6,000	82,000	44,000	36,000
5,500		6,000	82,000	44,000	36,000
5,550		6,000	82,000	44,000	36,000
5,560	7/32	6,000	82,000	44,000	36,000
5,600		6,000	82,000	44,000	36,000
5,700		6,000	82,000	44,000	36,000
5,800		6,000	82,000	44,000	36,000
5,900		6,000	82,000	44,000	36,000
5,950	15/64	6,000	82,000	44,000	36,000
6,000		6,000	82,000	44,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
6,100		8,000	91,000	53,000	36,000
6,200		8,000	91,000	53,000	36,000
6,300		8,000	91,000	53,000	36,000
6,350	1/4	8,000	91,000	53,000	36,000
6,400		8,000	91,000	53,000	36,000
6,500		8,000	91,000	53,000	36,000
6,600		8,000	91,000	53,000	36,000
6,700		8,000	91,000	53,000	36,000
6,750	17/64	8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
6,900		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,100		8,000	91,000	53,000	36,000
7,140	9/32	8,000	91,000	53,000	36,000
7,200		8,000	91,000	53,000	36,000
7,300		8,000	91,000	53,000	36,000
7,400		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000
7,540	19/64	8,000	91,000	53,000	36,000
7,600		8,000	91,000	53,000	36,000
7,700		8,000	91,000	53,000	36,000
7,800		8,000	91,000	53,000	36,000
7,900		8,000	91,000	53,000	36,000
7,940	5/16	8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
8,100		10,000	103,000	61,000	40,000
8,200		10,000	103,000	61,000	40,000
8,300		10,000	103,000	61,000	40,000
8,330	21/64	10,000	103,000	61,000	40,000
8,400		10,000	103,000	61,000	40,000
8,500		10,000	103,000	61,000	40,000
8,600		10,000	103,000	61,000	40,000
8,700		10,000	103,000	61,000	40,000
8,730	11/32	10,000	103,000	61,000	40,000
8,800		10,000	103,000	61,000	40,000
8,900		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,100		10,000	103,000	61,000	40,000
9,130	23/64	10,000	103,000	61,000	40,000
9,200		10,000	103,000	61,000	40,000
9,250		10,000	103,000	61,000	40,000
9,300		10,000	103,000	61,000	40,000

Punte TS con canali di lubrificazione

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,720	27/64	12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,100		14,000	124,000	77,000	45,000
12,200		14,000	124,000	77,000	45,000
12,300	31/64	14,000	124,000	77,000	45,000
12,400		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,600		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
12,900		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,100	33/64	14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,400		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
13,800		14,000	124,000	77,000	45,000
13,900		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,100		16,000	133,000	83,000	48,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,400		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,600		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
14,900		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,100		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,400		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,600		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
15,800		16,000	133,000	83,000	48,000
15,870	5/8	16,000	133,000	83,000	48,000
15,900		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
16,670	21/32	18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000

Punte TS con canali di lubrificazione

Articolo nr. 89412

P	M	K	N	S	H
●	○	●	○	○	○

VHM | F | TS 100 U | 7xD | WN | 140° | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata
acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise
• bronzo/ottone • leghe di alluminio con elevato contenuto di silicio

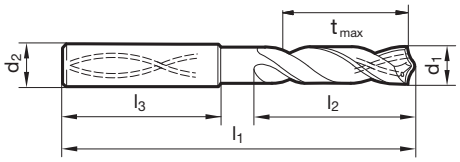
Articolo nr. 89416

P	M	K	N	S	H
●	○	●	○	○	○

VHM | F | TS 100 U | 7xD | WN | 140° | m7 | R | HE

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata
acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise
• bronzo/ottone • leghe di alluminio con elevato contenuto di silicio

$t_{max} = l_2\text{-}1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	70,000	30,000	36,000
3,100		6,000	70,000	30,000	36,000
3,170	1/8	6,000	70,000	30,000	36,000
3,200		6,000	70,000	30,000	36,000
3,250		6,000	70,000	30,000	36,000
3,300		6,000	70,000	30,000	36,000
3,400		6,000	75,000	35,500	36,000
3,500		6,000	75,000	35,500	36,000
3,570	9/64	6,000	75,000	35,500	36,000
3,600		6,000	75,000	35,500	36,000
3,700		6,000	75,000	35,500	36,000
3,800		6,000	75,000	37,500	36,000
3,900		6,000	75,000	37,500	36,000
3,970	5/32	6,000	75,000	37,500	36,000
4,000		6,000	75,000	37,500	36,000
4,100		6,000	75,000	37,500	36,000
4,200		6,000	75,000	37,500	36,000
4,300		6,000	85,000	45,000	36,000
4,370	11/64	6,000	85,000	45,000	36,000
4,400		6,000	85,000	45,000	36,000
4,500		6,000	85,000	45,000	36,000
4,600		6,000	85,000	45,000	36,000
4,650		6,000	85,000	45,000	36,000
4,700		6,000	85,000	45,000	36,000
4,760	3/16	6,000	90,000	50,000	36,000
4,800		6,000	90,000	50,000	36,000
4,900		6,000	90,000	50,000	36,000
5,000		6,000	90,000	50,000	36,000
5,100		6,000	90,000	50,000	36,000
5,160	13/64	6,000	90,000	50,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
5,200		6,000	90,000	50,000	36,000
5,300		6,000	90,000	50,000	36,000
5,400		6,000	97,000	57,000	36,000
5,500		6,000	97,000	57,000	36,000
5,700		6,000	97,000	57,000	36,000
5,800		6,000	97,000	57,000	36,000
5,900		6,000	97,000	57,000	36,000
5,950	15/64	6,000	97,000	57,000	36,000
6,000		6,000	97,000	57,000	36,000
6,200		8,000	106,000	66,000	36,000
6,300		8,000	106,000	66,000	36,000
6,350	1/4	8,000	106,000	66,000	36,000
6,500		8,000	106,000	66,000	36,000
6,600		8,000	106,000	66,000	36,000
6,700		8,000	106,000	66,000	36,000
6,800		8,000	106,000	66,000	36,000
6,900		8,000	116,000	76,000	36,000
7,000		8,000	116,000	76,000	36,000
7,100		8,000	116,000	76,000	36,000
7,200		8,000	116,000	76,000	36,000
7,500		8,000	116,000	76,000	36,000
7,600		8,000	116,000	76,000	36,000
7,700		8,000	116,000	76,000	36,000
7,800		8,000	116,000	76,000	36,000
8,000		8,000	116,000	76,000	36,000
8,100		10,000	131,000	87,000	40,000
8,200		10,000	131,000	87,000	40,000
8,400		10,000	131,000	87,000	40,000
8,500		10,000	131,000	87,000	40,000
8,600		10,000	131,000	87,000	40,000

Punte TS con canali di lubrificazione

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
8,700		10,000	131,000	87,000	40,000
8,800		10,000	131,000	87,000	40,000
9,000		10,000	131,000	87,000	40,000
9,100		10,000	139,000	95,000	40,000
9,200		10,000	139,000	95,000	40,000
9,250		10,000	139,000	95,000	40,000
9,300		10,000	139,000	95,000	40,000
9,400		10,000	139,000	95,000	40,000
9,500		10,000	139,000	95,000	40,000
9,520	3/8	10,000	139,000	95,000	40,000
9,700		10,000	139,000	95,000	40,000
9,800		10,000	139,000	95,000	40,000
9,900		10,000	139,000	95,000	40,000
10,000		10,000	139,000	95,000	40,000
10,200		12,000	155,000	106,000	45,000
10,300		12,000	155,000	106,000	45,000
10,500		12,000	155,000	106,000	45,000
10,800		12,000	155,000	106,000	45,000
11,000		12,000	155,000	106,000	45,000
11,200		12,000	163,000	114,000	45,000
11,500		12,000	163,000	114,000	45,000
11,800		12,000	163,000	114,000	45,000
12,000		12,000	163,000	114,000	45,000
12,100		14,000	182,000	133,000	45,000
12,200		14,000	182,000	133,000	45,000
12,500		14,000	182,000	133,000	45,000
12,700	1/2	14,000	182,000	133,000	45,000
13,000		14,000	182,000	133,000	45,000
13,100	33/64	14,000	182,000	133,000	45,000
13,500		14,000	182,000	133,000	45,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
14,000		14,000	182,000	133,000	45,000
14,100		16,000	204,000	152,000	48,000
14,200		16,000	204,000	152,000	48,000
14,500		16,000	204,000	152,000	48,000
15,000		16,000	204,000	152,000	48,000
15,100		16,000	204,000	152,000	48,000
15,500		16,000	204,000	152,000	48,000
16,000		16,000	204,000	152,000	48,000
16,500		18,000	223,000	171,000	48,000
16,900		18,000	223,000	171,000	48,000
17,000		18,000	223,000	171,000	48,000
17,500		18,000	223,000	171,000	48,000
18,000		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
18,900		20,000	244,000	190,000	50,000
19,000		20,000	244,000	190,000	50,000
19,050	3/4	20,000	244,000	190,000	50,000
19,500		20,000	244,000	190,000	50,000
20,000		20,000	244,000	190,000	50,000

Punte TS con canali di lubrificazione

Articolo nr. 89308

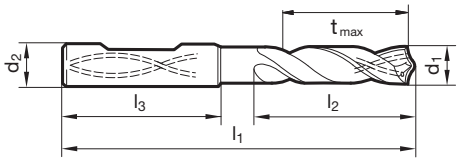
P	M	K	N	S	H
●	○	○	○		

HM | T | TS 80 U | 7xD | DIN 6538L | 140° | h8 | R | HE

Assott. del nocc. ≥ Ø 10,000 • spoglia sul cono tagliente • smorza vibrazioni e colpi • supporto in HSS con riporti in MD

acciai non legati o legati in bassa percentuale • ghisa grigia, ghisa grafitica sferoidale • ottone, bronzi, materie sintetiche, grafite

$t_{max} = l_2\text{-}1{,}5 \times d_1$



d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
10,000	16,000	151,000	99,000	48,000
11,000	16,000	151,000	99,000	48,000
11,800	16,000	151,000	99,000	48,000
12,000	16,000	151,000	99,000	48,000
13,000	16,000	167,000	115,000	48,000
13,500	16,000	167,000	115,000	48,000
14,000	16,000	167,000	115,000	48,000
15,000	20,000	186,000	132,000	50,000
16,000	20,000	186,000	132,000	50,000
16,500	20,000	202,000	148,000	50,000
17,000	20,000	202,000	148,000	50,000
17,500	20,000	202,000	148,000	50,000

d1 mm	d2 h6 mm	l1 mm	l2 mm	l3 mm
18,000	20,000	202,000	148,000	50,000
19,000	25,000	224,000	164,000	56,000
20,000	25,000	224,000	164,000	56,000
22,000	25,000	241,000	181,000	56,000

Punte TS con canali di lubrificazione

Articolo nr. 89427

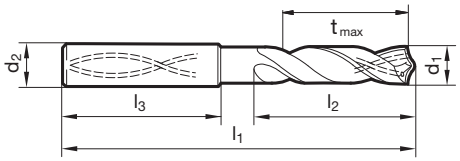
P	M	K	N	S	H
•				•	○

VHM | TS 100 H | 7xD | WN | 140° | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • il tagliente principale è leggermente concavo • geometria dei taglienti ottimizzata

per acciai legati e altamente legati fino a 1400 N/mm² • Inconel, Hastelloy, Monel • titanio e leghe di titanio

$t_{max} = l_2\text{-}1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	70,000	30,000	36,000
3,250		6,000	70,000	30,000	36,000
3,300		6,000	70,000	30,000	36,000
3,400		6,000	75,000	35,500	36,000
3,500		6,000	75,000	35,500	36,000
3,700		6,000	75,000	35,500	36,000
4,000		6,000	75,000	37,500	36,000
4,200		6,000	75,000	37,500	36,000
4,300		6,000	85,000	45,000	36,000
4,500		6,000	85,000	45,000	36,000
4,650		6,000	85,000	45,000	36,000
5,000		6,000	90,000	50,000	36,000
5,100		6,000	90,000	50,000	36,000
5,200		6,000	90,000	50,000	36,000
5,500		6,000	97,000	57,000	36,000
5,550		6,000	97,000	57,000	36,000
6,000		6,000	97,000	57,000	36,000
6,500		8,000	106,000	66,000	36,000
6,750	17/64	8,000	106,000	66,000	36,000
6,800		8,000	106,000	66,000	36,000
6,900		8,000	116,000	76,000	36,000
7,000		8,000	116,000	76,000	36,000
7,400		8,000	116,000	76,000	36,000
7,500		8,000	116,000	76,000	36,000
7,800		8,000	116,000	76,000	36,000
8,000		8,000	116,000	76,000	36,000
8,500		10,000	131,000	87,000	40,000
8,600		10,000	131,000	87,000	40,000
8,800		10,000	131,000	87,000	40,000
9,000		10,000	131,000	87,000	40,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9,250		10,000	139,000	95,000	40,000
9,400		10,000	139,000	95,000	40,000
9,500		10,000	139,000	95,000	40,000
10,000		10,000	139,000	95,000	40,000
10,200		12,000	155,000	106,000	45,000
10,400		12,000	155,000	106,000	45,000
10,500		12,000	155,000	106,000	45,000
10,800		12,000	155,000	106,000	45,000
11,000		12,000	155,000	106,000	45,000
11,300		12,000	163,000	114,000	45,000
11,400		12,000	163,000	114,000	45,000
11,500		12,000	163,000	114,000	45,000
12,000		12,000	163,000	114,000	45,000
12,500		14,000	182,000	133,000	45,000
13,000		14,000	182,000	133,000	45,000
13,100	33/64	14,000	182,000	133,000	45,000
13,500		14,000	182,000	133,000	45,000
14,000		14,000	182,000	133,000	45,000
14,500		16,000	204,000	152,000	48,000
15,000		16,000	204,000	152,000	48,000
15,100		16,000	204,000	152,000	48,000
15,500		16,000	204,000	152,000	48,000
16,000		16,000	204,000	152,000	48,000

Punte TS con canali di lubrificazione

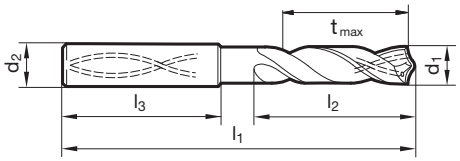
Articolo nr. 89421

P	M	K	N	S	H
		•			

VHM | F | TS 100 R | 7xD | WN | m7 | R | HA

Assott. del nocc. ≥ Ø 4,000 • affilatura raggiata brevettata • tagliente dritto (con la correzione del labbro)
ghisa verimicolare GGV e ADI, CDI • ghisa grigia, ghisa malleabile, ghisa sferoidale

$t_{max} = l_2\text{-}1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
4,000		6,000	75,000	37,500	36,000
4,100		6,000	75,000	37,500	36,000
4,200		6,000	75,000	37,500	36,000
4,300		6,000	85,000	45,000	36,000
4,370	11/64	6,000	85,000	45,000	36,000
4,400		6,000	85,000	45,000	36,000
4,500		6,000	85,000	45,000	36,000
4,600		6,000	85,000	45,000	36,000
4,650		6,000	85,000	45,000	36,000
4,700		6,000	85,000	45,000	36,000
4,760	3/16	6,000	90,000	50,000	36,000
4,800		6,000	90,000	50,000	36,000
4,900		6,000	90,000	50,000	36,000
5,000		6,000	90,000	50,000	36,000
5,100		6,000	90,000	50,000	36,000
5,160	13/64	6,000	90,000	50,000	36,000
5,200		6,000	90,000	50,000	36,000
5,300		6,000	90,000	50,000	36,000
5,400		6,000	97,000	57,000	36,000
5,500		6,000	97,000	57,000	36,000
5,550		6,000	97,000	57,000	36,000
5,560	7/32	6,000	97,000	57,000	36,000
5,600		6,000	97,000	57,000	36,000
5,700		6,000	97,000	57,000	36,000
5,800		6,000	97,000	57,000	36,000
5,900		6,000	97,000	57,000	36,000
5,950	15/64	6,000	97,000	57,000	36,000
6,000		6,000	97,000	57,000	36,000
6,100		8,000	106,000	66,000	36,000
6,200		8,000	106,000	66,000	36,000
6,300		8,000	106,000	66,000	36,000
6,350	1/4	8,000	106,000	66,000	36,000
6,400		8,000	106,000	66,000	36,000
6,500		8,000	106,000	66,000	36,000
6,600		8,000	106,000	66,000	36,000
6,700		8,000	106,000	66,000	36,000
6,750	17/64	8,000	106,000	66,000	36,000
6,800		8,000	106,000	66,000	36,000
6,900		8,000	116,000	76,000	36,000
7,000		8,000	116,000	76,000	36,000
7,100		8,000	116,000	76,000	36,000
7,140	9/32	8,000	116,000	76,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,200		8,000	116,000	76,000	36,000
7,300		8,000	116,000	76,000	36,000
7,400		8,000	116,000	76,000	36,000
7,500		8,000	116,000	76,000	36,000
7,540	19/64	8,000	116,000	76,000	36,000
7,600		8,000	116,000	76,000	36,000
7,700		8,000	116,000	76,000	36,000
7,800		8,000	116,000	76,000	36,000
7,900		8,000	116,000	76,000	36,000
7,940	5/16	8,000	116,000	76,000	36,000
8,000		8,000	116,000	76,000	36,000
8,100		10,000	131,000	87,000	40,000
8,200		10,000	131,000	87,000	40,000
8,300		10,000	131,000	87,000	40,000
8,330	21/64	10,000	131,000	87,000	40,000
8,400		10,000	131,000	87,000	40,000
8,500		10,000	131,000	87,000	40,000
8,600		10,000	131,000	87,000	40,000
8,700		10,000	131,000	87,000	40,000
8,730	11/32	10,000	131,000	87,000	40,000
8,800		10,000	131,000	87,000	40,000
8,900		10,000	131,000	87,000	40,000
9,000		10,000	131,000	87,000	40,000
9,100		10,000	139,000	95,000	40,000
9,130	23/64	10,000	139,000	95,000	40,000
9,200		10,000	139,000	95,000	40,000
9,250		10,000	139,000	95,000	40,000
9,300		10,000	139,000	95,000	40,000
9,400		10,000	139,000	95,000	40,000
9,500		10,000	139,000	95,000	40,000
9,520	3/8	10,000	139,000	95,000	40,000
9,600		10,000	139,000	95,000	40,000
9,700		10,000	139,000	95,000	40,000
9,800		10,000	139,000	95,000	40,000
9,900		10,000	139,000	95,000	40,000
9,920	25/64	10,000	139,000	95,000	40,000
10,000		10,000	139,000	95,000	40,000
10,100		12,000	155,000	106,000	45,000
10,200		12,000	155,000	106,000	45,000
10,300		12,000	155,000	106,000	45,000
10,320	13/32	12,000	155,000	106,000	45,000
10,400		12,000	155,000	106,000	45,000

Punte TS con canali di lubrificazione

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
10,500		12,000	155,000	106,000	45,000
10,600		12,000	155,000	106,000	45,000
10,700		12,000	155,000	106,000	45,000
10,720	27/64	12,000	155,000	106,000	45,000
10,800		12,000	155,000	106,000	45,000
10,900		12,000	155,000	106,000	45,000
11,000		12,000	155,000	106,000	45,000
11,100		12,000	163,000	114,000	45,000
11,110	7/16	12,000	163,000	114,000	45,000
11,200		12,000	163,000	114,000	45,000
11,300		12,000	163,000	114,000	45,000
11,400		12,000	163,000	114,000	45,000
11,500		12,000	163,000	114,000	45,000
11,600		12,000	163,000	114,000	45,000
11,700		12,000	163,000	114,000	45,000
11,800		12,000	163,000	114,000	45,000
11,900		12,000	163,000	114,000	45,000
11,910	15/32	12,000	163,000	114,000	45,000
12,000		12,000	163,000	114,000	45,000
12,100		14,000	182,000	133,000	45,000
12,200		14,000	182,000	133,000	45,000
12,300	31/64	14,000	182,000	133,000	45,000
12,400		14,000	182,000	133,000	45,000
12,500		14,000	182,000	133,000	45,000
12,600		14,000	182,000	133,000	45,000
12,700	1/2	14,000	182,000	133,000	45,000
12,800		14,000	182,000	133,000	45,000
12,900		14,000	182,000	133,000	45,000
13,000		14,000	182,000	133,000	45,000
13,100	33/64	14,000	182,000	133,000	45,000
13,300		14,000	182,000	133,000	45,000
13,400		14,000	182,000	133,000	45,000
13,500		14,000	182,000	133,000	45,000
13,700		14,000	182,000	133,000	45,000
13,800		14,000	182,000	133,000	45,000
13,900		14,000	182,000	133,000	45,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
14,000		14,000	182,000	133,000	45,000
14,100		16,000	204,000	152,000	48,000
14,200		16,000	204,000	152,000	48,000
14,290	9/16	16,000	204,000	152,000	48,000
14,300		16,000	204,000	152,000	48,000
14,400		16,000	204,000	152,000	48,000
14,500		16,000	204,000	152,000	48,000
14,600		16,000	204,000	152,000	48,000
14,700		16,000	204,000	152,000	48,000
14,900		16,000	204,000	152,000	48,000
15,000		16,000	204,000	152,000	48,000
15,100		16,000	204,000	152,000	48,000
15,200		16,000	204,000	152,000	48,000
15,300		16,000	204,000	152,000	48,000
15,400		16,000	204,000	152,000	48,000
15,500		16,000	204,000	152,000	48,000
15,600		16,000	204,000	152,000	48,000
15,700		16,000	204,000	152,000	48,000
15,800		16,000	204,000	152,000	48,000
15,870	5/8	16,000	204,000	152,000	48,000
15,900		16,000	204,000	152,000	48,000
16,000		16,000	204,000	152,000	48,000
16,500		18,000	223,000	171,000	48,000
16,670	21/32	18,000	223,000	171,000	48,000
17,000		18,000	223,000	171,000	48,000
17,500		18,000	223,000	171,000	48,000
18,000		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
19,000		20,000	244,000	190,000	50,000
19,500		20,000	244,000	190,000	50,000
20,000		20,000	244,000	190,000	50,000

Punte TS con canali di lubrificazione

Articolo nr. 89294

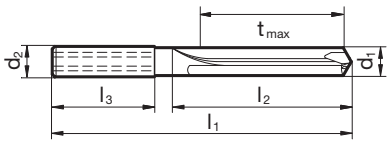
P	M	K	N	S	H
		○	●		

VHM | TS 150 GG | 7xD | WN | 120° | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • strette tolleranze sul diametro • ottima finitura di superf. del foro • attenzione alla press. ottimale del refrig.

alluminio e leghe di alluminio • leghe di alluminio con elevato contenuto di silicio

$t_{max} = l_2\text{-}1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	74,000	32,000	36,000
3,100		6,000	74,000	32,000	36,000
3,200		6,000	74,000	32,000	36,000
3,300		6,000	74,000	32,000	36,000
3,400		6,000	74,000	34,000	36,000
3,500		6,000	74,000	34,000	36,000
3,600		6,000	74,000	34,000	36,000
3,700		6,000	74,000	34,000	36,000
3,800		6,000	97,000	45,000	36,000
3,900		6,000	97,000	45,000	36,000
4,000		6,000	97,000	45,000	36,000
4,100		6,000	97,000	45,000	36,000
4,200		6,000	97,000	45,000	36,000
4,300		6,000	97,000	45,000	36,000
4,400		6,000	97,000	45,000	36,000
4,500		6,000	97,000	45,000	36,000
4,700		6,000	97,000	45,000	36,000
4,800		6,000	97,000	57,000	36,000
4,900		6,000	97,000	57,000	36,000
5,000		6,000	97,000	57,000	36,000
5,500		6,000	97,000	57,000	36,000
6,000		6,000	97,000	57,000	36,000
6,500		8,000	116,000	76,000	36,000
6,800		8,000	116,000	76,000	36,000
7,000		8,000	116,000	76,000	36,000
7,500		8,000	116,000	76,000	36,000
7,800		8,000	116,000	76,000	36,000
8,000		8,000	116,000	76,000	36,000
8,500		10,000	139,000	95,000	40,000
9,000		10,000	139,000	95,000	40,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9,500		10,000	139,000	95,000	40,000
10,000		10,000	139,000	95,000	40,000
10,200		12,000	163,000	114,000	45,000
10,500		12,000	163,000	114,000	45,000
11,000		12,000	163,000	114,000	45,000
11,500		12,000	163,000	114,000	45,000
12,000		12,000	163,000	114,000	45,000
12,300	31/64	14,000	182,000	133,000	45,000
12,500		14,000	182,000	133,000	45,000
12,700	1/2	14,000	182,000	133,000	45,000
13,000		14,000	182,000	133,000	45,000
13,500		14,000	182,000	133,000	45,000
14,000		14,000	182,000	133,000	45,000
14,500		16,000	204,000	152,000	48,000
15,000		16,000	204,000	152,000	48,000
15,500		16,000	204,000	152,000	48,000
16,000		16,000	204,000	152,000	48,000
16,500		18,000	223,000	171,000	48,000
17,000		18,000	223,000	171,000	48,000
17,500		18,000	223,000	171,000	48,000
18,000		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
19,000		20,000	244,000	190,000	50,000
19,500		20,000	244,000	190,000	50,000
20,000		20,000	244,000	190,000	50,000

Punte TS con canali di lubrificazione

Articolo nr. 89293

P	M	K	N	S	H
		○	●		

VHM | TS 150 GG | 10xD | WN | 120° | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • strette tolleranze sul diametro • ottima finitura di superf. del foro • attenzione alla press. ottimale del refrig.

alluminio e leghe di alluminio • leghe di alluminio con elevato contenuto di silicio

Articolo nr. 89295

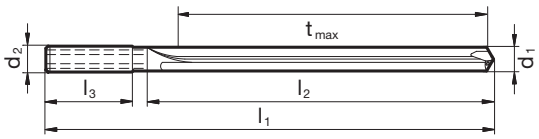
P	M	K	N	S	H
		●	○		

VHM | TS 150 GG | 10xD | WN | 130° | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • strette tolleranze sul diametro • ottima finitura di superf. del foro • attenzione alla press. ottimale del refrig.

ghisa grigia, ghisa malleabile, ghisa sferoidale

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	91,000	42,000	36,000
3,100		6,000	91,000	42,000	36,000
3,170	1/8	6,000	91,000	42,000	36,000
3,250		6,000	91,000	42,000	36,000
3,300		6,000	91,000	42,000	36,000
3,500		6,000	91,000	48,000	36,000
3,570	9/64	6,000	91,000	48,000	36,000
3,600		6,000	91,000	48,000	36,000
3,700		6,000	91,000	48,000	36,000
3,800		6,000	121,000	77,000	36,000
3,900		6,000	121,000	77,000	36,000
3,970	5/32	6,000	121,000	77,000	36,000
4,000		6,000	121,000	77,000	36,000
4,200		6,000	121,000	77,000	36,000
4,400		6,000	121,000	77,000	36,000
4,500		6,000	121,000	77,000	36,000
4,700		6,000	121,000	77,000	36,000
4,800		6,000	121,000	82,000	36,000
4,900		6,000	121,000	82,000	36,000
5,000		6,000	121,000	82,000	36,000
5,500		6,000	121,000	82,000	36,000
6,000		6,000	121,000	82,000	36,000
6,350	1/4	8,000	146,000	106,000	36,000
6,500		8,000	146,000	106,000	36,000
6,800		8,000	146,000	106,000	36,000
7,000		8,000	146,000	106,000	36,000
7,140	9/32	8,000	146,000	106,000	36,000
7,500		8,000	146,000	106,000	36,000
7,800		8,000	146,000	106,000	36,000
7,940	5/16	8,000	146,000	106,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
8,000		8,000	146,000	106,000	36,000
8,330	21/64	10,000	175,000	130,000	40,000
8,500		10,000	175,000	130,000	40,000
8,730	11/32	10,000	175,000	130,000	40,000
9,000		10,000	175,000	130,000	40,000
9,130	23/64	10,000	175,000	130,000	40,000
9,500		10,000	175,000	130,000	40,000
9,520	3/8	10,000	175,000	130,000	40,000
10,000		10,000	175,000	130,000	40,000
10,200		12,000	209,000	159,000	45,000
10,320	13/32	12,000	209,000	159,000	45,000
10,500		12,000	209,000	159,000	45,000
10,720	27/64	12,000	209,000	159,000	45,000
11,000		12,000	209,000	159,000	45,000
11,110	7/16	12,000	209,000	159,000	45,000
11,500		12,000	209,000	159,000	45,000
11,510	29/64	12,000	209,000	159,000	45,000
12,000		12,000	209,000	159,000	45,000
12,300	31/64	14,000	233,000	183,000	45,000
12,500		14,000	233,000	183,000	45,000
12,700	1/2	14,000	233,000	183,000	45,000
13,000		14,000	233,000	183,000	45,000
13,500		14,000	233,000	183,000	45,000
14,000		14,000	233,000	183,000	45,000
14,500		16,000	260,000	207,000	48,000
15,000		16,000	260,000	207,000	48,000
15,500		16,000	260,000	207,000	48,000
16,000		16,000	260,000	207,000	48,000
17,500		18,000	284,000	231,000	48,000
18,000		18,000	284,000	231,000	48,000

Punte TS con canali di lubrificazione

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
18,500		20,000	308,000	255,000	50,000
19,500		20,000	308,000	255,000	50,000
20,000		20,000	308,000	255,000	50,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm

HARTNER

Punte TS con canali di lubrificazione

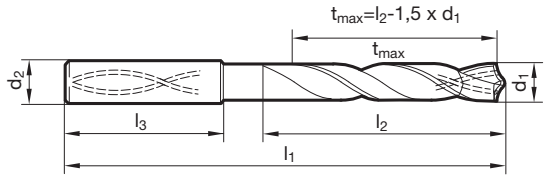
Articolo nr. 89418

P	M	K	N	S	H
●	○	●	○	○	○

VHM | F | TS 100 U | 12xD | WN | 135° | h7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • rivestimento in testa • forma dei taglienti principali diritta • geometria dei taglienti ottimizzata

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai (legati/non legati) fino a 1200 N/mm² • ghise • bronzo/ottone • leghe di alluminio con elevato contenuto di silicio



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	90,000	50,000	36,000
3,100		6,000	90,000	50,000	36,000
3,170	1/8	6,000	90,000	50,000	36,000
3,200		6,000	90,000	50,000	36,000
3,300		6,000	90,000	50,000	36,000
3,400		6,000	90,000	50,000	36,000
3,500		6,000	90,000	50,000	36,000
3,600		6,000	90,000	50,000	36,000
3,700		6,000	90,000	50,000	36,000
3,800		6,000	102,000	64,000	36,000
3,900		6,000	102,000	64,000	36,000
4,000		6,000	102,000	64,000	36,000
4,100		6,000	102,000	64,000	36,000
4,200		6,000	102,000	64,000	36,000
4,300		6,000	102,000	64,000	36,000
4,400		6,000	102,000	64,000	36,000
4,500		6,000	102,000	64,000	36,000
4,600		6,000	102,000	64,000	36,000
4,700		6,000	102,000	64,000	36,000
4,800		6,000	116,000	78,000	36,000
4,900		6,000	116,000	78,000	36,000
5,000		6,000	116,000	78,000	36,000
5,100		6,000	116,000	78,000	36,000
5,200		6,000	116,000	78,000	36,000
5,300		6,000	116,000	78,000	36,000
5,400		6,000	116,000	78,000	36,000
5,500		6,000	116,000	78,000	36,000
5,600		6,000	116,000	78,000	36,000
5,700		6,000	116,000	78,000	36,000
5,800		6,000	116,000	78,000	36,000
5,900		6,000	116,000	78,000	36,000
6,000		6,000	116,000	78,000	36,000
6,100		8,000	146,000	108,000	36,000
6,200		8,000	146,000	108,000	36,000
6,300		8,000	146,000	108,000	36,000
6,350	1/4	8,000	146,000	108,000	36,000
6,400		8,000	146,000	108,000	36,000
6,500		8,000	146,000	108,000	36,000
6,600		8,000	146,000	108,000	36,000
6,700		8,000	146,000	108,000	36,000
6,800		8,000	146,000	108,000	36,000
6,900		8,000	146,000	108,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,000		8,000	146,000	108,000	36,000
7,100		8,000	146,000	108,000	36,000
7,200		8,000	146,000	108,000	36,000
7,300		8,000	146,000	108,000	36,000
7,400		8,000	146,000	108,000	36,000
7,500		8,000	146,000	108,000	36,000
7,600		8,000	146,000	108,000	36,000
7,700		8,000	146,000	108,000	36,000
7,800		8,000	146,000	108,000	36,000
7,900		8,000	146,000	108,000	36,000
8,000		8,000	146,000	108,000	36,000
8,100		10,000	162,000	120,000	40,000
8,200		10,000	162,000	120,000	40,000
8,300		10,000	162,000	120,000	40,000
8,400		10,000	162,000	120,000	40,000
8,500		10,000	162,000	120,000	40,000
8,600		10,000	162,000	120,000	40,000
8,700		10,000	162,000	120,000	40,000
8,800		10,000	162,000	120,000	40,000
8,900		10,000	162,000	120,000	40,000
9,000		10,000	162,000	120,000	40,000
9,100		10,000	162,000	120,000	40,000
9,200		10,000	162,000	120,000	40,000
9,300		10,000	162,000	120,000	40,000
9,400		10,000	162,000	120,000	40,000
9,500		10,000	162,000	120,000	40,000
9,520	3/8	10,000	162,000	120,000	40,000
9,600		10,000	162,000	120,000	40,000
9,700		10,000	162,000	120,000	40,000
9,800		10,000	162,000	120,000	40,000
9,900		10,000	162,000	120,000	40,000
10,000		10,000	162,000	120,000	40,000
10,200		12,000	204,000	156,000	45,000
10,500		12,000	204,000	156,000	45,000
11,000		12,000	204,000	156,000	45,000
11,500		12,000	204,000	156,000	45,000
12,000		12,000	204,000	156,000	45,000
12,500		14,000	230,000	182,000	45,000
12,700	1/2	14,000	230,000	182,000	45,000
13,000		14,000	230,000	182,000	45,000
13,500		14,000	230,000	182,000	45,000
14,000		14,000	230,000	182,000	45,000

Punte TS con canali di lubrificazione

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
14,500		16,000	260,000	208,000	48,000
15,000		16,000	260,000	208,000	48,000
15,500		16,000	260,000	208,000	48,000
16,000		16,000	260,000	208,000	48,000
16,500		18,000	285,000	234,000	48,000
17,000		18,000	285,000	234,000	48,000
17,500		18,000	285,000	234,000	48,000
18,000		18,000	285,000	234,000	48,000
18,500		20,000	310,000	258,000	50,000
19,000		20,000	310,000	258,000	50,000
19,050	3/4	20,000	310,000	258,000	50,000
19,500		20,000	310,000	258,000	50,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
20,000		20,000	310,000	258,000	50,000

HARTNER

Punte TS con canali di lubrificazione

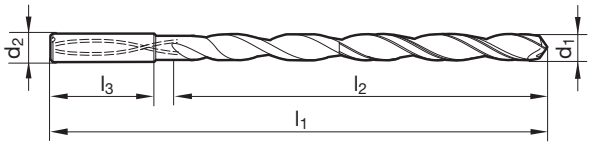
Articolo nr. 86509

P	M	K	N	S	H
●	●	●	○	○	○

VHM | A | TS 100 T | 15xD | WN | 135° | h7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • rivestimento in testa • main cutting edge form concave • taglio trasversale della scanalatura ottimizzato • max. taglio trasversale del foro • attenzione alla press. del refrig.

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm² • acciai inossidabili • ghise



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	95,000	55,000	36,000
3,170	1/8	6,000	106,000	67,000	36,000
3,500		6,000	116,000	76,000	36,000
3,570	9/64	6,000	116,000	76,000	36,000
3,970	5/32	6,000	116,000	76,000	36,000
4,000		6,000	116,000	76,000	36,000
4,370	11/64	6,000	133,000	93,000	36,000
4,500		6,000	133,000	93,000	36,000
4,760	3/16	6,000	133,000	93,000	36,000
5,000		6,000	133,000	93,000	36,000
5,100		6,000	150,000	110,000	36,000
5,160	13/64	6,000	150,000	110,000	36,000
5,410		6,000	150,000	110,000	36,000
5,500		6,000	150,000	110,000	36,000
5,560	7/32	6,000	150,000	110,000	36,000
5,950	15/64	6,000	150,000	110,000	36,000
6,000		6,000	150,000	110,000	36,000
6,350	1/4	8,000	167,000	127,000	36,000
6,500		8,000	167,000	127,000	36,000
6,750	17/64	8,000	167,000	127,000	36,000
7,000		8,000	167,000	127,000	36,000
7,140	9/32	8,000	183,000	143,000	36,000
7,500		8,000	183,000	143,000	36,000
7,540	19/64	8,000	183,000	143,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,940	5/16	8,000	183,000	143,000	36,000
8,000		8,000	183,000	143,000	36,000
8,330	21/64	10,000	204,000	160,000	40,000
8,500		10,000	204,000	160,000	40,000
9,000		10,000	204,000	160,000	40,000
9,130	23/64	10,000	221,000	177,000	40,000
9,520	3/8	10,000	221,000	177,000	40,000
9,920	25/64	10,000	221,000	177,000	40,000
10,000		10,000	221,000	177,000	40,000
10,320	13/32	12,000	247,000	198,000	45,000
10,720	27/64	12,000	247,000	198,000	45,000
11,000		12,000	247,000	198,000	45,000
11,110	7/16	12,000	263,000	214,000	45,000
11,510	29/64	12,000	263,000	214,000	45,000
11,910	15/32	12,000	263,000	214,000	45,000
12,000		12,000	263,000	214,000	45,000
12,300	31/64	14,000	297,000	248,000	45,000
12,700	1/2	14,000	297,000	248,000	45,000
13,100	33/64	14,000	297,000	248,000	45,000
13,490	17/32	14,000	297,000	248,000	45,000
13,890	35/64	14,000	297,000	248,000	45,000
14,000		14,000	297,000	248,000	45,000

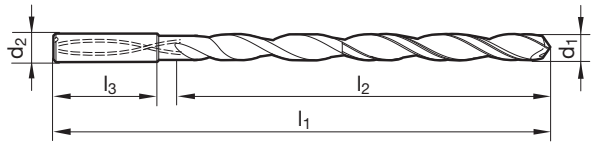
Punte TS con canali di lubrificazione

Articolo nr. 86511

P	M	K	N	S	H
●	●	●	○	○	○

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • rivestimento in testa • main cutting edge form concave • taglio trasversale della scanalatura ottimizzato • max. taglio trasversale del foro • attenzione alla press. del refrig.

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm² • acciai inossidabili • ghise



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	110,000	70,000	36,000
3,170	1/8	6,000	123,000	83,000	36,000
3,500		6,000	136,000	96,000	36,000
3,970	5/32	6,000	136,000	96,000	36,000
4,000		6,000	136,000	96,000	36,000
4,500		6,000	158,000	118,000	36,000
4,760	3/16	6,000	158,000	118,000	36,000
5,000		6,000	158,000	118,000	36,000
5,500		6,000	180,000	140,000	36,000
5,560	7/32	6,000	180,000	140,000	36,000
6,000		6,000	180,000	140,000	36,000
6,350	1/4	8,000	202,000	162,000	36,000
6,500		8,000	202,000	162,000	36,000
7,000		8,000	202,000	162,000	36,000
7,140	9/32	8,000	223,000	183,000	36,000
7,500		8,000	223,000	183,000	36,000
8,000		8,000	223,000	183,000	36,000
8,500		10,000	249,000	205,000	40,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9,000		10,000	249,000	205,000	40,000
9,920	25/64	10,000	271,000	227,000	40,000
10,000		10,000	271,000	227,000	40,000
11,000		12,000	302,000	253,000	45,000
12,000		12,000	323,000	274,000	45,000
12,300	31/64	14,000	367,000	318,000	45,000
13,100	33/64	14,000	367,000	318,000	45,000
13,490	17/32	14,000	367,000	318,000	45,000
13,890	35/64	14,000	367,000	318,000	45,000
14,000		14,000	367,000	318,000	45,000

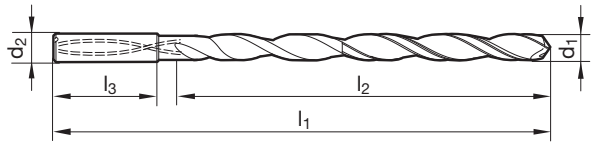
Punte TS con canali di lubrificazione

Articolo nr. 86512

P	M	K	N	S	H
●	●	●	○	○	○

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • rivestimento in testa • main cutting edge form concave • taglio trasversale della scanalatura ottimizzato • max. taglio trasversale del foro • attenzione alla press. del refrig.

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm² • acciai inossidabili • ghise



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	125,000	85,000	36,000
3,100		6,000	141,000	101,000	36,000
3,170	1/8	6,000	141,000	101,000	36,000
3,500		6,000	156,000	116,000	36,000
3,800		6,000	156,000	116,000	36,000
3,970	5/32	6,000	156,000	116,000	36,000
4,000		6,000	156,000	116,000	36,000
4,200		6,000	183,000	143,000	36,000
4,500		6,000	183,000	143,000	36,000
4,760	3/16	6,000	183,000	143,000	36,000
5,000		6,000	183,000	143,000	36,000
5,500		6,000	210,000	170,000	36,000
5,560	7/32	6,000	210,000	170,000	36,000
6,000		6,000	210,000	170,000	36,000
6,300		8,000	237,000	197,000	36,000
6,350	1/4	8,000	237,000	197,000	36,000
6,500		8,000	237,000	197,000	36,000
7,000		8,000	237,000	197,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,140	9/32	8,000	263,000	223,000	36,000
7,500		8,000	263,000	223,000	36,000
8,000		8,000	263,000	223,000	36,000
8,500		10,000	294,000	250,000	40,000
8,800		10,000	294,000	250,000	40,000
9,000		10,000	294,000	250,000	40,000
9,920	25/64	10,000	321,000	277,000	40,000
10,000		10,000	321,000	277,000	40,000
10,320	13/32	12,000	359,000	310,000	45,000
11,000		12,000	359,000	310,000	45,000
11,510	29/64	12,000	386,000	337,000	45,000
11,910	15/32	12,000	386,000	337,000	45,000
12,000		12,000	386,000	337,000	45,000

HARTNER

Punte TS con canali di lubrificazione

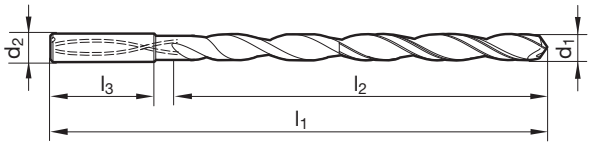
Articolo nr. 86513

P	M	K	N	S	H
●	●	●	○	○	○

VHM | A | TS 100 T | 30xD | WN | 135° | h7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • rivestimento in testa • main cutting edge form concave • taglio trasversale della scanalatura ottimizzato • max. taglio trasversale del foro • attenzione alla press. del refrig.

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm² • acciai inossidabili • ghise



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	140,000	100,000	36,000
3,100		6,000	158,000	118,000	36,000
3,170	1/8	6,000	158,000	118,000	36,000
3,500		6,000	176,000	136,000	36,000
3,800		6,000	176,000	136,000	36,000
3,970	5/32	6,000	176,000	136,000	36,000
4,000		6,000	176,000	136,000	36,000
4,200		6,000	208,000	168,000	36,000
4,500		6,000	208,000	168,000	36,000
4,760	3/16	6,000	208,000	168,000	36,000
5,000		6,000	208,000	168,000	36,000
5,500		6,000	240,000	200,000	36,000
5,560	7/32	6,000	240,000	200,000	36,000
6,000		6,000	240,000	200,000	36,000
6,300		8,000	272,000	232,000	36,000
6,350	1/4	8,000	272,000	232,000	36,000
6,500		8,000	272,000	232,000	36,000
7,000		8,000	272,000	232,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
7,140	9/32	8,000	303,000	263,000	36,000
7,500		8,000	303,000	263,000	36,000
8,000		8,000	303,000	263,000	36,000
8,500		10,000	339,000	295,000	40,000
8,800		10,000	339,000	295,000	40,000
9,000		10,000	339,000	295,000	40,000
9,920	25/64	10,000	371,000	327,000	40,000
10,000		10,000	371,000	327,000	40,000

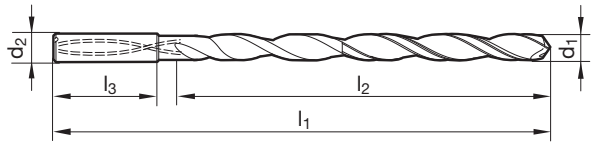
Punte TS con canali di lubrificazione

Articolo nr. 86514

P	M	K	N	S	H
●	●	●	○	○	○

Assott. del nocc. ≥ Ø 3,000 • spoglia sul cono tagliente • rivestimento in testa • main cutting edge form concave • taglio trasversale della scanalatura ottimizzato • max. taglio trasversale del foro • attenzione alla press. del refrig.

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm² • acciai inossidabili • ghise



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,000		6,000	170,000	130,000	36,000
3,100		6,000	193,000	153,000	36,000
3,170	1/8	6,000	193,000	153,000	36,000
3,500		6,000	193,000	153,000	36,000
3,570	9/64	6,000	216,000	176,000	36,000
3,800		6,000	216,000	176,000	36,000
3,970	5/32	6,000	216,000	176,000	36,000
4,000		6,000	216,000	176,000	36,000
4,200		6,000	238,000	198,000	36,000
4,370	11/64	6,000	238,000	198,000	36,000
4,500		6,000	238,000	198,000	36,000
4,760	3/16	6,000	258,000	218,000	36,000
5,000		6,000	258,000	218,000	36,000
5,100		6,000	280,000	240,000	36,000
5,160	13/64	6,000	280,000	240,000	36,000
5,410		6,000	280,000	240,000	36,000
5,500		6,000	280,000	240,000	36,000
5,560	7/32	6,000	300,000	260,000	36,000

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
5,950	15/64	6,000	300,000	260,000	36,000
6,000		6,000	300,000	260,000	36,000
6,300		8,000	322,000	282,000	36,000
6,350	1/4	8,000	322,000	282,000	36,000
6,500		8,000	322,000	282,000	36,000
6,750	17/64	8,000	342,000	302,000	36,000
7,000		8,000	342,000	302,000	36,000
7,140	9/32	8,000	363,000	323,000	36,000
7,500		8,000	363,000	323,000	36,000
7,540	19/64	8,000	383,000	343,000	36,000
7,940	5/16	8,000	383,000	343,000	36,000
8,000		8,000	383,000	343,000	36,000

HARTNER

Punte TS a 3 taglienti

Articolo nr. 89247

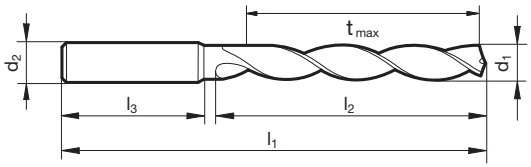
P	M	K	N	S	H
		•	•		

VHM | TS 3 G | 5xD | DIN 6537 L | 130° | m7 | R | HA

Assott. del nocc. ≥ Ø 3,000 • affilatura spiropoint • scanalature larghe • ottimale centraggio • adatta per esecuzione fori interrotti

ghisa • leghe di alluminio a truciolo lungo • ottone, bronzi

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
3,000	6,000	66,000	28,000	36,000
3,100	6,000	66,000	28,000	36,000
3,200	6,000	66,000	28,000	36,000
3,300	6,000	66,000	28,000	36,000
3,500	6,000	66,000	28,000	36,000
3,700	6,000	66,000	28,000	36,000
3,800	6,000	74,000	36,000	36,000
4,000	6,000	74,000	36,000	36,000
4,100	6,000	74,000	36,000	36,000
4,200	6,000	74,000	36,000	36,000
4,500	6,000	74,000	36,000	36,000
4,800	6,000	82,000	44,000	36,000
5,000	6,000	82,000	44,000	36,000
5,100	6,000	82,000	44,000	36,000
5,200	6,000	82,000	44,000	36,000
5,300	6,000	82,000	44,000	36,000
5,500	6,000	82,000	44,000	36,000
5,800	6,000	82,000	44,000	36,000
6,000	6,000	82,000	44,000	36,000
6,100	8,000	91,000	53,000	36,000
6,200	8,000	91,000	53,000	36,000
6,400	8,000	91,000	53,000	36,000
6,500	8,000	91,000	53,000	36,000
6,700	8,000	91,000	53,000	36,000
6,800	8,000	91,000	53,000	36,000
7,000	8,000	91,000	53,000	36,000
7,100	8,000	91,000	53,000	36,000
7,400	8,000	91,000	53,000	36,000
7,500	8,000	91,000	53,000	36,000
7,800	8,000	91,000	53,000	36,000
8,000	8,000	91,000	53,000	36,000
8,100	10,000	103,000	61,000	40,000
8,200	10,000	103,000	61,000	40,000
8,400	10,000	103,000	61,000	40,000
8,500	10,000	103,000	61,000	40,000
8,600	10,000	103,000	61,000	40,000

d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
8,700	10,000	103,000	61,000	40,000
8,800	10,000	103,000	61,000	40,000
9,000	10,000	103,000	61,000	40,000
9,100	10,000	103,000	61,000	40,000
9,500	10,000	103,000	61,000	40,000
9,800	10,000	103,000	61,000	40,000
10,000	10,000	103,000	61,000	40,000
10,100	12,000	118,000	71,000	45,000
10,200	12,000	118,000	71,000	45,000
10,300	12,000	118,000	71,000	45,000
10,500	12,000	118,000	71,000	45,000
11,000	12,000	118,000	71,000	45,000
11,200	12,000	118,000	71,000	45,000
11,500	12,000	118,000	71,000	45,000
11,800	12,000	118,000	71,000	45,000
12,000	12,000	118,000	71,000	45,000
12,100	14,000	124,000	77,000	45,000
12,500	14,000	124,000	77,000	45,000
13,000	14,000	124,000	77,000	45,000
13,500	14,000	124,000	77,000	45,000
14,000	14,000	124,000	77,000	45,000
14,500	16,000	133,000	83,000	48,000
15,000	16,000	133,000	83,000	48,000
15,500	16,000	133,000	83,000	48,000
16,000	16,000	133,000	83,000	48,000
16,500	18,000	143,000	93,000	48,000
17,000	18,000	143,000	93,000	48,000
17,500	18,000	143,000	93,000	48,000
18,000	18,000	143,000	93,000	48,000
18,500	20,000	153,000	101,000	50,000
19,000	20,000	153,000	101,000	50,000
19,500	20,000	153,000	101,000	50,000
20,000	20,000	153,000	101,000	50,000

HARTNER

Punte TS a 3 taglienti

Articolo nr. 89239

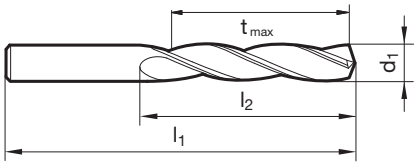
P	M	K	N	S	H
		•	•		

VHM | TS 3 G | 5xD | DIN 6539 | 150° | h7 | R | Cyl

Assott. del nocc. ≥ Ø 3,000 • affilatura su piani • per fori molto precisi • ottima finitura di superf. del foro • adatta per esecuzione fori interrotti

ghise • allunimio - leghe di ghisa

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
3,000	46,000	22,000	7,400	74,000	45,000
3,100	49,000	24,000	7,500	74,000	45,000
3,200	49,000	24,000	7,600	79,000	48,000
3,300	49,000	24,000	7,700	79,000	48,000
3,400	52,000	27,000	7,800	79,000	48,000
3,500	52,000	27,000	8,000	79,000	48,000
3,600	52,000	27,000	8,100	79,000	48,000
3,700	52,000	27,000	8,200	79,000	48,000
3,800	55,000	30,000	8,400	79,000	48,000
3,900	55,000	30,000	8,500	79,000	48,000
4,000	55,000	30,000	8,700	84,000	52,000
4,100	55,000	30,000	8,800	84,000	52,000
4,200	55,000	30,000	9,000	84,000	52,000
4,300	58,000	32,000	9,100	84,000	52,000
4,500	58,000	32,000	9,200	84,000	52,000
4,600	58,000	32,000	9,300	84,000	52,000
4,700	58,000	32,000	9,500	84,000	52,000
4,800	62,000	35,000	9,600	89,000	55,000
4,900	62,000	35,000	9,700	89,000	55,000
5,000	62,000	35,000	9,800	89,000	55,000
5,100	62,000	35,000	10,000	89,000	55,000
5,200	62,000	35,000	10,200	89,000	55,000
5,300	62,000	35,000	10,300	89,000	55,000
5,400	66,000	39,000	10,500	89,000	55,000
5,500	66,000	39,000	10,700	95,000	60,000
5,600	66,000	39,000	11,000	95,000	60,000
5,700	66,000	39,000	11,110	95,000	60,000
5,800	66,000	39,000	11,200	95,000	60,000
5,900	66,000	39,000	11,500	95,000	60,000
6,000	66,000	39,000	11,800	95,000	60,000
6,100	70,000	42,000	12,000	102,000	65,000
6,200	70,000	42,000	12,500	102,000	65,000
6,300	70,000	42,000	12,700	102,000	65,000
6,400	70,000	42,000	13,000	102,000	65,000
6,500	70,000	42,000	13,500	107,000	66,000
6,600	70,000	42,000	13,800	107,000	66,000
6,700	70,000	42,000	14,000	107,000	66,000
6,800	74,000	45,000	14,300	111,000	70,000
7,000	74,000	45,000	14,500	111,000	70,000
7,100	74,000	45,000	15,000	111,000	70,000
7,200	74,000	45,000	15,500	115,000	73,000
7,300	74,000	45,000	16,000	115,000	73,000

Punte TS a 3 taglienti

d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
17,000	119,000	73,000			
18,500	127,000	76,000			
19,000	127,000	76,000			
20,000	131,000	79,000			

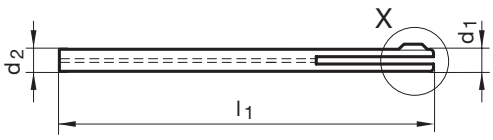
Utensili sbavatori

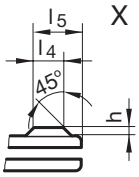
Articolo nr. 84100

P	M	K	N	S	H
●	●	●	○	●	○

VHM | TS 100 EG | WN | R | Cyl

con refrigerazione interna • con codolo cilindrico passante per impiego con pinze di serraggio
per sbavatura interna ed esterna • di impiego universale su macchine utensili, fresatrici, torni e robots





Campo Ø	d1 mm	d2 mm	l1 mm	l4 mm	l5 mm	h mm	Codice
1,91-2,15	1,900	1,900	80,000	1,000	2,050	0,350	2,000
2,16-2,40	2,100	2,100	80,000	1,500	2,600	0,400	2,250
2,41-2,70	2,400	2,400	80,000	1,500	2,900	0,400	2,500
2,71-2,90	2,600	2,600	90,000	1,500	2,950	0,450	2,750
2,91-3,25	2,900	2,900	90,000	2,000	3,650	0,450	3,000
3,26-3,60	3,200	3,200	90,000	2,000	3,800	0,600	3,500
3,61-4,25	3,600	3,600	90,000	2,000	4,100	0,700	4,000
4,26-4,75	4,200	4,200	90,000	2,500	4,600	0,700	4,500
4,76-5,30	4,700	4,700	100,000	2,500	4,850	0,750	5,000
5,31-5,80	5,200	5,200	100,000	2,500	4,850	0,750	5,500
5,81-6,20	5,600	5,600	110,000	3,000	5,800	0,800	6,000
6,21-6,70	6,000	6,000	110,000	3,000	5,900	0,900	6,500
6,71-7,10	6,500	6,500	110,000	3,000	5,850	0,850	7,000
7,11-7,60	6,900	6,900	110,000	3,500	6,950	0,950	7,500
7,61-8,05	7,300	7,300	110,000	3,500	7,000	1,000	8,000

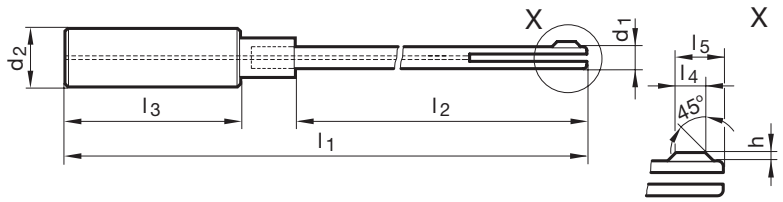
Utensili sbavatori

Articolo nr. 84101

P	M	K	N	S	H
●	●	●	○	●	○

VHM | TS 100 EG | WN | R | HA

per impiego in mandrini ad espansione idraulica e per calettamento • con codolo a DIN 6535 • con refrigerazione interna per sbavatura interna ed esterna • di impiego universale su macchine utensili, fresatrici, torni e robots



Campo Ø	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	l4 mm	l5 mm	h mm	Codice
1,91 -2,15	1,900	6,000	120,000	69,000	36,000	1,000	2,050	0,350	2,000
2,16 -2,40	2,100	6,000	120,000	69,000	36,000	1,500	2,600	0,400	2,250
2,41 -2,70	2,400	6,000	120,000	69,000	36,000	1,500	2,900	0,400	2,500
2,71 -2,90	2,600	6,000	130,000	79,000	36,000	1,500	2,950	0,450	2,750
2,91 -3,25	2,900	6,000	130,000	79,000	36,000	2,000	3,650	0,450	3,000
3,26 -3,60	3,200	10,000	135,000	80,000	40,000	2,000	3,800	0,600	3,500
3,61 -4,25	3,600	10,000	135,000	80,000	40,000	2,000	4,100	0,700	4,000
4,26 -4,75	4,200	10,000	135,000	80,000	40,000	2,500	4,600	0,700	4,500
4,76 -5,30	4,700	10,000	145,000	80,000	40,000	2,500	4,850	0,750	5,000
5,31 -5,80	5,200	10,000	145,000	90,000	40,000	2,500	4,850	0,750	5,500
5,81 -6,20	5,600	10,000	155,000	90,000	40,000	3,000	5,800	0,800	6,000
6,21 -6,70	6,000	16,000	165,000	102,000	48,000	3,000	5,900	0,900	6,500
6,71 -7,10	6,500	16,000	165,000	102,000	48,000	3,000	5,850	0,850	7,000
7,11 -7,60	6,900	16,000	165,000	102,000	48,000	3,500	6,950	0,950	7,500
7,61 -8,05	7,300	16,000	165,000	102,000	48,000	3,500	7,000	1,000	8,000

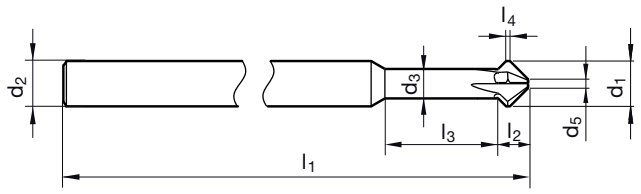
Sbavatori a 90° ad avanzamento ed estrazione

Articolo nr. 80495

P	M	K	N	S	H
●	●	●	○	●	○

VHM | a | TS 100 VR | WN | 90° | R | ~HA

con codolo a DIN 6535 • per impiego in mandrini ad espansione idraulica e per calettamento per sbavatura interna ed esterna • per sbavatura di fori e contorni

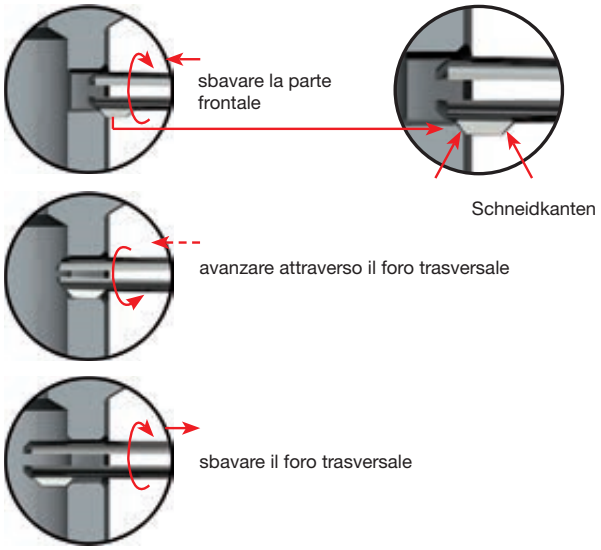


d1 mm	d2 h6 mm	d3 mm	d5 mm	l1 mm	l2 mm	l3 mm	l4 mm	Z	Codice
3,000	4,000	2,200	0,600	75,000	2,10	9,300	0,500	4	3,000
4,000	4,000	2,900	0,800	75,000	2,70	12,300	0,500	4	4,000
5,000	5,000	3,900	1,000	75,000	3,00	15,000	0,500	4	5,000
6,000	6,000	3,900	1,200	100,000	3,90	14,300	0,500	4	6,000
8,000	6,000	6,000	1,600	100,000	4,70		0,500	4	8,000
10,000	6,000	6,000	2,000	100,000	6,50		0,500	4	10,000
12,000	6,000	6,000	2,400	100,000	8,30		0,500	4	12,000

HARTNER

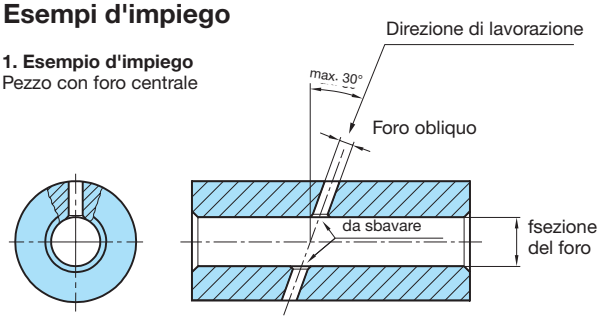
Forchetta per sbavare in MD TS 100 EG

La lavorazione



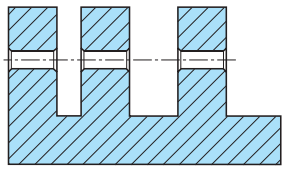
Esempi d'impiego

1. Esempio d'impiego
Pezzo con foro centrale



Con pezzi da lavorare con fori trasversali tenete presente che:
- il diametro del foro trasversale deve essere max. 35% del diametro del foro centrale
- il diametro del foro centrale deve essere 40% più grande della lunghezza tagliente l_4

2. Esempio d'impiego
Pezzo con foro interrotto più volte



Passo per passo:
La sbavatura meccanica interna ed esterna con la forchetta TS 100 EG è una semplice ed economica alternativa all'attuale laboriosa operazione manuale. Con un unico utensile si eseguono tutte le operazioni di lavoro.

Ø-misura (mm)	v_c m/min	fu (mm)
< Ø 4	8 - 10	0,1 - 0,2
Ø 4 - < Ø 6	10 - 14	0,1 - 0,2
6 - Ø 8	14 - 20	0,1 - 0,2

Utilizzo universale:
Con la nuova forchetta per sbavare in MD integrale si possono sbavare pezzi con fori obliqui e con fori interrotti più volte.
Il risultato è in ogni caso la perfetta sbavatura interna ed esterna.

Attenzione:
I valori di taglio sono solo indicativi. Possono essere aumentati o diminuiti a seconda delle condizioni di lavoro.

Utensili a sbavare per entrata ed uscita TS 100 VR

Valori di taglio sbavatore in entrata ed uscita TS 100 VR

Gruppi di materiali	Resistenza Durezza MPa (N/mm²)	v_c (m/min)	Col. avanz.
Acciai	< 850	*120 - 200*	71
	850-1200	*100 - 180*	71
	> 1200	*80 - 140*	71
Acciai temprati	< 54 HRC	*60 - 120*	71
	54-60 HRC	*40 - 80*	71
Acciai inossidabili	< 850	*80 - 120*	71
Leghe a base di nichel	< 1300	*30 - 60*	71
Leghe di titanio	< 1300	*50 - 100*	71
Ghise	< 240 HB30	*120 - 180*	72
	> 240 HB30	*100 - 160*	72
Alu per lav. plastiche < 3% Si		*150 - 250*	72
Leghe di ghisa-alu > 3% Si		*100 - 200*	72
Leghe di magnesio		*150 - 250*	72
Leghe a base non ferrosa	< 850	*30 - 200*	72

Codice colonna avanz. (mm/giro)

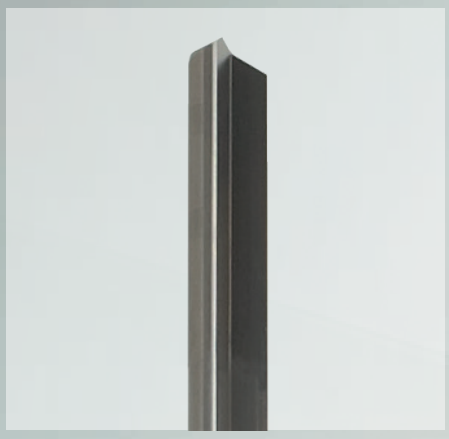
Ø	71	72
≤ 3,00	0,060	0,080
4,00	0,100	0,125
5,00	0,100	0,125
6,30	0,125	0,160
8,00	0,160	0,200
10,00	0,200	0,250
12,50	0,200	0,250

Attenzione:
I valori di taglio sono solo indicativi. Possono essere aumentati o diminuiti a seconda delle condizioni di lavoro.

HARTNER

Precision Cutting Tools

MULTIPLEX



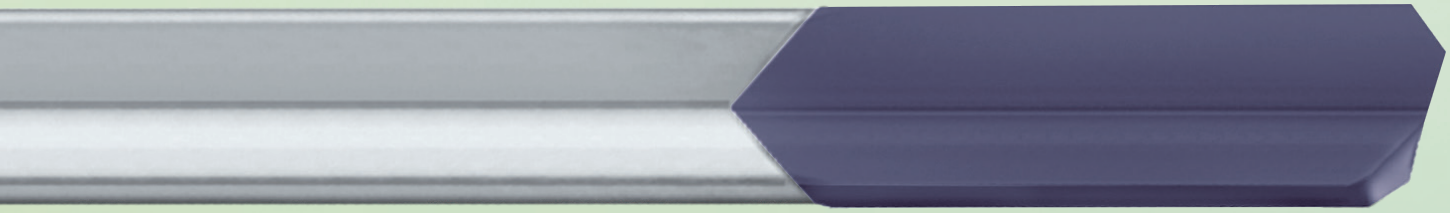
HARTNER

Precision Cutting Tools

Punte a cannone ad
1 tagliente / a 2 taglienti

PUNTE A CANNONE AD 1 TAGLIENTE / A 2 TAGLIENTI

in metallo duro, con testa in MD o con
inserti intercambiabili
lucide e ricoperte



P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina

Punte a cannone ad 1 tagliente E 100

●	●	○	●	○	○	Norma di fab.	TLB E 100	Metallo duro	a	destra	HA	25xD	2,380 - 12,000	**89520**	253

●	●	○	●	○	○	Norma di fab.	TLB E 100	Metallo duro	a	destra	HA	50xD	2,380 - 8,000	**89521**	254

●	●	○	●	○	○	Norma di fab.	TLB E 100	Metallo duro	a	destra	HA	75xD	2,380 - 6,000	**89522**	255

○	○	○	●	●	○	Norma di fab.	TLB E 100	Metallo duro	○	destra	HA	45.000	1,200 - 3,200	**89503**	256

●	○	●	○	○	○	Norma di fab.	TLB E 100	Metallo duro	A	destra	HA	45.000	1,200 - 3,200	**89510**	256

○	○	○	●	●	○	Norma di fab.	TLB E 100	Metallo duro	○	destra	HA	80.000	1,200 - 5,000	**89501**	257

●	○	●	○	○	○	Norma di fab.	TLB E 100	Metallo duro	A	destra	HA	80.000	1,200 - 5,000	**89511**	257

○	○	○	●	●	○	Norma di fab.	TLB E 100	Metallo duro	○	destra	HA	120.000	1,500 - 5,000	**89504**	258

●	○	●	○	○	○	Norma di fab.	TLB E 100	Metallo duro	A	destra	HA	120.000	1,500 - 5,000	**89512**	258

○	○	○	●	●	○	Norma di fab.	TLB E 100	Metallo duro	○	destra	HA	160.000	1,500 - 8,000	**89502**	259

●	○	●	○	○	○	Norma di fab.	TLB E 100	Metallo duro	A	destra	HA	160.000	1,500 - 8,000	**89513**	259

Punte a cannone ad 1 tagliente E 80

●	○	●	○	○	○	Norma di fab.	TLB E 80	Metallo duro	T	destra	HA	20xD	3,970 - 12,700	**89505**	260

○	●	○	○	●	○	Norma di fab.	TLB E 80	Metallo duro	C	destra	HA	20xD	3,970 - 12,700	**89514**	260

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina

Punte a cannone ad 1 tagliente E 80

●	○	●	○	○	○	Norma di fab.	TLB E 80	**Metallo duro**	T	destra	HA	30xD	3,970 - 12,700	**89509**	261

○	●	○	○	●	○	Norma di fab.	TLB E 80	**Metallo duro**	C	destra	HA	30xD	3,970 - 12,700	**89515**	261

●	○	●	○	○	○	Norma di fab.	TLB E 80	**Metallo duro**	T	destra	HA	40xD	3,970 - 12,700	**89506**	262

○	●	○	○	●	○	Norma di fab.	TLB E 80	**Metallo duro**	C	destra	HA	40xD	3,970 - 12,700	**89516**	262

●	○	●	○	○	○	Norma di fab.	TLB E 80	**Metallo duro**	T	destra	HA	80xD	4,950 - 12,650	**89507**	263

○	●	○	○	●	○	Norma di fab.	TLB E 80	**Metallo duro**	C	destra	HA	80xD	4,950 - 12,650	**89517**	263

Punte a cannone ad 1 tagliente E 800 con inserti intercambiabili

●	○	○	●	○		Norma di fab.	TLB E 800	**Metallo duro**	T	destra	HB	30xD	12,000 - 24,000	**89530**	264

Inserti per punte a cannone E 800

●	○	○	●	○		Norma di fab.		**Metallo duro**	T	destra			12,000 - 40,000	**89535**	265

Pattini di guida per punte a cannone E 800

●	○	○	●	○		Norma di fab.		**Metallo duro**	T				12,000 - 40,000	**89536**	266

Punte a cannone a 2 taglienti Z 80

			●			Norma di fab.	TLB Z 80	**Metallo duro**	◯	destra	HA	30xD	8,000 - 12,000	**89508**	267

Punte a cannone a 2 taglienti Z 80

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina
		•				Norma di fab.	TLB Z 80	**Metallo duro**	◯	destra	HA	30xD	8,000 - 12,000	**89518**	267

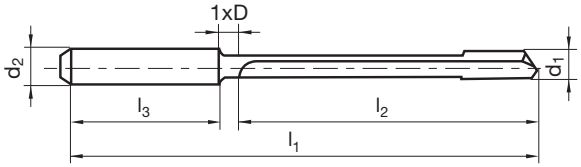
Punte a cannone ad 1 tagliente E 100

Articolo nr. 89520

P	M	K	N	S	H
●	●	○	●	○	○

VHM | a | TLB E 100 | 25xD | WN | h5 | R | HA

profondità di foro fino a 25xD • forma tagliente G • punta in metallo duro con attacco in metallo duro integrale e parte terminale conica MMS da d1 =3 mm e d2 = 6 mm



d1 mm	 inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
2,380	3/32	4,000	100,000	70,000	28,000
2,500		4,000	115,000	85,000	28,000
2,780	7/64	4,000	115,000	85,000	28,000
3,000		6,000	145,000	105,000	36,000
3,170	1/8	6,000	145,000	105,000	36,000
3,500		6,000	145,000	105,000	36,000
3,970	5/32	6,000	160,000	120,000	36,000
4,000		6,000	160,000	120,000	36,000
5,000		6,000	220,000	180,000	36,000
5,560	7/32	6,000	220,000	180,000	36,000
6,000		6,000	220,000	180,000	36,000
6,350	1/4	8,000	260,000	210,000	36,000
7,000		8,000	260,000	210,000	36,000
7,140	9/32	8,000	285,000	240,000	36,000
8,000		8,000	285,000	240,000	36,000
9,000		10,000	350,000	300,000	40,000
10,000		10,000	350,000	300,000	40,000
11,000		12,000	420,000	360,000	45,000
12,000		12,000	420,000	360,000	45,000

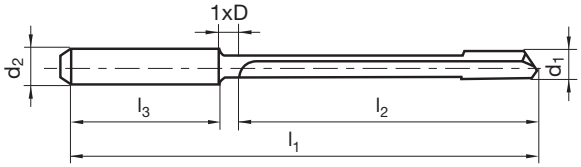
Punte a cannone ad 1 tagliente E 100

Articolo nr. 89521

P	M	K	N	S	H
●	●	○	●	○	○

VHM | a | TLB E 100 | 50xD | WN | h5 | R | HA

profondità di foro fino a 50xD • forma tagliente G • punta in metallo duro con attacco in metallo duro integrale e parte terminale conica MMS da d1 =3 mm e d2 = 6 mm



d1 mm	 inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
2,380	3/32	4,000	160,000	130,000	28,000
2,500		4,000	185,000	155,000	28,000
2,780	7/64	4,000	185,000	155,000	28,000
3,000		6,000	230,000	190,000	36,000
3,170	1/8	6,000	230,000	190,000	36,000
3,500		6,000	230,000	190,000	36,000
3,970	5/32	6,000	260,000	220,000	36,000
4,000		6,000	260,000	220,000	36,000
5,000		6,000	370,000	330,000	36,000
5,560	7/32	6,000	370,000	330,000	36,000
6,000		6,000	370,000	330,000	36,000
6,350	1/4	8,000	430,000	385,000	36,000
7,000		8,000	430,000	385,000	36,000
7,140	9/32	8,000	485,000	440,000	36,000
8,000		8,000	485,000	440,000	36,000

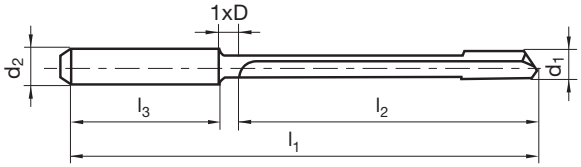
Punte a cannone ad 1 tagliente E 100

Articolo nr. 89522

P	M	K	N	S	H
●	●	○	●	○	○

VHM | a | TLB E 100 | 75xD | WN | h5 | R | HA

profondità di foro fino a 75xD • forma tagliente G • punta in metallo duro con attacco in metallo duro integrale e parte terminale conica MMS da d1 =3 mm e d2 = 6 mm



d1 mm	 inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
2,380	3/32	4,000	220,000	190,000	28,000
2,500		4,000	255,000	220,000	28,000
2,780	7/64	4,000	255,000	220,000	28,000
3,000		6,000	320,000	280,000	36,000
3,170	1/8	6,000	320,000	280,000	36,000
3,500		6,000	320,000	280,000	36,000
3,970	5/32	6,000	360,000	320,000	36,000
4,000		6,000	360,000	320,000	36,000
5,000		6,000	525,000	485,000	36,000
5,560	7/32	6,000	525,000	485,000	36,000
6,000		6,000	525,000	485,000	36,000

Punte a cannone ad 1 tagliente E 100

Articolo nr. 89503

P	M	K	N	S	H
○	○	○	●	●	○

VHM | ◯ | TLB E 100 | 45,00 | WN | h5 | R | HA

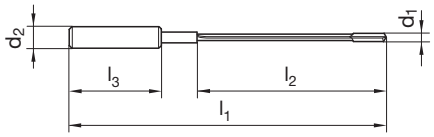
lunghezza elica 45 mm • forma tagliente G

Articolo nr. 89510

P	M	K	N	S	H
●	○	●	○	○	○

VHM | A | TLB E 100 | 45,00 | WN | h5 | R | HA

lunghezza elica 45 mm • forma tagliente G



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
1,200		4,000	90,000	45,000	28,000
1,500		4,000	90,000	45,000	28,000
1,600		4,000	90,000	45,000	28,000
2,000		4,000	90,000	45,000	28,000
2,500		10,000	100,000	45,000	40,000
2,700		10,000	100,000	45,000	40,000
3,000		10,000	100,000	45,000	40,000
3,200		10,000	100,000	45,000	40,000

Punte a cannone ad 1 tagliente E 100

Articolo nr. 89501

P	M	K	N	S	H
○	○	○	●	●	○

VHM | ○ | TLB E 100 | 80,00 | WN | h5 | R | HA

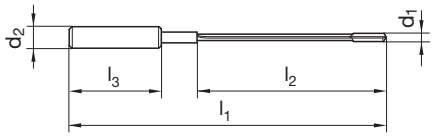
lunghezza elica 80 mm • forma tagliente G

Articolo nr. 89511

P	M	K	N	S	H
●	○	●	○	○	○

VHM | A | TLB E 100 | 80,00 | WN | h5 | R | HA

lunghezza elica 80 mm • forma tagliente G



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
1,200		4,000	125,000	80,000	28,000
1,500		4,000	125,000	80,000	28,000
1,600		4,000	125,000	80,000	28,000
2,000		4,000	125,000	80,000	28,000
2,500		10,000	135,000	80,000	40,000
2,700		10,000	135,000	80,000	40,000
3,000		10,000	135,000	80,000	40,000
3,200		10,000	135,000	80,000	40,000
3,500		10,000	135,000	80,000	40,000
4,000		10,000	135,000	80,000	40,000
4,200		10,000	135,000	80,000	40,000
4,500		10,000	135,000	80,000	40,000
5,000		10,000	135,000	80,000	40,000

Punte a cannone ad 1 tagliente E 100

Articolo nr. 89504

P	M	K	N	S	H
○	○	○	●	●	○

VHM | ○ | TLB E 100 | 120,00 | WN | h5 | R | HA |

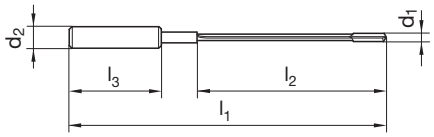
lunghezza elica 120 mm • forma tagliente G

Articolo nr. 89512

P	M	K	N	S	H
●	○	●	○	○	○

VHM | A | TLB E 100 | 120,00 | WN | h5 | R | HA |

lunghezza elica 120 mm • forma tagliente G



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
1,500		4,000	165,000	120,000	28,000
1,600		4,000	165,000	120,000	28,000
2,000		4,000	165,000	120,000	28,000
2,500		10,000	175,000	120,000	40,000
2,700		10,000	175,000	120,000	40,000
3,000		10,000	175,000	120,000	40,000
3,200		10,000	175,000	120,000	40,000
3,500		10,000	175,000	120,000	40,000
4,000		10,000	175,000	120,000	40,000
4,200		10,000	175,000	120,000	40,000
4,500		10,000	175,000	120,000	40,000
5,000		10,000	175,000	120,000	40,000

Punte a cannone ad 1 tagliente E 100

Articolo nr. 89502

P	M	K	N	S	H
○	○	○	●	●	○

VHM | ◯ | TLB E 100 | 160,00 | WN | h5 | R | HA

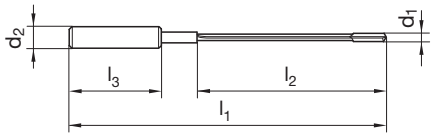
lunghezza elica 160 mm • forma tagliente G

Articolo nr. 89513

P	M	K	N	S	H
●	○	●	○	○	○

VHM | A | TLB E 100 | 160,00 | WN | h5 | R | HA

lunghezza elica 160 mm • forma tagliente G



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
1,500		4,000	205,000	160,000	28,000
1,600		4,000	205,000	160,000	28,000
2,000		4,000	205,000	160,000	28,000
2,500		10,000	215,000	160,000	40,000
2,700		10,000	215,000	160,000	40,000
3,000		10,000	215,000	160,000	40,000
3,200		10,000	215,000	160,000	40,000
3,500		10,000	215,000	160,000	40,000
4,000		10,000	215,000	160,000	40,000
4,200		10,000	215,000	160,000	40,000
4,500		10,000	215,000	160,000	40,000
5,000		10,000	215,000	160,000	40,000
6,000		16,000	225,000	160,000	48,000
8,000		16,000	225,000	160,000	48,000

Punte a cannone ad 1 tagliente E 80

Articolo nr. 89505

P	M	K	N	S	H
●	○	●	○	○	○

HM | T | TLB E 80 | 20xD | WN | h5 | R | HA

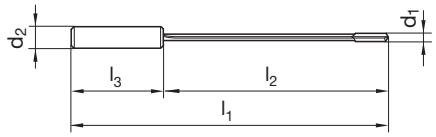
profondità di foro fino a 20xD • forma tagliente G • con rompitruciolo

Articolo nr. 89514

P	M	K	N	S	H
○	●	○	○	●	○

HM | C | TLB E 80 | 20xD | WN | h5 | R | HA

profondità di foro fino a 20xD • forma tagliente G • per acciai legati e altamente legati



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,970	5/32	10,000	150,000	100,000	40,000
4,000		12,000	150,000	100,000	45,000
4,200		12,000	160,000	110,000	45,000
4,500		12,000	170,000	120,000	45,000
5,000		16,000	180,000	130,000	48,000
5,156		16,000	180,000	130,000	48,000
5,500		16,000	190,000	140,000	48,000
6,000		16,000	210,000	160,000	48,000
6,350	1/4	16,000	220,000	170,000	48,000
6,500		16,000	220,000	170,000	48,000
7,000		16,000	235,000	185,000	48,000
7,938	5/16	16,000	260,000	210,000	48,000
8,000		16,000	260,000	210,000	48,000
9,000		16,000	280,000	230,000	48,000
9,525	3/8	16,000	290,000	240,000	48,000
10,000		20,000	320,000	260,000	50,000
11,000		20,000	340,000	290,000	50,000
11,113	7/16	20,000	340,000	290,000	50,000
12,000		20,000	370,000	310,000	50,000
12,700	1/2	20,000	385,000	330,000	50,000

Punte a cannone ad 1 tagliente E 80

Articolo nr. 89509

P	M	K	N	S	H
●	○	●	○	○	○

HM | T | TLB E 80 | 30xD | WN | h5 | R | HA

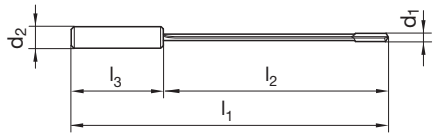
profondità di foro fino a 30xD • forma tagliente G • con rompitruciolo

Articolo nr. 89515

P	M	K	N	S	H
○	●	○	○	●	○

HM | C | TLB E 80 | 30xD | WN | h5 | R | HA

profondità di foro fino a 30xD • forma tagliente G • per acciai legati e altamente legati



d1 mm	 inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,970	5/32	10,000	200,000	155,000	40,000
4,000		12,000	200,000	155,000	45,000
4,200		12,000	210,000	165,000	45,000
4,500		12,000	220,000	175,000	45,000
5,000		16,000	230,000	182,000	48,000
5,156		16,000	230,000	182,000	48,000
5,500		16,000	245,000	197,000	48,000
6,000		16,000	260,000	212,000	48,000
6,350	1/4	16,000	275,000	227,000	48,000
6,500		16,000	275,000	227,000	48,000
7,000		16,000	290,000	242,000	48,000
7,938	5/16	16,000	320,000	272,000	48,000
8,000		16,000	320,000	272,000	48,000
9,000		16,000	350,000	302,000	48,000
9,525	3/8	16,000	380,000	330,000	48,000
10,000		20,000	400,000	350,000	50,000
11,000		20,000	430,000	380,000	50,000
11,113	7/16	20,000	430,000	380,000	50,000
12,000		20,000	450,000	400,000	50,000
12,700	1/2	20,000	500,000	450,000	50,000

Punte a cannone ad 1 tagliente E 80

Articolo nr. 89506

P	M	K	N	S	H
●	○	●	○	○	○

HM | T | TLB E 80 | 40xD | WN | h5 | R | HA

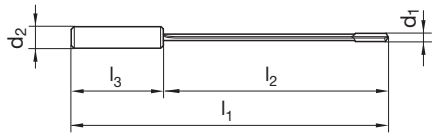
profondità di foro fino a 40xD • forma tagliente G • con rompitruciolo

Articolo nr. 89516

P	M	K	N	S	H
○	●	○	○	●	○

HM | C | TLB E 80 | 40xD | WN | h5 | R | HA

profondità di foro fino a 40xD • forma tagliente G • per acciai legati e altamente legati



d1 mm	 inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3,970	5/32	10,000	230,000	185,000	40,000
4,000		12,000	230,000	185,000	45,000
4,200		12,000	240,000	195,000	45,000
4,500		12,000	250,000	205,000	45,000
5,000		16,000	280,000	232,000	48,000
5,156		16,000	280,000	232,000	48,000
5,500		16,000	300,000	252,000	48,000
6,000		16,000	320,000	272,000	48,000
6,350	1/4	16,000	340,000	292,000	48,000
6,500		16,000	340,000	292,000	48,000
7,000		16,000	370,000	322,000	48,000
7,938	5/16	16,000	420,000	372,000	48,000
8,000		16,000	420,000	372,000	48,000
9,000		16,000	450,000	402,000	48,000
9,525	3/8	16,000	480,000	432,000	48,000
10,000		20,000	510,000	460,000	50,000
11,000		20,000	550,000	500,000	50,000
11,113	7/16	20,000	550,000	500,000	50,000
12,000		20,000	600,000	550,000	50,000
12,700	1/2	20,000	635,000	585,000	50,000

Punte a cannone ad 1 tagliente E 80

Articolo nr. 89507

P	M	K	N	S	H
●	○	●	○	○	○

HM | T | TLB E 80 | 80xD | WN | h5 | R | HA

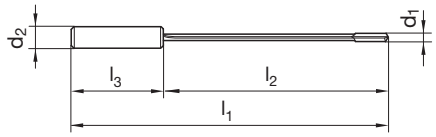
profondità di foro fino a 80xD • forma tagliente G • con rompitruciolo • per materiali a truciolo lungo • massima profondità di taglio per utensile 40xD, per profondità di taglio maggiore utilizzare prima la punte Art. nr. 89506

Articolo nr. 89517

P	M	K	N	S	H
○	●	○	○	●	○

HM | C | TLB E 80 | 80xD | WN | h5 | R | HA

profondità di foro fino a 80xD • forma tagliente G • massima profondità di taglio per utensile 40xD, per profondità di taglio maggiore utilizzare prima la punte Art. nr. 89516 • per acciai legati e altamente legati



d1 mm	 inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
4,950		16,000	480,000	432,000	48,000
5,106		16,000	480,000	432,000	48,000
5,950	15/64	16,000	560,000	512,000	48,000
6,300		16,000	590,000	542,000	48,000
6,950		16,000	650,000	602,000	48,000
7,888		16,000	740,000	692,000	48,000
7,950		16,000	740,000	692,000	48,000
8,950		16,000	820,000	772,000	48,000
9,475		16,000	870,000	822,000	48,000
9,950		20,000	910,000	860,000	50,000
10,950		20,000	995,000	945,000	50,000
11,063		20,000	995,000	945,000	50,000
11,950		20,000	1080,000	1030,000	50,000
12,650		20,000	1140,000	1090,000	50,000

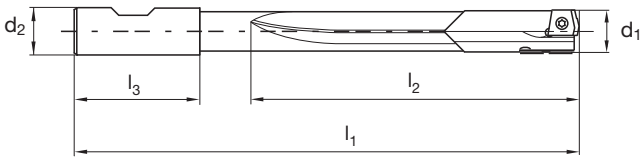
Punte a cannone ad 1 tagliente E 800 con inserti intercambiabili

Articolo nr. 89530

P	M	K	N	S	H
●	○	○	●	○	

HM | T | TLB E 800 | 30xD | WN | h8 | R | HB

profondità di foro fino a 30xD • con inserti intercambiabili • con pattini di guida intercambiabili • con giravite • con viti • uso universale



d1 mm	 inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
12,000		20,000	446,000	384,000	50,000
12,700	1/2	20,000	468,000	406,000	50,000
14,000		20,000	510,000	448,000	50,000
15,000		25,000	548,000	480,000	56,000
16,000		25,000	580,000	512,000	56,000
18,000		25,000	644,000	576,000	56,000
20,000		32,000	712,000	640,000	60,000
24,000		32,000	840,000	768,000	60,000

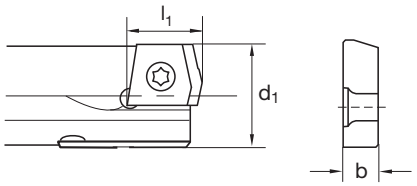
Inserti per punte a cannone E 800

Articolo nr. 89535

P	M	K	N	S	H
●	○	○	●	○	

VHM T WN R

uso universale



d1 mm	l1 mm	b mm	Codice
12,000	10,000	2,800	12,000
12,500	10,000	2,800	12,500
12,700	10,000	2,800	12,700
13,000	10,000	2,800	13,000
13,500	10,000	2,800	13,500
14,000	10,000	2,800	14,000
14,500	10,000	2,800	14,500
15,000	10,000	2,800	15,000
16,000	12,000	3,000	16,000
16,100	12,000	3,000	16,100
16,300	12,000	3,000	16,300
16,500	12,000	3,000	16,500
17,000	12,000	3,000	17,000
17,500	12,000	3,000	17,500
18,000	12,000	3,000	18,000
18,400	12,000	3,000	18,400
18,500	12,000	3,000	18,500
19,000	12,000	3,000	19,000
19,300	12,000	3,000	19,300
19,500	12,000	3,000	19,500
19,800	12,000	3,000	19,800
20,000	15,000	4,000	20,000
20,200	15,000	4,000	20,200
20,500	15,000	4,000	20,500
21,000	15,000	4,000	21,000
21,500	15,000	4,000	21,500
22,000	15,000	4,000	22,000
22,200	15,000	4,000	22,200
22,500	15,000	4,000	22,500
23,000	15,000	4,000	23,000
23,500	15,000	4,000	23,500
24,000	15,000	4,000	24,000
24,500	15,000	4,000	24,500
25,000	15,000	4,000	25,000
25,100	15,000	4,000	25,100
25,400	15,000	4,000	25,400

d1 mm	l1 mm	b mm	Codice
25,500	15,000	4,000	25,500
25,800	15,000	4,000	25,800
26,000	16,000	5,000	26,000
26,500	16,000	5,000	26,500
27,000	16,000	5,000	27,000
27,500	16,000	5,000	27,500
28,000	16,000	5,000	28,000
28,100	16,000	5,000	28,100
28,500	16,000	5,000	28,500
29,000	16,000	5,000	29,000
29,500	16,000	5,000	29,500
29,700	16,000	5,000	29,700
30,000	18,000	6,000	30,000
30,100	18,000	6,000	30,100
30,500	18,000	6,000	30,500
31,000	18,000	6,000	31,000
31,500	18,000	6,000	31,500
32,000	18,000	6,000	32,000
32,500	18,000	6,000	32,500
33,000	18,000	6,000	33,000
33,500	18,000	6,000	33,500
34,000	19,000	6,500	34,000
34,500	19,000	6,500	34,500
35,000	19,000	6,500	35,000
35,500	19,000	6,500	35,500
36,000	19,000	6,500	36,000
36,500	19,000	6,500	36,500
37,000	19,000	6,500	37,000
37,500	19,000	6,500	37,500
37,700	19,000	6,500	37,700
38,000	20,000	7,000	38,000
38,100	20,000	7,000	38,100
38,500	20,000	7,000	38,500
39,000	20,000	7,000	39,000
39,500	20,000	7,000	39,500
40,000	20,000	7,000	40,000

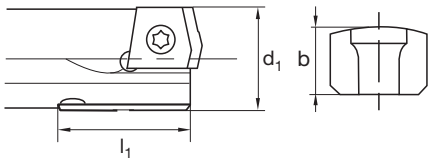
Pattini di guida per punte a cannone E 800

Articolo nr. 89536

P	M	K	N	S	H
●	○	○	●	○	

VHM T WN

uso universale



d1 mm	l1 mm	b mm	Codice
12,000	19,950	2,150	12,000
12,500	19,950	2,150	12,500
12,700	19,950	2,250	12,700
13,000	19,950	2,150	13,000
13,500	19,950	2,150	13,500
14,000	19,950	2,150	14,000
14,500	19,950	2,150	14,500
15,000	19,950	2,150	15,000
16,000	20,000	2,850	16,000
16,100	20,000	2,900	16,100
16,300	20,000	3,000	16,300
16,500	20,000	2,850	16,500
17,000	20,000	2,850	17,000
17,500	20,000	2,850	17,500
18,000	20,000	2,850	18,000
18,400	20,000	3,050	18,400
18,500	20,000	2,850	18,500
19,000	20,000	2,850	19,000
19,300	20,000	3,000	19,300
19,500	20,000	2,850	19,500
19,800	20,000	3,000	19,800
20,000	25,000	3,350	20,000
20,200	25,000	3,450	20,200
20,500	25,000	3,350	20,500
21,000	25,000	3,350	21,000
21,500	25,000	3,350	21,500
22,000	25,000	3,350	22,000
22,200	25,000	3,450	22,200
22,500	25,000	3,350	22,500
23,000	25,000	3,350	23,000
23,500	25,000	3,350	23,500
24,000	25,000	3,350	24,000
24,500	25,000	3,350	24,500
25,000	25,000	3,350	25,000
25,100	25,000	3,400	25,100
25,400	25,000	3,550	25,400

d1 mm	l1 mm	b mm	Codice
25,500	25,000	3,350	25,500
25,800	25,000	3,500	25,800
26,000	25,000	3,850	26,000
26,500	25,000	3,850	26,500
27,000	25,000	3,850	27,000
27,500	25,000	3,850	27,500
28,000	25,000	3,850	28,000
28,100	25,000	3,900	28,100
28,500	25,000	3,850	28,500
29,000	25,000	3,850	29,000
29,500	25,000	3,850	29,500
29,700	25,000	3,950	29,700
30,000	30,000	4,350	30,000
30,100	30,000	4,400	30,100
30,500	30,000	4,350	30,500
31,000	30,000	4,350	31,000
31,500	30,000	4,350	31,500
32,000	30,000	4,350	32,000
32,500	30,000	4,350	32,500
33,000	30,000	4,350	33,000
33,500	30,000	4,350	33,500
34,000	30,000	4,850	34,000
34,500	30,000	4,850	34,500
35,000	30,000	4,850	35,000
35,500	30,000	4,850	35,500
36,000	30,000	4,850	36,000
36,500	30,000	4,850	36,500
37,000	30,000	4,850	37,000
37,500	30,000	4,850	37,500
37,700	30,000	4,950	37,700
38,000	30,000	5,350	38,000
38,100	30,000	5,400	38,100
38,500	30,000	5,350	38,500
39,000	30,000	5,350	39,000
39,500	30,000	5,350	39,500
40,000	30,000	5,600	40,000

Punte a cannone a 2 taglienti Z 80

Articolo nr. 89508

P	M	K	N	S	H
			•		

HM | TLB Z 80 | 30xD | WN | h5 | R | HA

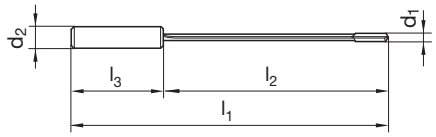
profondità di foro fino a 30xD • Punte a cannone a 4 fasi • per alluminio

Articolo nr. 89518

P	M	K	N	S	H
		•			

HM | TLB Z 80 | 30xD | WN | h5 | R | HA

profondità di foro fino a 30xD • Punte a cannone a 4 fasi • per ghise



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
8,000		16,000	330,000	280,000	48,000
10,000		20,000	390,000	340,000	50,000
12,000		20,000	450,000	400,000	50,000

Punte a cannone ad 1 tagliente E 100

Adatte per quasi tutti i materiali, fornibili da Ø 0,9 a 12,0 mm, lunghezza elica max. 500* mm

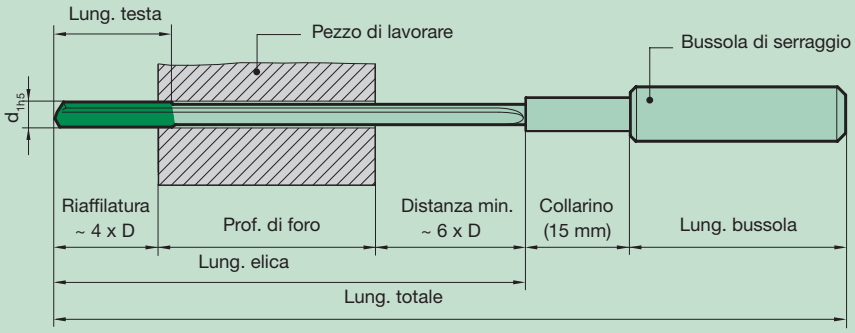
* dipende dal Ø

Affinchè la punta a cannone in MD integrale E 100 sia progettata e costruita per il Vostro specifico impiego,
Vi preghiamo di voler compilare il modulo „richiesta“.

Per una serie di materiali da lavorare è necessaria una ricopertura, perchè la funzionalità della punta a cannone lucida non può essere garantita.
Definizione delle ricoperture, vedere consigli per l'impiego nella parte tecnica.

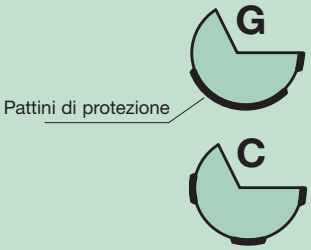
S TiN A TiAlN C TiCN F FIRE Y TiAlSiN A AlTiN a AlTiN nano

Misure necessarie per calcolo delle lunghezze per macchine utensili convenzionali



Forme taglienti

(Posizione del bordo di protezione.
Possibilità di fornire forme speciali)



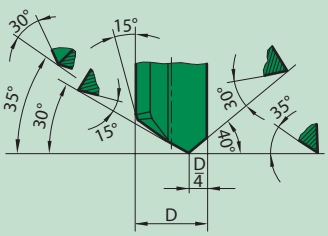
Adatta per tutti i materiali, con strette tolleranze del foro

Adatta per materiali di difficile truciolabilità, per esempio acciai legati in alta percentuale.

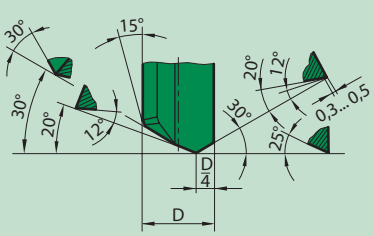
Affilature standard

(Possibilità di fornire affilature speciali)

Ø 2…4,00 mm



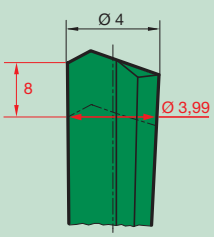
Ø > 4,01…20 mm



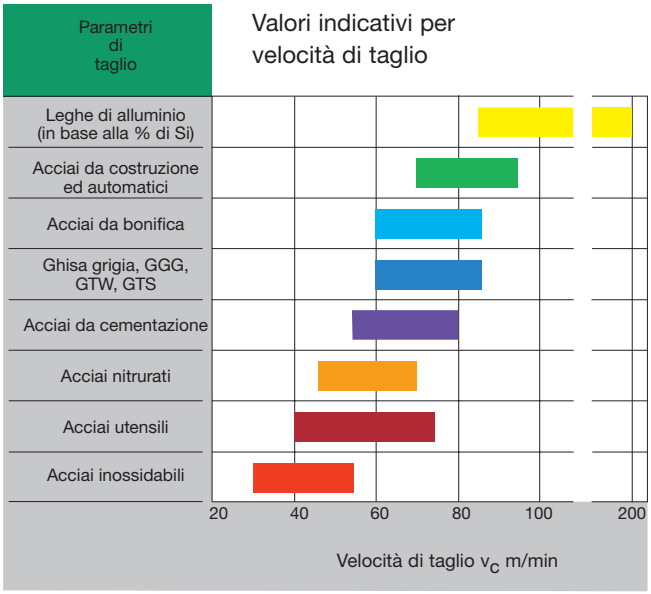
Conicità

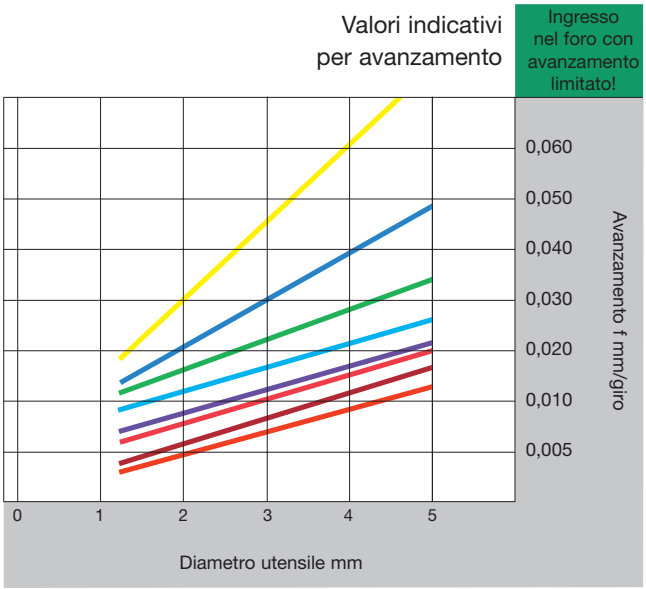
(dimensioni in mm)

1:800 (Standard)



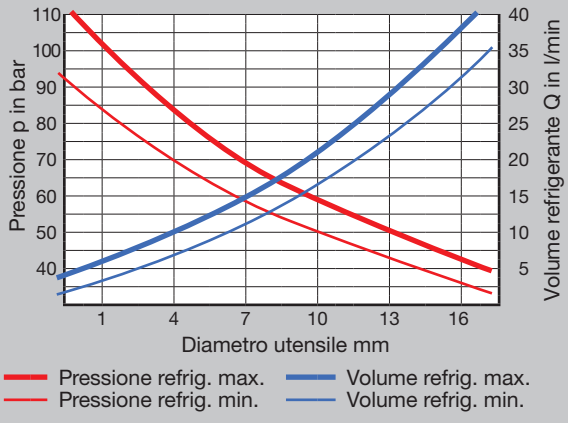
Punte a cannone ad 1 tagliente E 100





Valori refrigerante E 100

(Valori indicativi per emulsione)



E100 con attacco in metallo duro integrale

in esecuzione ricoperta AlTiN nanoA adatte per quasi tutti i materiali

Attacco in metallo duro integrale con parte terminale conica MMS

HARTNER

Punte a cannone ad 1 tagl. testa MD E 80

Adatte per quasi tutti i materiali, fornibili da Ø 2 - 40,0 mm, lunghezza totale 3000 mm

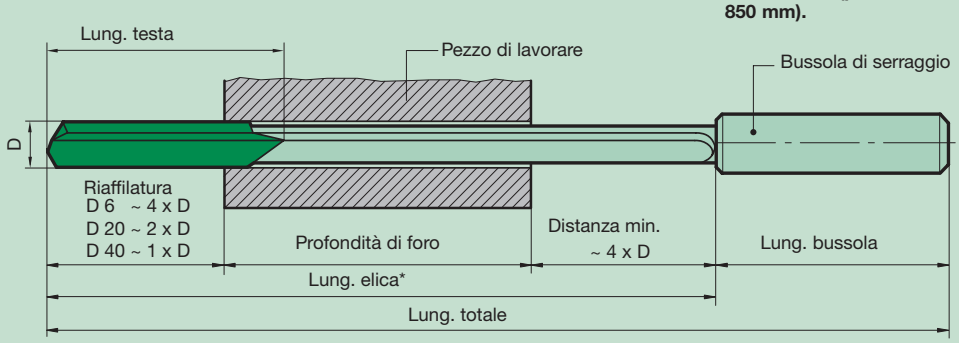
Affinchè la EB 80 sia progettata e costruita per il Vostro specifico impiego, Vi preghiamo di voler compilare il modulo „richiesta“.
Per Ø 6,0…20,0 mm a richiesta possiamo montare taglienti in PKD o PKB.
P. es. in leghe di AlSi in questo modo il tempo di impiego aumenta considerevolmente.

Per una serie di materiali da lavorare è necessaria una ricopertura, perchè la funzionalità della punta a cannone lucida non può essere garantita. Definizione delle ricoperture, vedere consigli per l'impiego nella parte tecnica.

T TiN A TiAlN C TiCN F FIRE Y TiAlSiN A AlTiN a AlTiN nano

Misure necessarie per calcolo delle lunghezze per macchine utensili convenzionali

***max. lunghezza elica per utensile 40 x D, per profondità di foro superiori, impiegare due utensili (p. es. Ø 10 x 450 e Ø 9,95 x 850 mm).**



Forme taglienti
(posizione pattini di protezione)

Esecuzioni standard

Adatta per tutti i materiali, con strette tolleranze del foro

Adatta per materiali di difficile truciolabilità, per esempio acciai legati in alta percentuale.

pattini di protezione

Esecuzioni speciali

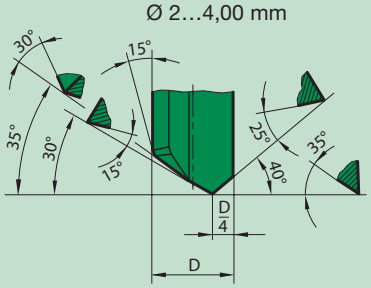
adatta per tutti i materiali, con tolleranze del foro larghe

adatta per tutti i materiali, ma in condizioni di preforo sfavorevoli

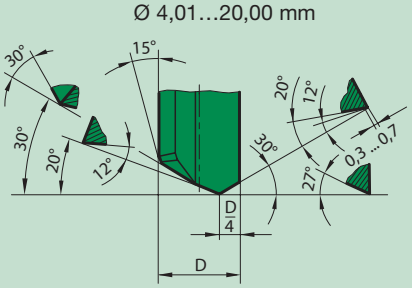
questa esecuzione è prevalentemente adatta per ghisa grigia

Affilature standard (Possibilità di fornire affilature speciali)

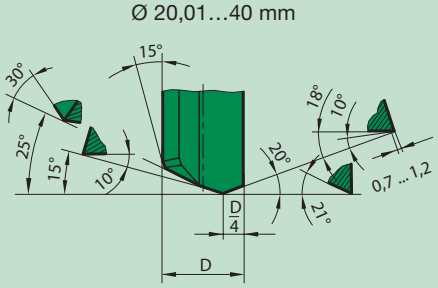
Ø 2…4,00 mm



Ø 4,01…20,00 mm



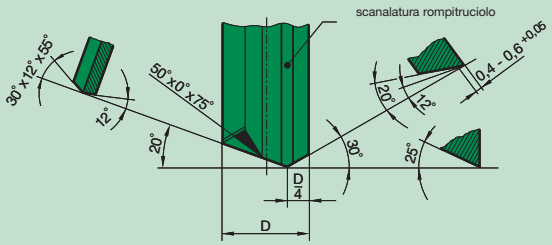
Ø 20,01…40 mm



Punte a cannone ad 1 tagl. testa MD E 80

Affilatura standard con scanalatura rompitruciolo

per numero articolo 89505, 89509, 89506 und 89507



Punte a cannone ad 1 tagliente saldo-brasate

Hartner è naturalmente in grado di produrre qualsiasi tipo di punta a cannone saldo-brasata, lucida o ricoperta, su richiesta del cliente. Per esecuzioni speciali occorre un determinato lasso di tempo. Offriamo termini di consegna brevi, max. 3 settimane, per le misure sottosegnate.

Ø nom. mm	in progr. mm	Forma tagliente	Lung. totale
2,00...13,90	0,1	G	≤ 7,5 mm Ø 650 max
4,00...13,90	0,1	C	> 7,5 mm Ø 1200 max
14,00...22,00	0,5	G	1200 max
14,00...22,00	0,5	C	

Prezzi a richiesta

Materiale tagliente: metallo duro

Tratt. di superficie: ○

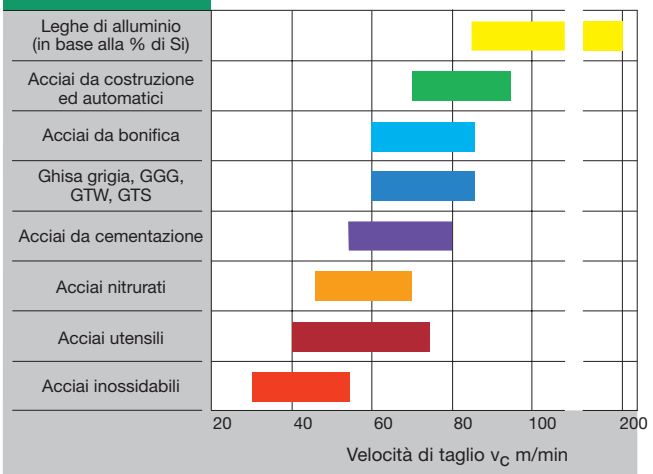
Lung. standard per le teste mm

Ø da...a	Lung.	Ø da...a	Lung.
2,00...2,49	15	10,00...10,99	35
2,50...2,99	18	11,00...17,00	40
3,00...3,99	20	17,01...20,00	45
4,00...5,19	25	20,01...23,00	50
5,20...6,99	30	23,01...26,00	55
7,00...9,99	35	26,01...40,00	65

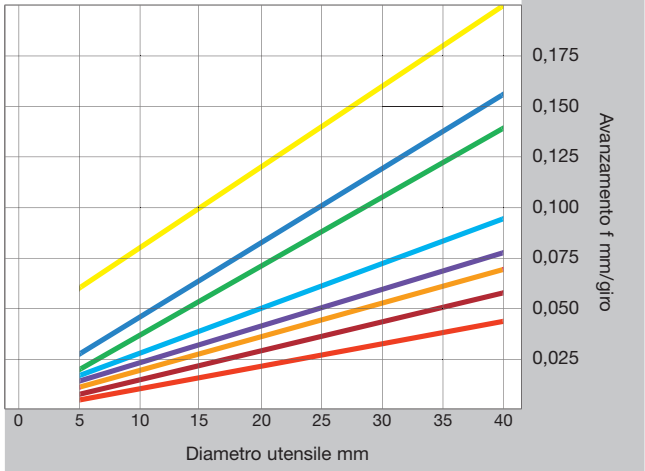
Lunghezza elica: min. 20 x D

Parametri di taglio

Valori indicativi per velocità di taglio

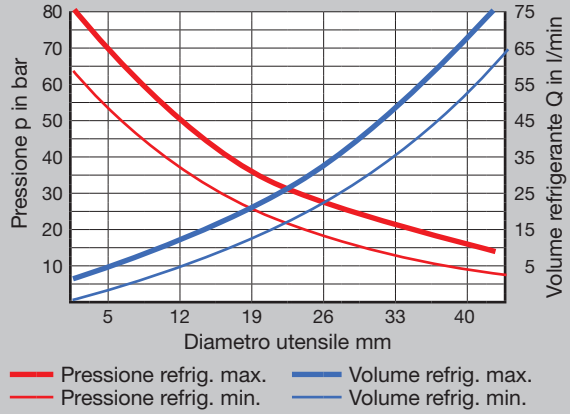


Valori indicativi per avanzamento



Valori refrigerante E 80

(Valori indicativi per emulsione)



in esecuzione ricoperta TiN con scanalatura rompitruciolo per acciai a truciolo lungo

in esecuzione ricoperta TiCN senza scanalatura rompitruciolo per acciai legati e non legati

Punte a cannone a 2 tagl. testa MD Z 80

Adatte per ghisa, alluminio e metalli non ferrosi a truciolo corto, fornibili dal Ø 6,0 - 27,0 mm, lunghezza totale max. 1000 mm

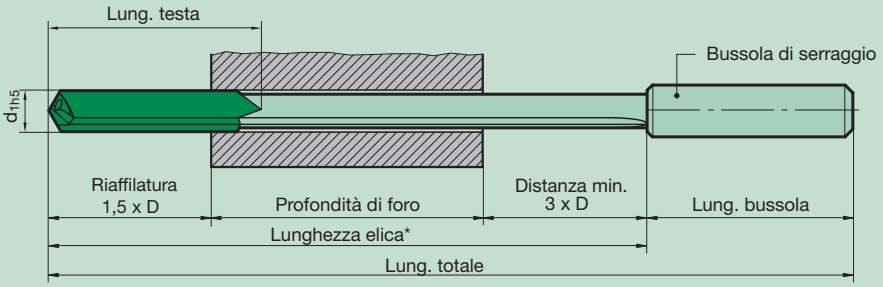
Affinchè la Z 80 sia progettata e costruita per il Vostro specifico impiego,
Vi preghiamo di voler compilare il modulo „richiesta“.

F FIRE **a AlTiN nano**
Per una serie di materiali da lavorare è necessaria una ricopertura, perchè la funzionalità della punta a cannone lucida non può essere garantita.

Principale vantaggio della punta a cannone a 2 taglienti rispetto a quella ad 1 tagliente è l'avanzamento sensibilmente superiore con il quale si può lavorare per produrre fori. Esso deriva dalla costruzione della punta a cannone con due taglienti e due scanalature. Quindi si possono produrre fori più velocemente. In ogni caso questo aumento della velocità di lavorazione è legato ad una diminuita precisione del foro. Anche questa è una diretta conseguenza della costruzione della punta con due taglienti. Poichè c'è un tagliente dalla parte opposta, l'effetto di spianamento e la guida sono minori rispetto a quelli di una punta a cannone con un tagliente. Per profondità di foro ≤ 10 x D consigliamo la punta TS 150 GG, disponibile a magazzeno e, con queste profondità di foro, più conveniente di una punta a cannone. Inoltre, forando con una TS 150 GG, in molti casi si può fare a meno del foro pilota.

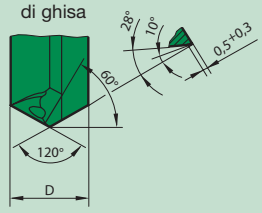
Misure necessarie per calcolo delle lunghezze per macchine utensili convenzionali

***max. lunghezza elica per utensile 40 x D, per profondità di foro superiori, impiegare due utensili (p. es. Ø 10 x 450 e Ø 9,95 x 850 mm).**

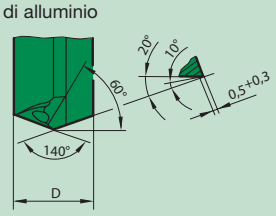


Affilature standard
(Possibilità di fornire affilature speciali)

Affilatura G per lavorazione di ghisa

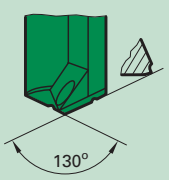


Affilatura A per lavorazione di alluminio

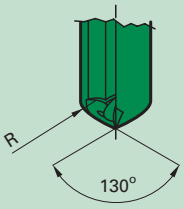


Affilature speciali per esempio:

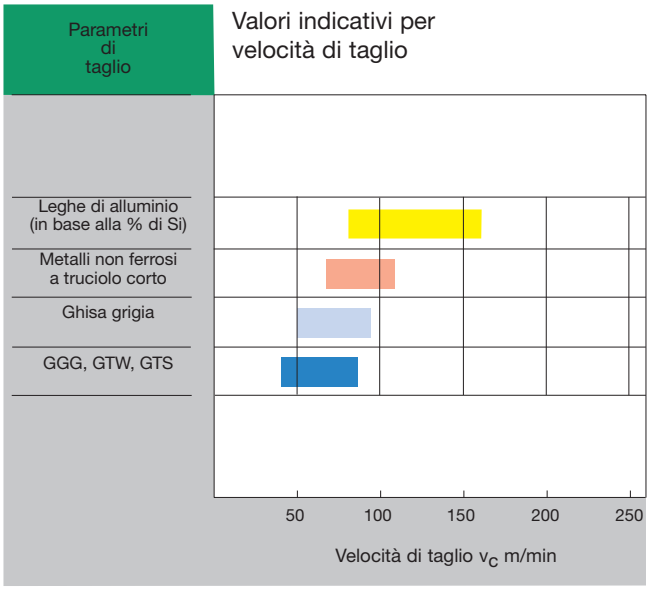
alluminio

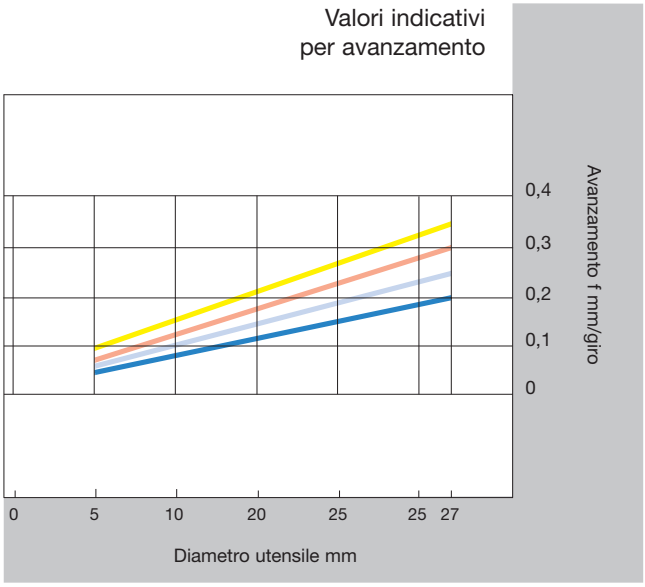


ghisa



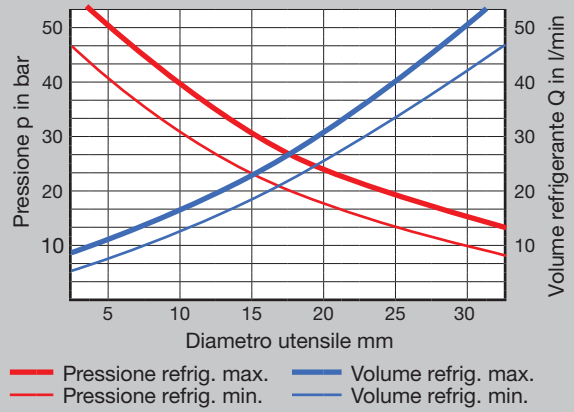
Punte a cannone a 2 tagl. testa MD Z 80





(Vedere i parametri di taglio dettagliati nei consigli per l'impiego)

Valori refrigerante Z 80
(Valori indicativi per emulsione)

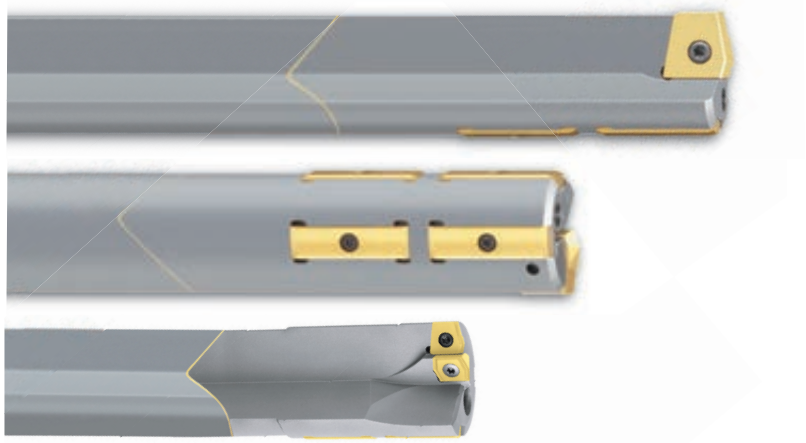


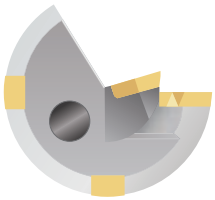
Art. 89518 con affilatura per ghise

Art. 89508 con affilatura per alluminio

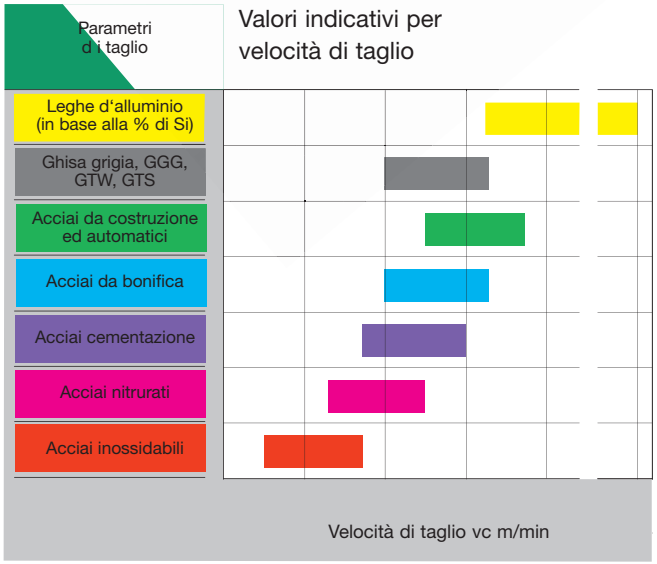
Punte a cannone ad 1 tagliente E 800

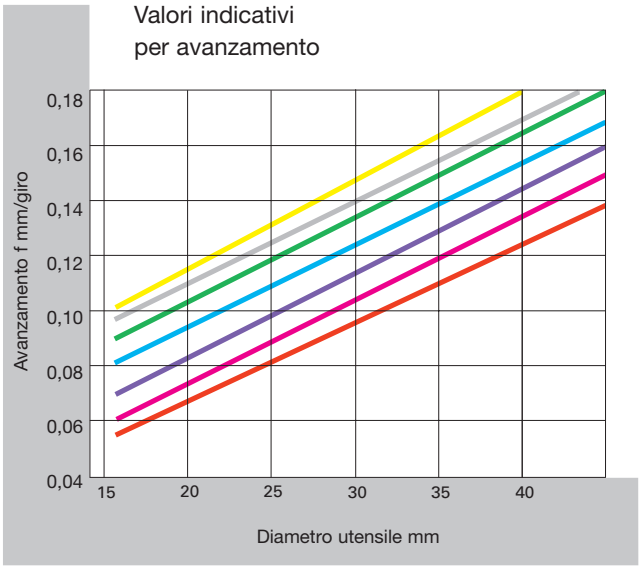
Con inserti e pattini di guida intercambiabili, adatte per quasi tutti i materiali, fornibili dal 12,0 - 40,0 mm, lunghezza totale max. 3000 mm





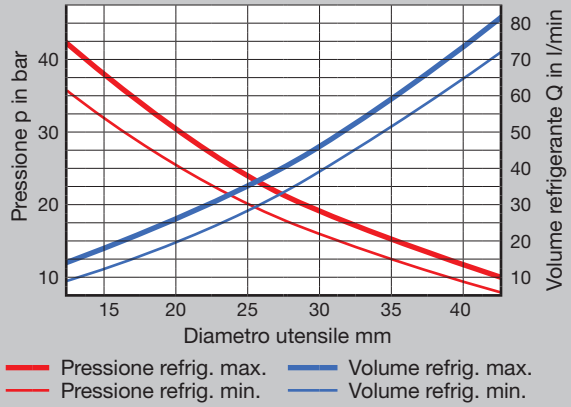
Ø 40.01 - 52.00 mm con inserti interni ed esterni





Affinchè la E 800 sia progettata e costruita per il Vostro specifico impiego, Vi preghiamo di voler compilare il modulo „richiesta“.

Valori refrigerante E 800
(Valori indicativi per emulsione)



Punte a cannone ad 1 tagliente E 800

Tabella accessori

Per il primo ordine, riceverete le punte a cannone con inserti E800 complete di inserti, pattini di guida ed accessori.
Per ordini successivi vogliate utilizzare i seguenti articoli e codici:

Ø	Inserti	Viti per inserti	Giraviti per inserti	Pattini di guida	Viti per pattini di guida	Giraviti per pattini di guida
16	Art. 89535 Ø 16,0 + TiN	89537 3,002	89538 9.001	Art. 89536 Ø 16,0 + TiN	89537 2,203	89538 7.001
18	Art. 89535 Ø 18,0 + TiN	89537 3,002	89538 9.001	Art. 89536 Ø 18,0 + TiN	89537 2,203	89538 7.001
20	Art. 89535 Ø 20,0 + TiN	89537 4,001	89538 15.001	Art. 89536 Ø 20,0 + TiN	89537 2,502	89538 8.001
24	Art. 89535 Ø 24,0 + TiN	89537 4,001	89538 15.001	Art. 89536 Ø 24,0 + TiN	89537 2,502	89538 8.001

Ogni punta a cannone con inserti intercambiabili E 800 sia del programma di vendita che come esecuzione speciale può essere modificata nell'ambito dei diametri sotto indicati.

Grandezza	Diametri da...a (mm)
0.00	12,00 - 12,49
0.01	12,50 - 12,99
0.02	13,00 - 13,49
0.03	13,50 - 13,99
0.04	14,00 - 14,49
0.05	14,50 - 14,99
0.06	15,00 - 15,49
0.07	15,50 - 15,99
1.00	16,00 - 16,49
1.01	16,50 - 16,99
1.02	17,00 - 17,49
1.03	17,50 - 17,99
1.04	18,00 - 18,49
1.05	18,50 - 18,99
1.06	19,00 - 19,49
1.07	19,50 - 19,99
2.00	20,00 - 20,49
2.01	20,50 - 20,99
2.02	21,00 - 21,49
2.03	21,50 - 21,99
2.04	22,00 - 22,49
2.05	22,50 - 22,99
2.06	23,00 - 23,49
2.07	23,50 - 23,99
2.08	24,00 - 24,49
2.09	24,50 - 24,99
2.10	25,00 - 25,49
2.11	25,50 - 25,99
3.00	26,00 - 26,49
3.01	26,50 - 26,99

Grandezza	Diametri da...a (mm)
3.02	27,00 - 27,49
3.03	27,50 - 27,99
3.04	28,00 - 28,49
3.05	28,50 - 28,99
3.06	29,00 - 29,49
3.07	29,50 - 29,99
4.00	30,00 - 30,49
4.01	30,50 - 30,99
4.02	31,00 - 31,49
4.03	31,50 - 31,99
4.04	32,00 - 32,49
4.05	32,50 - 32,99
4.06	33,00 - 33,49
4.07	33,50 - 33,99
5.00	34,00 - 34,49
5.01	34,50 - 34,99
5.02	35,00 - 35,49
5.03	35,50 - 35,99
5.04	36,00 - 36,49
5.05	36,50 - 36,99
5.06	37,00 - 37,49
5.07	37,50 - 37,99
6.00	38,00 - 38,49
6.01	38,50 - 38,99
6.02	39,00 - 39,49
6.03	39,50 - 40,00
7.00	40,01 - 43,99
8.00	44,00 - 47,99
9.00	48,00 - 52,00

Punte a cannone ad 1 tagliente E 800 con inserti intercambiabili

Accessory table for Ø 12.0 - 52.0 mm

Misura	Diametro da ... a ...(mm) / misure corpo	Corpo / Porta utensile	Inserti esterni		
			Inserti taglienti rivestiti TiN	Vite	Giravite
0.	Ø12.00 - Ø12.49 Ø12.50 - Ø12.99 Ø13.00 - Ø13.49 Ø13.50 - Ø13.99 Ø14.00 - Ø14.49 Ø14.50 - Ø14.99 Ø15.00 - Ø15.49 Ø15.50 - Ø15.99	Corpo/ Porta utensile a richiesta del cliente. Lung totale fino a 3000 mm, lunghezza utile da 15xD Alternativa: programma standard articolo nr. 89530 da diametro 12,00 mm a 24,00 mm completo di inserti e pattini di guida TiN	art. no. 89535 + Diametro nominale = nr. d'ordinazione	nr. d'ordinazione 4071 2,502 T8 M2.5x 5.2	nr. d'ordinazione 86842 8,001
1.	Ø16.00 - Ø16.49 Ø16.50 - Ø16.99 Ø17.00 - Ø17.49 Ø17.50 - Ø17.99 Ø18.00 - Ø18.49 Ø18.50 - Ø18.99 Ø19.00 - Ø19.49 Ø19.50 - Ø19.99			nr. d'ordinazione 4071 3,002 T9 M3x6.4	nr. d'ordinazione 86842 9,001
2.	Ø20.00 - Ø20.49 Ø20.50 - Ø20.99 Ø21.00 - Ø21.49 Ø21.50 - Ø21.99 Ø22.00 - Ø22.49 Ø22.50 - Ø22.99 Ø23.00 - Ø23.49 Ø23.50 - Ø23.99 Ø24.00 - Ø24.49 Ø24.50 - Ø24.99 Ø25.00 - Ø25.49 Ø25.50 - Ø25.99			nr. d'ordinazione 4071 4,001 T15 M4x7.7	nr. d'ordinazione 86842 15,001
3.	Ø26.00 - Ø26.49 Ø26.50 - Ø26.99 Ø27.00 - Ø27.49 Ø27.50 - Ø27.99 Ø28.00 - Ø28.49 Ø28.50 - Ø28.99 Ø29.00 - Ø29.49 Ø29.50 - Ø29.99			nr. d'ordinazione 4071 4,002 T15 M4x10.6	
4.	Ø30.00 - Ø30.49 Ø30.50 - Ø30.99 Ø31.00 - Ø31.49 Ø31.50 - Ø31.99 Ø32.00 - Ø32.49 Ø32.50 - Ø32.99 Ø33.00 - Ø33.49 Ø33.50 - Ø33.99				
5.	Ø34.00 - Ø34.49 Ø34.50 - Ø34.99 Ø35.00 - Ø35.49 Ø35.50 - Ø35.99 Ø36.00 - Ø36.49 Ø36.50 - Ø36.99 Ø37.00 - Ø37.49 Ø37.50 - Ø37.99			nr. d'ordinazione 4071 5,002 T20 M5x14.2	nr. d'ordinazione 86842 20,001
6.	Ø38.00 - Ø38.49 Ø38.50 - Ø38.99 Ø39.00 - Ø39.49 Ø39.50 - Ø40.00				
7.	Ø40.01 - Ø40.49 Ø40.50 - Ø40.99 Ø41.00 - Ø41.49 Ø41.50 - Ø41.99 Ø42.00 - Ø42.49 Ø42.50 - Ø42.99 Ø43.00 - Ø43.49 Ø43.50 - Ø43.99		a richiesta	nr. d'ordinazione 4071 3,002 TX9 M3x6.4	nr. d'ordinazione 86842 9,001
8.	Ø44.00 - Ø44.49 Ø44.50 - Ø44.99 Ø45.00 - Ø45.49 Ø45.50 - Ø45.99 Ø46.00 - Ø46.49 Ø46.50 - Ø46.99 Ø47.00 - Ø47.49 Ø47.50 - Ø47.99			nr. d'ordinazione 4071 4,001 TX15 M4x7.7	nr. d'ordinazione 86842 15,001
9.	Ø48.00 - Ø48.49 Ø48.50 - Ø48.99 Ø49.00 - Ø49.49 Ø49.50 - Ø49.99 Ø50.00 - Ø50.49 Ø50.50 - Ø50.99 Ø51.00 - Ø51.49 Ø51.50 - Ø52.00			nr. d'ordinazione 4071 4,002 TX15 M4x10.6	

Further coatings on request

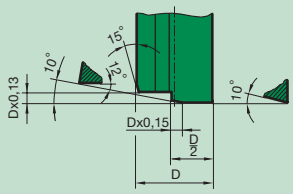
Punte a cannone ad 1 tagliente E 800 con inserti intercambiabili

<table>
<tr><th colspan="3">Inserti interni</th><th colspan="3">Pattini di guida</th></tr>
<tr><th>Inserto tagliente</th><th>Vite</th><th>Cacciavite</th><th>Pattini di guida</th><th>Vite</th><th>Giravite</th></tr>
<tr><th></th><th></th><th></th><th>rivestiti TiN</th><th></th><th></th></tr>
<tr><td colspan="3" rowspan="6"></td><td rowspan="6">art. no. 89536
+ Diametro
nominale
= nr. d’ordinazione</td><td>nr. d’ordinazione
4071 1,601
T5
M1.6x4.4</td><td>nr. d’ordinazione
86842 5,001</td></tr>
<tr><td>nr. d’ordinazione
4071 2,203
T7 / M2.2x 4.6</td><td rowspan="2">nr. d’ordinazione
86842 7,001</td></tr>
<tr><td>nr. d’ordinazione
4071 2,202
T7 / M2.2x5.6</td></tr>
<tr><td>nr. d’ordinazione
4071 2,502
T8
M2.5x 5.2</td><td rowspan="3">nr. d’ordinazione
86842 8,001</td></tr>
<tr><td>nr. d’ordinazione
4071 2,501
T8
M2.5x6.4</td></tr>
<tr><td rowspan="2">nr. d’ordinazione
4071 3,003
T9
M3x8</td></tr>
<tr><td>a richiesta</td><td>nr. d’ordinazione
4071 4,501
T15
M4.5x11.8</td><td>nr. d’ordinazione Nr.
d’ordine
86842 15,001</td><td>a richiesta</td><td>nr. d’ordinazione
86842 9,001</td></tr>
</table>

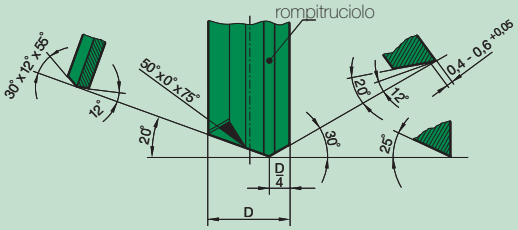
Integrazione parametri tecnici

Esempi di affilature speciali per punte a cannone ad un tagliente con testa in MD

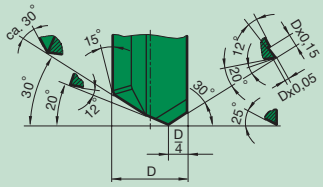
con vano olio arretrato



con rompitruciolo



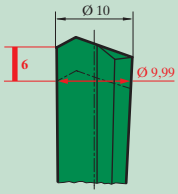
con gradino di guida



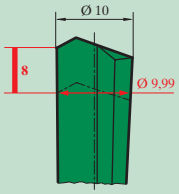
Conicità

(dimensioni in mm)

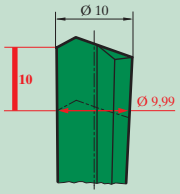
1:600



1:800 (Standard)



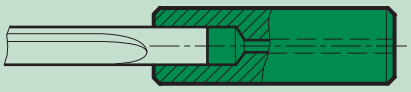
1:1000



Varianti di produzione delle bussole di serraggio in punte a cannone con codolo a tubo

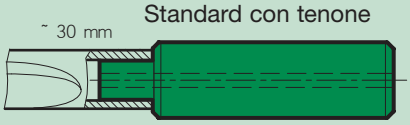
Prevalentemente per Ø nominale < Ø bussola
(la differenza deve essere di ca. 6 mm):
codolo a tubo si accoppia alla bussola di serraggio

Standard



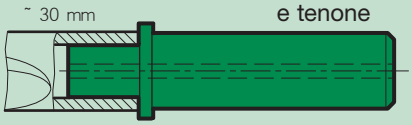
Prevalentemente per Ø nominale ≠ Ø bussola (max fino a pareggio):
codolo a tubo si accoppia tramite il tenone

Standard con tenone



Prevalentemente per Ø nominale > Ø bussola:
codolo a tubo si accoppia tramite tenone, il cui Ø interno
è > al Ø della bussola, e chiude a livello con il collarino

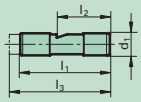
Standard con collarino
e tenone



Bussole

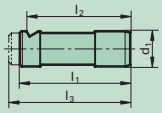
Bussole per forature profonde

1



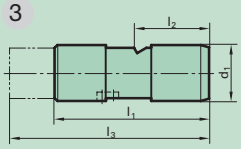
Codice	d_1	l_1	l_2	l_3
1.1	10	40	24	-
1.2	10	40	24	45
1.3	10	40	24	55
1.4	16	45	31,2	-
1.5	25	70	34	-
1.6	25	70	34	78

2



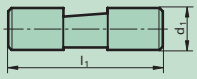
Codice	d_1	l_1	l_2	l_3
2.1	16	50	47	-
2.2	16	50	47	55
2.3	16	50	47	70

3



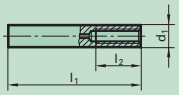
Codice	d_1	l_1	l_2	l_3
3.1	25	70	34	100

4



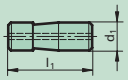
Codice	d_1	l_1
4.1	19,05	70
4.2	12,70	70
4.3	25,40	70
4.4	31,75	70
4.5	38,10	70

5



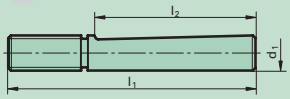
Codice	d_1	l_1	l_2
5.1	10	60	20
5.2	16	80	28
5.3	25	100	50
5.4	10	100	
5.5	10	110	

6



Codice	d_1	l_1
6.1	12.7	38
6.2	19.05	70
6.3	38.1	70

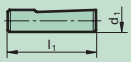
7



Codice	d_1	l_1	l_2
7.1	16	112	73
7.2	20	126	82

Bussole a DIN 1835

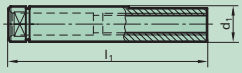
9 Forma E



Codice	d_1	l_1
9.1	8	36
9.2	10	40
9.3	12	45
9.4	16	48
9.5	20	50
9.6	25	56
9.7	32	60
9.8	31.75	70
9.9	38.1	70
9.10	40	70

Bussole a VDI-progetto

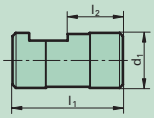
12



Codice	d_1	l_1
12.1	10	68
12.2	16	90
12.3	25	112

Bussole a sitema Speed-Bit

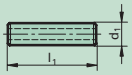
13



Codice	d_1	l_1	l_2
13.1	16	40	16
13.2	25	50	25
13.3	35.6	60	

Bussole a DIN 6535

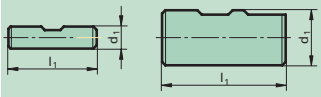
10 Forma HA



Codice	d_1	l_1
10.1	8	36
10.2	10	40
10.3	12	45
10.4	16	48
10.5	20	50
10.6	25	56
10.7	32	60
10.8	25	70
10.9	40	70

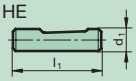
8 Forma HB

a Codice 8.6, 8.7, 8.8



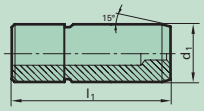
Codice	d_1	l_1
8.1	8	36
8.2	10	40
8.3	12	45
8.4	16	48
8.5	20	50
8.6	25	56
8.7	32	60
8.8	40	70

11 Forma HE



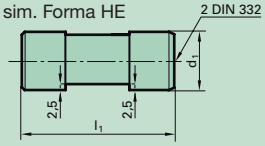
Codice	d_1	l_1
11.1	8	36
11.2	10	40
11.3	12	45
11.4	16	48
11.5	20	50
11.6	25.4	70
11.7	25	56
11.8	32	60
11.9	40	70

16 sim. Forma HA



Codice	d_1	l_1
16.1	10	50
16.2	16	64
16.3	20	70
16.4	25	81
16.5	32	92

17 sim. Forma HE



Codice	d_1	l_1
17.1	19.05	70
17.2	25.40	70
17.3	31.75	70
17.4	38.1	70

Abbiamo a magazzino le bussole del programma qui raffigurato, esso rappresenta però solo una scelta. Naturalmente noi produciamo anche bussole di massima precisione a disegno del cliente. Attenzione! Per E 100 sono necessarie bussole con perno di allineamento. Informazioni a richiesta.

Breve introduzione al tema punte a cannone

Nella tecnica di truciolatura da una profondità di foro di 10 x D e superiore, si parla della così detta punta a cannone, anche se, logicamente, con punte a cannone si possono produrre fori più corti. Si approfitta così dei positivi fenomeni collaterali nei fori, come buona finitura di superficie, minimo scostamento di diametro e rettilineità ottimizzata.

Procedimento per impiego di tutte le punte a cannone su macchine utensili convenzionali:

- Produzione di un foro pilota (tolleranza H8). Entrare con un numero di giri di ca. 200 giri/min, avanzamento ca. 500 mm/min
- Regolazione della pressione del lubrificante e del no. di giri
- Foratura in continuo sull'intera lunghezza, senza scaricare. Impiegando punte a cannone con un grosso rapporto lunghezza-diametro (p. es. E 100 da lunghezza elica 160 mm), consigliamo di lavorare fino ad una profondità di foro di ca. 25 mm con parametri di taglio ridotti (ca. 75% della velocità di taglio ottimale).
- spegnimento dell'adduzione refrigerante al raggiungimento della profondità di foro voluta
- Corsa di ritorno rapida con mandrino fermo.

Raffreddamento ad alta pressione - oggi una cosa ormai ovvia

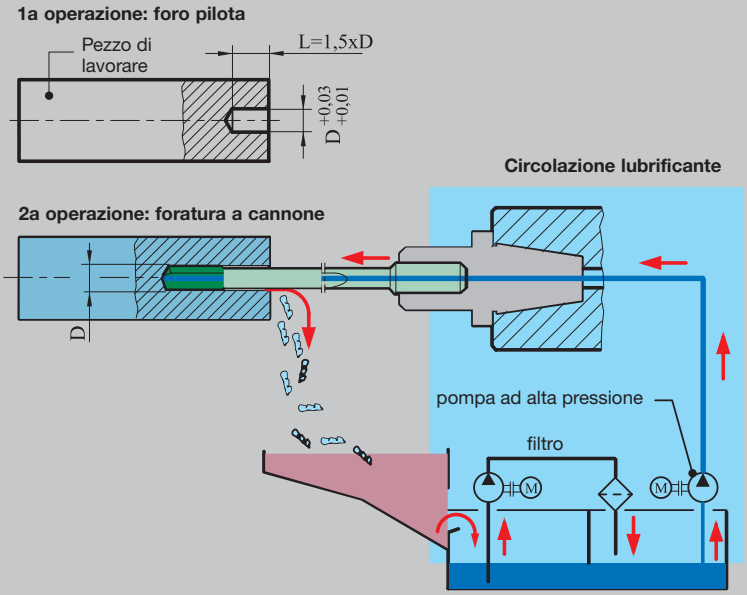
Poichè negli ultimi anni hanno preso piede utensili con fori di refrigerazione interni, il lubrificante passa attraverso tali fori, per arrivare là dove è necessario.
Con questo sviluppo si ottennero anche con punte elicoidali, maschi ecc. sensibili miglioramenti del tempo di impiego ed inferiori rotture degli utensili.
Oggi ogni macchina utensile convenzionale è offerta con refrigerazione interna ad alta pressione, adatta quindi anche per punte a cannone.
In tal modo la quota di punte a cannone impiegate su centri di lavoro, torni ecc. guadagna sempre maggiore importanza. Il procedimento risulta sempre più popolare nella tecnica di truciolatura.

Tutte le punte a cannone devono essere guidate da un preforo.
Le punte a cannone non devono essere mai mosse libere al massimo dei giri nello spazio macchina.

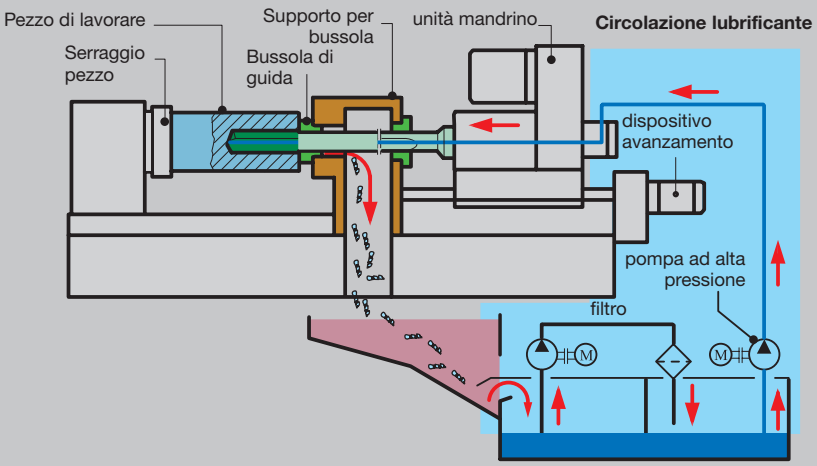
Le punte a cannone non sono un enigma, bensì qualcosa che ognuno può utilizzare tenendo presente precisi presupposti.
Troverete i valori indicativi per l'impiego delle punte a cannone Hartner alle pagine dei rispettivi consigli.

Rappresentazione schematica

Forare con punte a cannone
su macchine utensili convenzionali

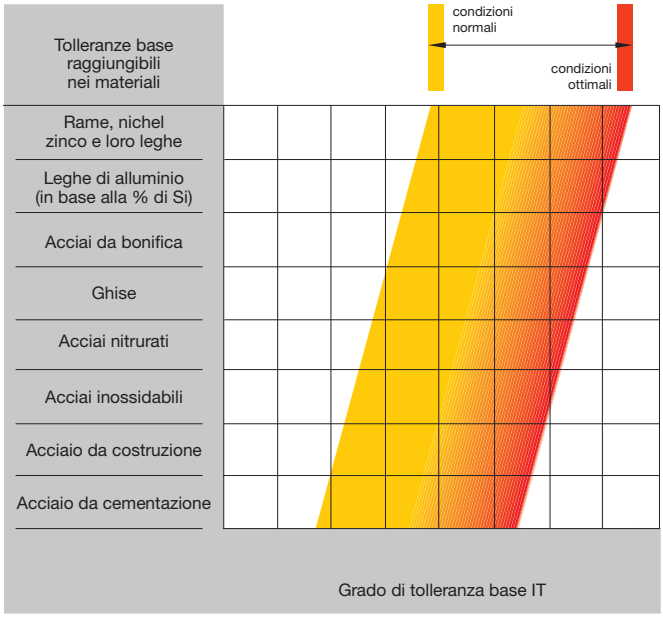


Forare con punte a cannone
su macchine specifiche

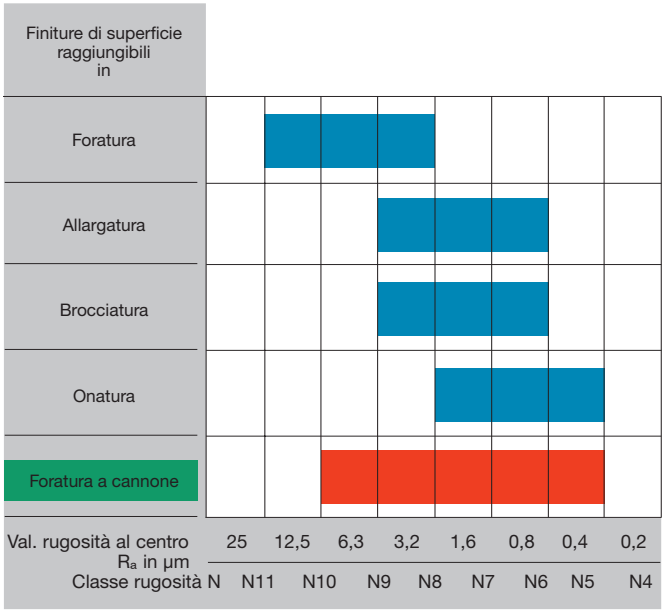


Con punte a cannone ad un tagliente

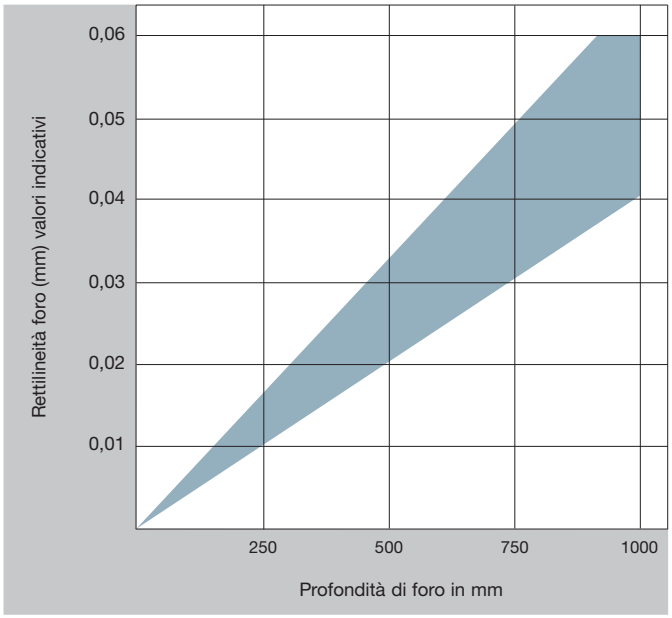
Tolleranze base
Con punte a cannone ad un tagliente si possono raggiungere strette tolleranze di base, perchè le forze taglienti sono assorbite dai pattini di supporto del tagliente e quindi, ad esempio, non accade come per le punte elicoidali che un minimo scostamento di entrambe i taglienti porti subito ad un foro allargato.



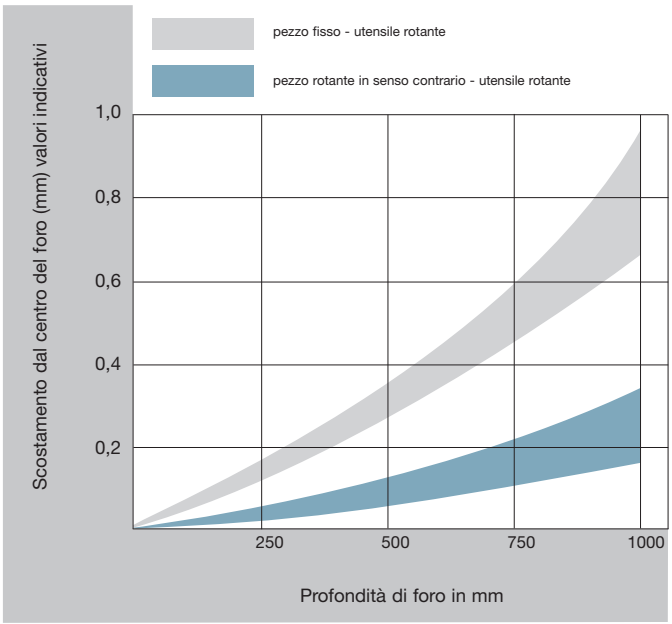
Finitura di superficie
Le forze sul tagliente sono assorbite dai pattini di supporto, che lucidano anche la superficie. Perciò la pellicola lubrificante tra i pattini di supporto e la superficie del foro gioca un ruolo importante. Migliore è il lubrificante, superiore risulta la finitura di superficie.



Rettilineità del foro
Dato che la testa di precisione in MD delle punte a cannone ad un tagliente è sempre saldata su un tubo flessibile, l'utensile produce sempre un foro molto diritto, senza essere influenzato da eventuali errori di circolarità. Tuttavia oscillazioni estreme del materiale ed altri fattori possono pregiudicare la rettilineità.



Scostamento dal centro del foro
Se un foro è prodotto con una normale punta elicoidale, la qualità dell'affilatura influenza, tra l'altro, anche lo scostamento dal centro del foro. Insorgono disparità di forze sui taglienti. Nelle punte a cannone ad un tagliente le forze di taglio sono assorbite dai pattini di supporto, ottenendo quindi una buona centratura.



HARTNER

Formulario per la richiesta di E 100 E 80 e Z 80

❑ Richiesta ❑ Ordine per Fax: +49 7431 125-21547

Nr. cliente | nuovo cliente | Ordine nr.

Nome cliente | Indirizzo | Contatto per chiarimenti

Hartner GmbH
Casella post. 10 04 27
D-72425 Albstadt
Tel. +49 74 31 1 25-0
Fax +49 74 31 1 25-5 47

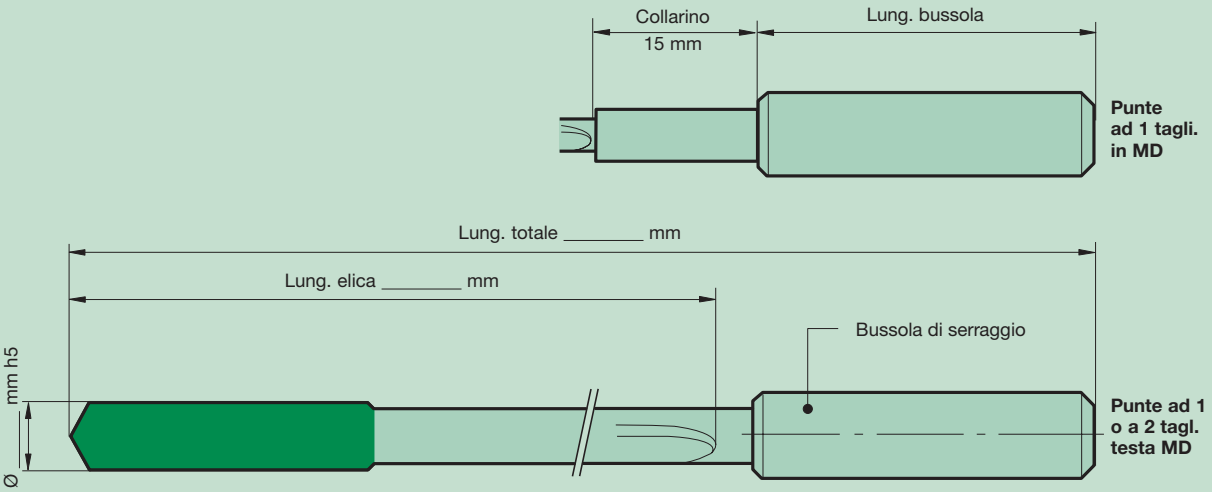
Via/Nr. | Città /codice postale

Telefono | Fax

Data | Firma

Punte a cannone: ❑ **Punte ad 1 tagli. in MD E 100** ❑ **Punte ad 1 tagl. testa MD E 80** ❑ **Punte a 2 tagl. Z 80**

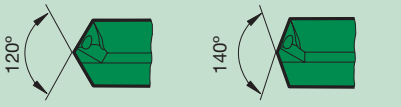
Forma taglienti: _____ **Quantità richiesta:**_____ **pezzi**



Schizzo posizione di foratura

ad 1 tagliente

a 2 taglienti



necessario solo per casi speciali

Bussola di serraggio: ❑ **nessuna** ❑ **nr. ident.:** ❑ **a disegno allegato**

Ricopertura: ❑ **TiN** ❑ **Fire** ❑ **TiCN** ❑ **MolyGlide** ❑ **TiAlN** ❑ **AlTiN** ❑ _____

Pezzo da lavorare: **Prof. di foro:**_____ **Tolleranza del foro:** _____ **Materiale:** _____

Macchina-tipo: ❑ **macc. per punte a cannone** ❑ **macchina utensile convenz.**
❑ **foro pilota** ❑ **bussola di guida**

Lubrorefrigerante: ❑ **olio per punte a cannone** ❑ **emulsione**
Pressione _____ **bar** **Quantità** _____ **l/min**

HARTNER

Formulario per la richiesta di E 800

❑ Richiesta ❑ Ordine per Fax: +49 74 31 125 - 21547

Nr. cliente | nuovo cliente | Ordine nr.

Contatto per chiarimenti

Hartner GmbH
Casella post. 10 04 27
D-72425 Albstadt
Tel. +49 74 31 1 25-0
Fax +49 74 31 1 25-5 47

Indirizzo | Contatto per chiarimenti

Via/Nr. | Città /codice postale

Telefono | Fax

Data | Firma

Pezzo di lav.

Materiale:

Descrizione del particolare:

Numero di pezzi/anno:

Diametro del foro:

Tolleranza di diametro:

Profondità di foro:

Finitura di superficie richiesta:

Spigolo di disturbo alla foratura:
No Si mm

Ulteriori informazioni:

Macchina

Centro di lavoro:

Codolo:

Numero mandrini:

Macchina per punte a cannone:

Codolo:

Numero mandrini:

Lunghezza totale utensile:

Refrigerante:
Emulsione Olio

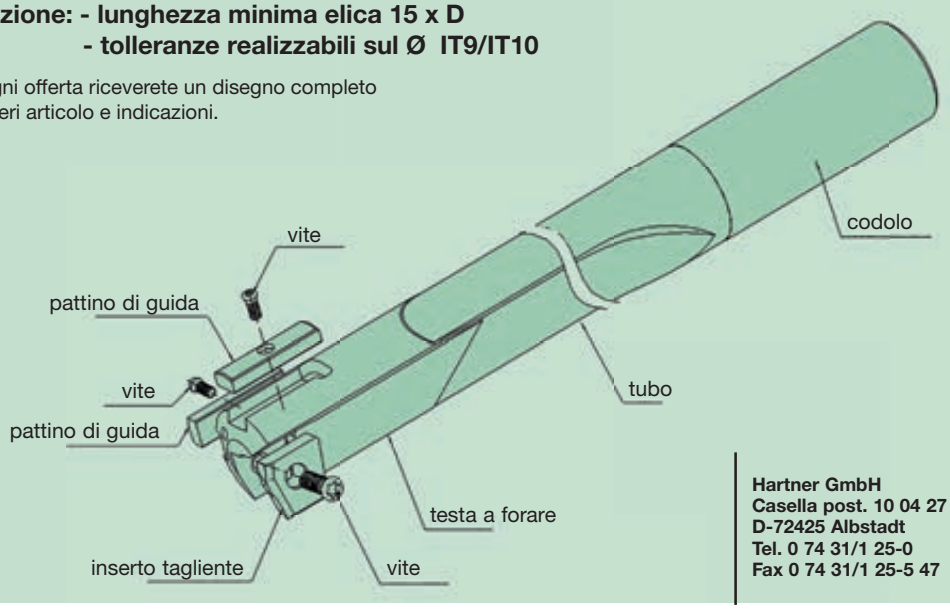
Pressione:
bar

Portata:
l/min

La punta a cannone E 800 per le Vostre applicazioni

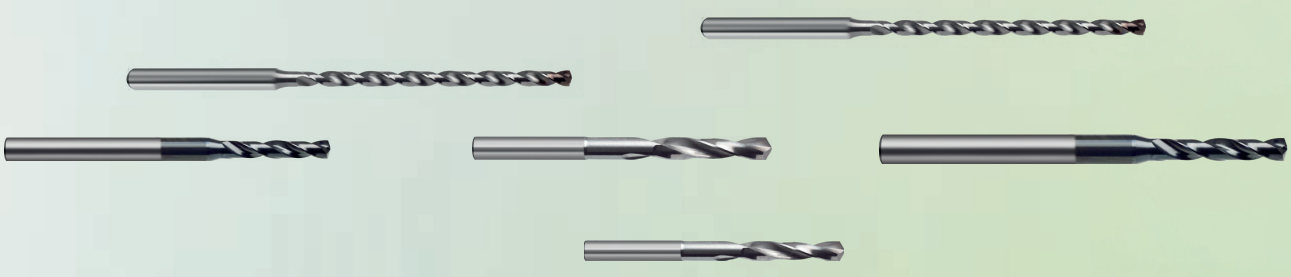
Attenzione: - lunghezza minima elica 15 x D
- tolleranze realizzabili sul Ø IT9/IT10

Con ogni offerta riceverete un disegno completo di numeri articolo e indicazioni.



Hartner GmbH
Casella post. 10 04 27
D-72425 Albstadt
Tel. 0 74 31/1 25-0
Fax 0 74 31/1 25-5 47

Punta a cannone con inserti e pattini di guida intercambiabili ed adduzione interna del refrigerante.
Ø da 12,00 a 40,00 mm



HARTNER

Precision Cutting Tools

MICROPUNTE

in metallo duro e HSS-E-PM
lucide e ricoperte

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	Profondità di foro	d1/mm	Articolo nr.	Pagina

Micropunte senza fori di refrigerazione

●	●	●	●	○		DIN 1899	N	HSS-E-PM	◯	destra	cil.	~5xD	0,050 - 1,900	**87011**	289

●	●	●	●	○		DIN 1899	N	HSS-E-PM	◯	sinistra	cil.	~5xD	0,150 - 1,450	**87016**	291

●	●	●	●	○		DIN 1899	N	HSS-E-PM	T	destra	cil.	~5xD	0,200 - 1,500	**84810**	292

●		●				Norma di fab.	N	Metallo duro	A	destra	cil.		0,100 - 3,000	**86402**	294

●	●	●	○	○		Norma di fab.	N	Metallo duro	A	destra	cil.	4xD	0,500 - 3,000	**86400**	295

●	○	●	○	○	○	Norma di fab.	N	Metallo duro	◯	destra	cil.	~5xD	0,200 - 1,300	**89281**	293

●	●	●	○	○		Norma di fab.	N	Metallo duro	A	destra	cil.	7xD	0,500 - 3,000	**86401**	296

Micropunte con fori di refrigerazione

●	●	●	○	○		Norma di fab.	N	Metallo duro	A	destra	cil.	5xD	1,400 - 3,000	**86405**	297

●	●	●	○	○		Norma di fab.	N	Metallo duro	A	destra	cil.	8xD	1,400 - 3,000	**86408**	298

●	●	●	○	○		Norma di fab.	N	Metallo duro	A	destra	cil.	15xD	1,400 - 3,000	**86412**	299

HARTNER

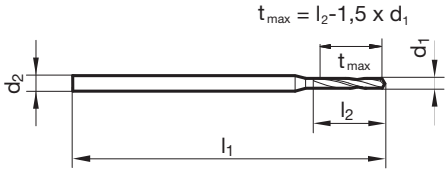
Micropunte senza fori di refrigerazione

Articolo nr. 87011

P	M	K	N	S	H
●	●	●	●	○	

HSS-E-PM | N | ~5xD | DIN 1899 | 118° | 0/-0,004 | R | Cyl

affilatura su piani • < Ø 0,15 mm acciaio HSS legato al Co • con codolo rinforzato
acciai legati in alta percentuale



d1 mm	d2 mm	l1 mm	l2 mm	d1 mm	d2 mm	l1 mm	l2 mm
0,050	1,000	25,000	0,400	0,345	1,000	25,000	2,400
0,060	1,000	25,000	0,400	0,350	1,000	25,000	2,400
0,080	1,000	25,000	0,500	0,355	1,000	25,000	2,400
0,090	1,000	25,000	0,500	0,360	1,000	25,000	2,400
0,100	1,000	25,000	0,500	0,365	1,000	25,000	2,400
0,110	1,000	25,000	0,500	0,370	1,000	25,000	2,400
0,120	1,000	25,000	0,500	0,375	1,000	25,000	2,400
0,130	1,000	25,000	0,800	0,380	1,000	25,000	2,400
0,140	1,000	25,000	0,800	0,390	1,000	25,000	3,000
0,150	1,000	25,000	0,800	0,400	1,000	25,000	3,000
0,160	1,000	25,000	1,100	0,405	1,000	25,000	3,000
0,170	1,000	25,000	1,100	0,410	1,000	25,000	3,000
0,180	1,000	25,000	1,100	0,415	1,000	25,000	3,000
0,190	1,000	25,000	1,100	0,420	1,000	25,000	3,000
0,200	1,000	25,000	1,500	0,425	1,000	25,000	3,000
0,205	1,000	25,000	1,500	0,430	1,000	25,000	3,000
0,210	1,000	25,000	1,500	0,440	1,000	25,000	3,000
0,215	1,000	25,000	1,500	0,450	1,000	25,000	3,000
0,220	1,000	25,000	1,500	0,460	1,000	25,000	3,000
0,225	1,000	25,000	1,500	0,470	1,000	25,000	3,000
0,230	1,000	25,000	1,500	0,480	1,000	25,000	3,000
0,235	1,000	25,000	1,500	0,485	1,000	25,000	3,400
0,240	1,000	25,000	1,500	0,490	1,000	25,000	3,400
0,245	1,000	25,000	1,900	0,495	1,000	25,000	3,400
0,250	1,000	25,000	1,900	0,500	1,000	25,000	3,400
0,255	1,000	25,000	1,900	0,510	1,000	25,000	3,400
0,260	1,000	25,000	1,900	0,520	1,000	25,000	3,400
0,265	1,000	25,000	1,900	0,530	1,000	25,000	3,400
0,270	1,000	25,000	1,900	0,535	1,000	25,000	3,900
0,275	1,000	25,000	1,900	0,540	1,000	25,000	3,900
0,280	1,000	25,000	1,900	0,550	1,000	25,000	3,900
0,285	1,000	25,000	1,900	0,555	1,000	25,000	3,900
0,290	1,000	25,000	1,900	0,560	1,000	25,000	3,900
0,295	1,000	25,000	1,900	0,570	1,000	25,000	3,900
0,300	1,000	25,000	1,900	0,580	1,000	25,000	3,900
0,310	1,000	25,000	2,400	0,585	1,000	25,000	3,900
0,315	1,000	25,000	2,400	0,590	1,000	25,000	3,900
0,320	1,000	25,000	2,400	0,600	1,000	25,000	3,900
0,325	1,000	25,000	2,400	0,610	1,000	25,000	4,200
0,330	1,000	25,000	2,400	0,620	1,000	25,000	4,200
0,335	1,000	25,000	2,400	0,630	1,000	25,000	4,200
0,340	1,000	25,000	2,400	0,640	1,000	25,000	4,200

Micropunte senza fori di refrigerazione

d1 mm	d2 mm	l1 mm	l2 mm	d1 mm	d2 mm	l1 mm	l2 mm
0,650	1,000	25,000	4,200	1,060	1,500	25,000	6,800
0,660	1,000	25,000	4,200	1,070	1,500	25,000	7,600
0,665	1,000	25,000	4,200	1,080	1,500	25,000	7,600
0,670	1,000	25,000	4,200	1,100	1,500	25,000	7,600
0,680	1,000	25,000	4,800	1,110	1,500	25,000	7,600
0,690	1,000	25,000	4,800	1,120	1,500	25,000	7,600
0,700	1,000	25,000	4,800	1,140	1,500	25,000	7,600
0,710	1,000	25,000	4,800	1,150	1,500	25,000	7,600
0,720	1,000	25,000	4,800	1,160	1,500	25,000	7,600
0,730	1,000	25,000	4,800	1,180	1,500	25,000	7,600
0,740	1,000	25,000	4,800	1,190	1,500	25,000	8,500
0,750	1,000	25,000	4,800	1,200	1,500	25,000	8,500
0,760	1,000	25,000	5,300	1,210	1,500	25,000	8,500
0,770	1,000	25,000	5,300	1,230	1,500	25,000	8,500
0,780	1,000	25,000	5,300	1,240	1,500	25,000	8,500
0,790	1,000	25,000	5,300	1,250	1,500	25,000	8,500
0,800	1,500	25,000	5,300	1,260	1,500	25,000	8,500
0,810	1,500	25,000	5,300	1,270	1,500	25,000	8,500
0,820	1,500	25,000	5,300	1,280	1,500	25,000	8,500
0,830	1,500	25,000	5,300	1,300	1,500	25,000	8,500
0,840	1,500	25,000	5,300	1,310	1,500	25,000	8,500
0,850	1,500	25,000	5,300	1,320	1,500	25,000	8,500
0,860	1,500	25,000	6,000	1,340	1,500	25,000	9,500
0,870	1,500	25,000	6,000	1,350	1,500	25,000	9,500
0,880	1,500	25,000	6,000	1,380	1,500	25,000	9,500
0,890	1,500	25,000	6,000	1,390	1,500	25,000	9,500
0,900	1,500	25,000	6,000	1,400	1,500	25,000	9,500
0,910	1,500	25,000	6,000	1,410	1,500	25,000	9,500
0,920	1,500	25,000	6,000	1,420	1,500	25,000	9,500
0,930	1,500	25,000	6,000	1,430	1,500	25,000	9,500
0,940	1,500	25,000	6,000	1,440	1,500	25,000	9,500
0,950	1,500	25,000	6,000	1,450	1,500	25,000	9,500
0,960	1,500	25,000	6,800	1,500	2,000	30,000	9,500
0,970	1,500	25,000	6,800	1,600	2,000	30,000	10,600
0,980	1,500	25,000	6,800	1,630	2,000	30,000	10,600
0,990	1,500	25,000	6,800	1,800	2,000	30,000	11,800
1,000	1,500	25,000	6,800	1,850	2,000	30,000	11,800
1,010	1,500	25,000	6,800	1,900	2,000	30,000	11,800
1,020	1,500	25,000	6,800				
1,030	1,500	25,000	6,800				
1,040	1,500	25,000	6,800				
1,050	1,500	25,000	6,800				

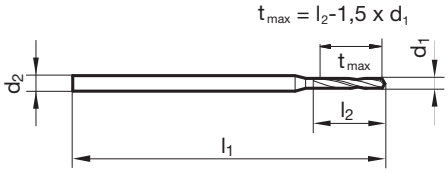
Micropunte senza fori di refrigerazione

Articolo nr. 87016

P	M	K	N	S	H
●	●	●	●	○	

HSS-E-PM | N | ~5xD | DIN 1899 | 118° | 0/-0,004 | L | Cyl

affilatura su piani • < Ø 0,15 mm acciaio HSS legato al Co • con codolo rinforzato
acciai legati in alta percentuale



d1 mm	d2 mm	l1 mm	l2 mm	d1 mm	d2 mm	l1 mm	l2 mm
0,150	1,000	25,000	0,800	0,710	1,000	25,000	4,800
0,160	1,000	25,000	1,100	0,750	1,000	25,000	4,800
0,200	1,000	25,000	1,500	0,760	1,000	25,000	5,300
0,210	1,000	25,000	1,500	0,780	1,000	25,000	5,300
0,220	1,000	25,000	1,500	0,800	1,500	25,000	5,300
0,230	1,000	25,000	1,500	0,820	1,500	25,000	5,300
0,240	1,000	25,000	1,500	0,830	1,500	25,000	5,300
0,280	1,000	25,000	1,900	0,840	1,500	25,000	5,300
0,300	1,000	25,000	1,900	0,870	1,500	25,000	6,000
0,310	1,000	25,000	2,400	0,900	1,500	25,000	6,000
0,330	1,000	25,000	2,400	0,910	1,500	25,000	6,000
0,350	1,000	25,000	2,400	0,920	1,500	25,000	6,000
0,370	1,000	25,000	2,400	0,930	1,500	25,000	6,000
0,380	1,000	25,000	2,400	0,940	1,500	25,000	6,000
0,390	1,000	25,000	3,000	0,950	1,500	25,000	6,000
0,400	1,000	25,000	3,000	0,970	1,500	25,000	6,800
0,410	1,000	25,000	3,000	0,980	1,500	25,000	6,800
0,420	1,000	25,000	3,000	0,990	1,500	25,000	6,800
0,430	1,000	25,000	3,000	1,000	1,500	25,000	6,800
0,440	1,000	25,000	3,000	1,010	1,500	25,000	6,800
0,450	1,000	25,000	3,000	1,040	1,500	25,000	6,800
0,460	1,000	25,000	3,000	1,080	1,500	25,000	7,600
0,480	1,000	25,000	3,000	1,100	1,500	25,000	7,600
0,490	1,000	25,000	3,400	1,150	1,500	25,000	7,600
0,500	1,000	25,000	3,400	1,250	1,500	25,000	8,500
0,510	1,000	25,000	3,400	1,300	1,500	25,000	8,500
0,520	1,000	25,000	3,400	1,340	1,500	25,000	9,500
0,540	1,000	25,000	3,900	1,350	1,500	25,000	9,500
0,550	1,000	25,000	3,900	1,450	1,500	25,000	9,500
0,560	1,000	25,000	3,900				
0,570	1,000	25,000	3,900				
0,600	1,000	25,000	3,900				
0,610	1,000	25,000	4,200				
0,670	1,000	25,000	4,200				
0,680	1,000	25,000	4,800				
0,700	1,000	25,000	4,800				

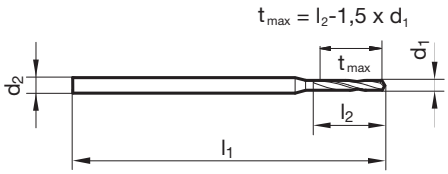
Micropunte senza fori di refrigerazione

Articolo nr. 84810

P	M	K	N	S	H
●	●	●	●	○	

HSS-E-PM | T | N | ~5xD | DIN 1899 | 118° | 0/-0,004 | R | Cyl

affilatura su piani • con codolo rinforzato • massima resistenza all'usura
acciai legati in alta percentuale



d1 mm	d2 mm	l1 mm	l2 mm
0,200	1,000	25,000	1,500
0,300	1,000	25,000	1,900
0,450	1,000	25,000	3,000
0,490	1,000	25,000	3,400
0,500	1,000	25,000	3,400
0,510	1,000	25,000	3,400
0,520	1,000	25,000	3,400
0,590	1,000	25,000	3,900
0,600	1,000	25,000	3,900
0,700	1,000	25,000	4,800
0,760	1,000	25,000	5,300
0,800	1,500	25,000	5,300
0,880	1,500	25,000	6,000
0,900	1,500	25,000	6,000
0,920	1,500	25,000	6,000
0,950	1,500	25,000	6,000
0,980	1,500	25,000	6,800
1,000	1,500	25,000	6,800

d1 mm	d2 mm	l1 mm	l2 mm
1,050	1,500	25,000	6,800
1,100	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,180	1,500	25,000	7,600
1,200	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,400	1,500	25,000	9,500
1,450	1,500	25,000	9,500
1,500	2,000	30,000	9,500

Micropunte senza fori di refrigerazione

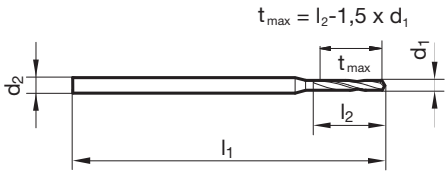
Articolo nr. 89281

P	M	K	N	S	H
●	○	●	○	○	○

VHM | N | ~5xD | WN | 130° | 0/-0,004 | R | Cyl

Assott. del nocc. ≥ Ø 0,800 • affilatura su piani • forma dei taglienti principali diritta

acciai da costruzione e da cementazione • ghise • bronzo/ottone • alluminio e leghe di alluminio • magnesio e leghe di magnesio • materie sintetiche e materie sintetiche a fibre rinforzate



d1 mm	d2 mm	l1 mm	l2 mm	d1 mm	d2 mm	l1 mm	l2 mm
0,200	1,000	25,000	1,500	0,700	1,000	25,000	4,800
0,300	1,000	25,000	1,900	0,800	1,500	25,000	5,300
0,350	1,000	25,000	2,400	1,000	1,500	25,000	6,800
0,400	1,000	25,000	3,000	1,100	1,500	25,000	7,600
0,500	1,000	25,000	3,400	1,250	1,500	25,000	8,500
0,600	1,000	25,000	3,900	1,300	1,500	25,000	8,500

Micropunte senza fori di refrigerazione

Articolo nr. 86402

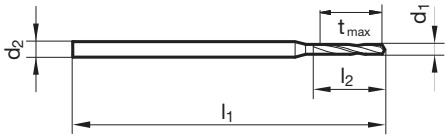
P	M	K	N	S	H
•		•			

VHM | A | N | WN | 140° | h7 | R | Cyl

Assott. del nocc. ≥ Ø 0,800 • affilatura su piani • unitaria codolo 3 mm • lunghezza unitaria 38 mm totale

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm² • ghise • lavorazione delle schede di circuiti elettronici

$t_{max} = l_2\text{-}1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm
0,100		3,000	38,000	1,200	0,980		3,000	38,000	10,000
0,150		3,000	38,000	2,000	0,990		3,000	38,000	10,000
0,200		3,000	38,000	2,500	1,000		3,000	38,000	10,000
0,250		3,000	38,000	3,000	1,100		3,000	38,000	10,000
0,300		3,000	38,000	5,000	1,110		3,000	38,000	10,000
0,310		3,000	38,000	5,000	1,150		3,000	38,000	10,000
0,350		3,000	38,000	6,000	1,200		3,000	38,000	10,000
0,370		3,000	38,000	6,000	1,210		3,000	38,000	10,000
0,400		3,000	38,000	7,000	1,400		3,000	38,000	10,000
0,450		3,000	38,000	7,000	1,450		3,000	38,000	10,000
0,500		3,000	38,000	7,000	1,500		3,000	38,000	10,000
0,550		3,000	38,000	7,000	1,510		3,000	38,000	10,000
0,600		3,000	38,000	7,000	1,520		3,000	38,000	10,000
0,640		3,000	38,000	7,000	1,550		3,000	38,000	10,000
0,650		3,000	38,000	7,000	1,600		3,000	38,000	12,000
0,700		3,000	38,000	8,000	1,650		3,000	38,000	12,000
0,710		3,000	38,000	8,000	1,700		3,000	38,000	12,000
0,720		3,000	38,000	8,000	1,800		3,000	38,000	12,000
0,740		3,000	38,000	8,000	1,810		3,000	38,000	12,000
0,750		3,000	38,000	8,000	1,830		3,000	38,000	12,000
0,760		3,000	38,000	8,000	1,850		3,000	38,000	12,000
0,770		3,000	38,000	8,000	1,900		3,000	38,000	12,000
0,780		3,000	38,000	8,000	1,920		3,000	38,000	12,000
0,790		3,000	38,000	8,000	1,950		3,000	38,000	12,000
0,800		3,000	38,000	10,000	1,980		3,000	38,000	12,000
0,810		3,000	38,000	10,000	2,000		3,000	38,000	12,000
0,820		3,000	38,000	10,000	2,050		3,000	38,000	12,000
0,830		3,000	38,000	10,000	2,100		3,000	38,000	12,000
0,840		3,000	38,000	10,000	2,400		3,000	38,000	12,000
0,850		3,000	38,000	10,000	2,500		3,000	38,000	12,000
0,860		3,000	38,000	10,000	2,600		3,000	38,000	12,000
0,870		3,000	38,000	10,000	2,750		3,000	38,000	12,000
0,880		3,000	38,000	10,000	2,950		3,000	38,000	12,000
0,890		3,000	38,000	10,000	3,000		3,000	38,000	12,000
0,900		3,000	38,000	10,000					
0,910		3,000	38,000	10,000					
0,920		3,000	38,000	10,000					
0,930		3,000	38,000	10,000					
0,940		3,000	38,000	10,000					
0,950		3,000	38,000	10,000					
0,960		3,000	38,000	10,000					
0,970		3,000	38,000	10,000					

Micropunte senza fori di refrigerazione

Articolo nr. 86400

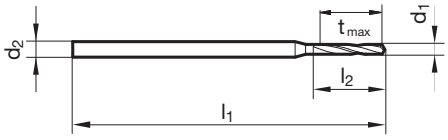
P	M	K	N	S	H
●	●	●	○	○	

VHM | A | N | 4xD | WN | 140° | m7 | R | Cyl

Assott. del nocc. ≥ Ø 0,500 • affilatura su piani • forma dei taglienti principali diritta • fresatura dei taglienti ridotti

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm² • acciai inossidabili • ghise

$t_{max} = l_2\text{-}1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm
0,500		3,000	47,000	3,000	1,950		3,000	52,000	11,700
0,550		3,000	47,000	3,300	1,980		4,000	59,000	12,000
0,600		3,000	47,000	3,600	2,000		4,000	59,000	12,000
0,650		3,000	47,000	3,900	2,050		4,000	59,000	12,300
0,700		3,000	47,000	4,200	2,100		4,000	59,000	12,600
0,750		3,000	47,000	4,500	2,150		4,000	59,000	12,900
0,800		3,000	47,000	4,800	2,200		4,000	59,000	13,200
0,850		3,000	47,000	5,100	2,250		4,000	59,000	13,500
0,900		3,000	47,000	5,400	2,300		4,000	59,000	13,800
0,950		3,000	47,000	5,700	2,350		4,000	59,000	14,100
1,000		3,000	47,000	6,000	2,380		4,000	59,000	14,400
1,050		3,000	47,000	6,300	2,400		4,000	59,000	14,400
1,100		3,000	47,000	6,600	2,450		4,000	59,000	14,700
1,150		3,000	47,000	6,900	2,500		4,000	59,000	15,000
1,200		3,000	47,000	7,200	2,550		4,000	59,000	15,300
1,250		3,000	47,000	7,500	2,600		4,000	59,000	15,600
1,300		3,000	47,000	7,800	2,650		4,000	59,000	15,900
1,350		3,000	47,000	8,100	2,700		4,000	59,000	16,200
1,400		3,000	47,000	8,400	2,750		4,000	59,000	16,500
1,450		3,000	47,000	8,700	2,780		4,000	59,000	16,800
1,500		3,000	47,000	9,000	2,800		4,000	59,000	16,800
1,550		3,000	47,000	9,300	2,850		4,000	59,000	17,100
1,590		3,000	47,000	9,600	2,900		4,000	59,000	17,400
1,600		3,000	47,000	9,600	2,950		4,000	59,000	17,700
1,650		3,000	47,000	9,900	3,000		4,000	59,000	18,000
1,700		3,000	47,000	10,200					
1,750		3,000	47,000	10,500					
1,800		3,000	52,000	10,800					
1,850		3,000	52,000	11,100					
1,900		3,000	52,000	11,400					

Micropunte senza fori di refrigerazione

Articolo nr. 86401

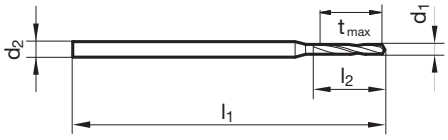
P	M	K	N	S	H
●	●	●	○	○	

VHM | A | N | 7xD | WN | 140° | m7 | R | Cyl

Assott. del nocc. ≥ Ø 0,500 • affilatura su piani • forma dei taglienti principali diritta • fresatura dei taglienti ridotti

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm² • acciai inossidabili • ghise

$t_{max} = l_2\text{-}1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm
0,500		3,000	47,000	4,000
0,550		3,000	47,000	4,400
0,600		3,000	47,000	4,800
0,650		3,000	47,000	5,200
0,700		3,000	47,000	5,600
0,750		3,000	47,000	6,000
0,800		3,000	47,000	6,400
0,850		3,000	47,000	6,800
0,900		3,000	47,000	7,200
0,950		3,000	47,000	7,600
1,000		3,000	47,000	8,000
1,050		3,000	47,000	8,400
1,100		3,000	47,000	8,800
1,150		3,000	47,000	9,200
1,200		3,000	52,000	10,800
1,250		3,000	52,000	11,300
1,300		3,000	52,000	11,700
1,350		3,000	52,000	12,200
1,400		3,000	52,000	12,600
1,450		3,000	52,000	13,100
1,500		3,000	52,000	13,500
1,550		3,000	52,000	14,000
1,590		3,000	52,000	14,400
1,600		3,000	52,000	14,400
1,650		3,000	52,000	14,900
1,700		3,000	52,000	15,300
1,750		3,000	52,000	15,800
1,800		3,000	52,000	16,200
1,850		3,000	52,000	16,700
1,900		3,000	52,000	17,100

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm
1,950		3,000	52,000	17,600
1,980		4,000	63,000	18,000
2,000		4,000	63,000	18,000
2,050		4,000	63,000	18,500
2,100		4,000	63,000	18,900
2,150		4,000	63,000	19,400
2,200		4,000	63,000	19,800
2,250		4,000	63,000	20,300
2,300		4,000	63,000	20,700
2,350		4,000	63,000	21,200
2,380		4,000	63,000	21,600
2,400		4,000	63,000	21,600
2,450		4,000	63,000	22,100
2,500		4,000	63,000	22,500
2,550		4,000	63,000	23,000
2,600		4,000	67,000	23,400
2,650		4,000	67,000	23,900
2,700		4,000	67,000	24,300
2,750		4,000	67,000	24,800
2,780		4,000	67,000	25,200
2,800		4,000	67,000	25,200
2,850		4,000	67,000	25,700
2,900		4,000	67,000	26,100
2,950		4,000	67,000	26,600
3,000		4,000	67,000	27,000

HARTNER

Micropunte con fori di refrigerazione

Articolo nr. 86405

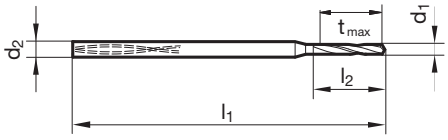
P	M	K	N	S	H
●	●	●	○	○	

VHM | A | N | 5xD | WN | 140° | m7 | R | Cyl

Assott. del nocc. ≥ Ø 1,400 • affilatura su piani • forma dei taglienti principali diritta • fresatura dei taglienti ridotti

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm² • acciai inossidabili • ghise

$t_{max} = l_2\text{-}1{,}5 \times d_1$



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm
1,400		4,000	52,000	11,000	2,450		4,000	62,000	20,000
1,450		4,000	52,000	12,000	2,500		4,000	62,000	20,000
1,500		4,000	52,000	12,000	2,550		4,000	62,000	20,000
1,550		4,000	52,000	12,000	2,600		4,000	66,000	21,000
1,590		4,000	52,000	13,000	2,650		4,000	66,000	21,000
1,600		4,000	52,000	13,000	2,700		4,000	66,000	22,000
1,650		4,000	52,000	13,000	2,750		4,000	66,000	22,000
1,700		4,000	56,000	14,000	2,780		4,000	66,000	22,000
1,750		4,000	56,000	14,000	2,800		4,000	66,000	22,000
1,800		4,000	56,000	14,000	2,850		4,000	66,000	23,000
1,850		4,000	56,000	15,000	2,900		4,000	66,000	23,000
1,900		4,000	56,000	15,000	2,950		4,000	66,000	24,000
1,950		4,000	56,000	16,000	3,000		4,000	66,000	24,000
1,980		4,000	56,000	16,000					
2,000		4,000	56,000	16,000					
2,050		4,000	56,000	16,000					
2,100		4,000	62,000	17,000					
2,150		4,000	62,000	17,000					
2,200		4,000	62,000	18,000					
2,250		4,000	62,000	18,000					
2,300		4,000	62,000	18,000					
2,350		4,000	62,000	19,000					
2,380		4,000	62,000	19,000					
2,400		4,000	62,000	19,000					

HARTNER

Micropunte con fori di refrigerazione

Articolo nr. 86408

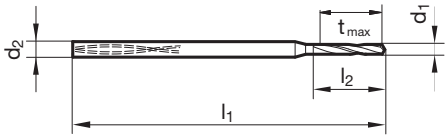
P	M	K	N	S	H
●	●	●	○	○	

VHM | A | N | 8xD | WN | 135° | h7 | R | Cyl

Assott. del nocc. ≥ Ø 1,400 • affilatura su piani • forma dei taglienti principali diritta • fresatura dei taglienti ridotti

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm² • acciai inossidabili • ghise

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	d2 h6 mm	l1 mm	l2 mm
1,400	4,000	52,000	15,000
1,500	4,000	52,000	17,000
1,600	4,000	52,000	18,000
1,700	4,000	56,000	19,000
1,800	4,000	56,000	20,000
1,900	4,000	56,000	21,000
2,000	4,000	56,000	22,000
2,100	4,000	62,000	23,000
2,200	4,000	62,000	24,000
2,300	4,000	62,000	25,000
2,400	4,000	62,000	26,000
2,500	4,000	62,000	28,000

d1 mm	d2 h6 mm	l1 mm	l2 mm
2,600	4,000	66,000	29,000
2,700	4,000	66,000	30,000
2,800	4,000	66,000	31,000
2,900	4,000	66,000	32,000
3,000	4,000	66,000	33,000

HARTNER

Micropunte con fori di refrigerazione

Articolo nr. 86412

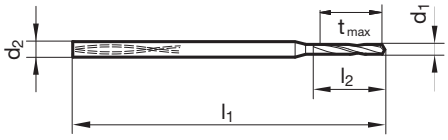
P	M	K	N	S	H
●	●	●	○	○	

VHM | A | N | 15xD | WN | 135° | h7 | R | Cyl

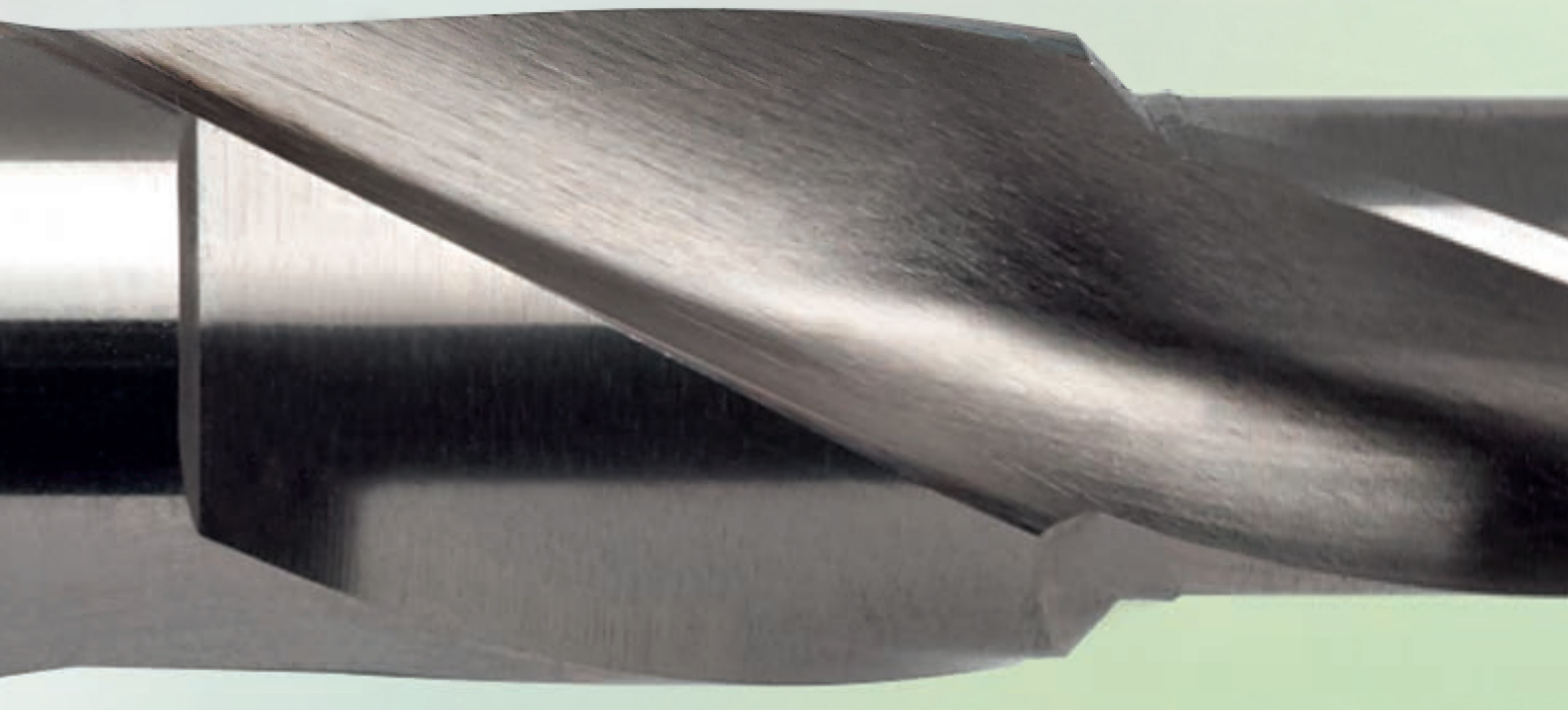
Assott. del nocc. ≥ Ø 1,400 • affilatura su piani • forma dei taglienti principali diritta • fresatura dei taglienti ridotti

acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm² • acciai inossidabili • ghise

$t_{max} = l_2 - 1{,}5 \times d_1$



d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
1,400	4,000	62,000	25,000	2,600	4,000	87,000	47,000
1,500	4,000	62,000	27,000	2,700	4,000	87,000	48,000
1,600	4,000	62,000	29,000	2,800	4,000	87,000	50,000
1,700	4,000	70,000	31,000	2,900	4,000	87,000	52,000
1,800	4,000	70,000	32,000	3,000	4,000	87,000	54,000
1,900	4,000	70,000	34,000				
2,000	4,000	70,000	36,000				
2,100	4,000	78,000	38,000				
2,200	4,000	78,000	40,000				
2,300	4,000	78,000	42,000				
2,400	4,000	78,000	44,000				
2,500	4,000	78,000	45,000				



HARTNER

Precision Cutting Tools

PUNTE A CENTRARE / PUNTE A GRADINO / SVASATORI

Punte a gradino corte, punte a gradino ad eliche indipendenti, in HSS e metalo duro

Punte a centrare in HSS e HSS-E lucide e ricoperte

Svasatori in HSS

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	angolo di svasatura / forma	d1/mm	Articolo nr.	Pagina

Punte a gradino per fori centraggio a DIN 332

						Norma di fab.	N	HSS	●	destra	cil.	90	8,000 - 40,000	85910	306

						Norma di fab.	N	HSS	●	destra	cil.	90	8,000 - 40,000	85911	306

						Norma di fab.	N	HSS	●	destra	cil.	90	8,000 - 20,000	85912	307

						Norma di fab.	N	HSS	●	destra	CM	90	14,000 - 40,000	85914	308

Punte a gradino corte, cil.

						Norma di fab.	N	HSS	Ⓣ	destra	cil.	90	3,400 - 13,500	84445	313

						Norma di fab.	N	HSS	○	destra	cil.	90	6,000 - 19,000	85916	310

						Norma di fab.	N	HSS	○	destra	cil.	90	6,600 - 21,500	85917	311

						Norma di fab.	N	HSS	○	destra	cil.	180	6,000 - 18,000	85918	312

						Norma di fab.	N	HSS	○	destra	cil.	90	3,400 - 13,500	85920	314

						Norma di fab.	N	Metallo duro	○	destra	HE	90	5,500 - 9,000	89254	309

Punte a gradino ad eliche indipendenti, cil.

						DIN 8374	N	HSS	●	destra	cil.	90	6,000 - 19,000	85010	315

						DIN 8374	N	HSS	●	destra	cil.	90	7,500 - 19,000	85218	318

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	angolo di svasatura / forma	d1/mm	Articolo nr.	Pagina

Punte a gradino ad eliche indipendenti, cil.

●	○	●	○			DIN 8376	N	HSS	⬤	destra	cil.	180	6,000 - 18,000	**85210**	319

●	○	●	○			DIN 8378	N	HSS	⬤	destra	cil.	90	3,400 - 13,500	**85310**	317

●	○	●	○			Norma di fab.	N	HSS	⬤	destra	cil.	90	6,600 - 17,200	**85110**	316

●	○	●	○			Norma di fab.	N	HSS	⬤	destra	cil.	180	5,900 - 16,500	**85216**	320

○	○	○	○	○	○		N	Metallo duro	◯	destra	cil.	180	6,000 - 11,000	**89252**	321

Punte a gradino ad eliche indipendenti, CM

●	○	●	○			DIN 8375	N	HSS	⬤	destra	CM	90	12,000 - 23,000	**85619**	326

●	○	●	○			DIN 8377	N	HSS	⬤	destra	CM	180	10,000 - 33,000	**85610**	324

●	○	●	○			DIN 8379	N	HSS	⬤	destra	CM	90	9,000 - 22,000	**85710**	323

●	○	●	○			Norma di fab.	N	HSS	⬤	destra	CM	90	11,000 - 21,500	**85510**	322

●	○	●	○			Norma di fab.	N	HSS	⬤	destra	CM	180	9,400 - 33,000	**85616**	325

Svasatori 90°

●	○	●	●			DIN 335		HSS	◯	destra	cil.	C	4,300 - 31,000	**88200**	327

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	angolo di svasatura / forma	d1/mm	Articolo nr.	Pagina

Punte a centrare senza piano

●	○	●	●			DIN 333	N	HSS	◯	destra	cil.	A	0,500 - 12,500	**83100**	328

●	○	●	●			DIN 333	N	HSS	◯	sinistra	cil.	A	0,500 - 4,000	**83105**	329

●	○	●	●			DIN 333	N	HSS	◯	destra	cil.	A	1,000 - 10,000	**83300**	332

●	○	●	●			DIN 333	N	HSS	Ⓣ	destra	cil.	A	0,500 - 12,500	**84450**	328

●	○	●	●	○		DIN 333	N	HSS	◯	destra	cil.	B	1,000 - 10,000	**83200**	335

●	○	●	●			DIN 333	N	HSS	◯	destra	cil.	R	0,500 - 10,000	**83000**	330

●	○	●	●			DIN 333	N	HSS	◯	sinistra	cil.	R	1,000 - 4,000	**83005**	331

●	○	●	●			DIN 333	N	HSS	Ⓣ	destra	cil.	R	0,500 - 10,000	**84448**	330

●	○	●	●			Norma di fab.	N	HSS	◯	destra	cil.	A	1,000 - 3,150	**83110**	334

●	●	●	●	○		DIN 333	N	HSS-E	◯	destra	cil.	A	1,000 - 4,000	**83101**	333

○	○	○	○	○	○	Norma di fab.	N	Metallo duro	◯	destra	cil.	A	0,500 - 6,300	**83370**	336

Punte a centrare con piano

●	○	●	●			DIN 333	N	HSS	◯	destra	cil.	A	1,600 - 12,500	**83600**	337

●	○	●	●			DIN 333	N	HSS	◯	destra	cil.	B	1,600 - 8,000	**83700**	338

Punte a centrare con piano

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Forma dell'attacco	angolo di svasatura / forma	d1/mm	Articolo nr.	Pagina
●	○	●	●			DIN 333	N	**HSS**	◯	destra	cil.	R	1,600 - 12,500	**83500**	337

Punte a gradino per fori centraggio a DIN 332

Articolo nr. 85910

P	M	K	N	S	H
●	○	●	●		

HSS | N | WN | 118° | h8 | R | Cyl

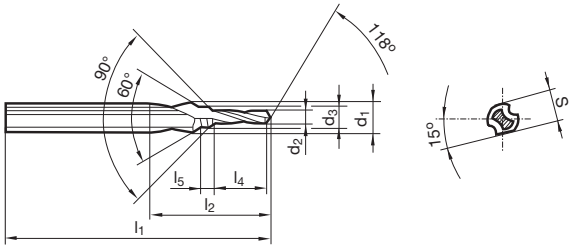
Assott. del nocc. ≥ Ø 8,000 • spoglia sul cono tagliente • con pianetto sul codolo • angolo di svasatura 60° • per fori filettati secondo DIN 332, foglio 2, forma D • uso con macchine automatiche

Articolo nr. 85911

P	M	K	N	S	H
●	○	●	●		

HSS | N | WN | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 8,000 • spoglia sul cono tagliente • con pianetto sul codolo • angolo di svasatura 60° • per fori filettati secondo DIN 332, foglio 2, forma DR • uso con macchine automatiche



d1 h7 mm	d3 h11 mm	d2 h8 mm	S mm	l1 mm	l2 mm	l4 mm	l5 mm	per filettatura
8,000	4,300	3,300	6,750	63,000	23,000	11,000	1,600	M 4
10,000	5,300	4,200	8,450	67,000	27,000	13,000	2,150	M 5
12,500	6,400	5,000	10,450	71,000	33,000	16,000	2,900	M 6
14,000	8,400	6,800	12,500	88,000	41,000	19,500	3,500	M 8
16,000	10,500	8,500	14,850	94,000	47,000	23,000	4,700	M10
20,000	13,000	10,200	18,450	105,000	59,000	28,000	6,500	M12
25,000	17,000	14,000	23,400	132,000	67,000	33,000	8,300	M16
31,500	21,000	17,500	29,350	145,000	76,500	38,000	10,350	M20
40,000	25,000	21,000	36,500	160,000	90,000	45,000	12,000	M24

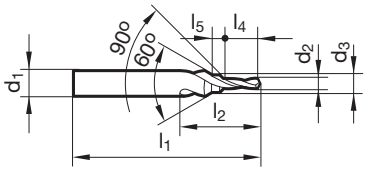
Punte a gradino per fori centraggio a DIN 332

Articolo nr. 85912

P	M	K	N	S	H
●	○	●	●		

HSS | N | WN | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 8,000 • spoglia sul cono tagliente • angolo di svasatura 60° • per fori filettati secondo DIN 332, foglio 2, forma D



d1 h7 mm	d3 h11 mm	d2 h8 mm	l1 mm	l2 mm	l4 mm	l5 mm	per filettatura
8,000	4,300	3,300	63,000	23,000	11,000	1,600	M 4
10,000	5,300	4,200	67,000	27,000	13,000	2,150	M 5
12,500	6,400	5,000	71,000	33,000	16,000	2,900	M 6
14,000	8,400	6,800	88,000	41,000	19,500	3,500	M 8
16,000	10,500	8,500	94,000	47,000	23,000	4,700	M10
20,000	13,000	10,200	105,000	59,000	28,000	6,500	M12

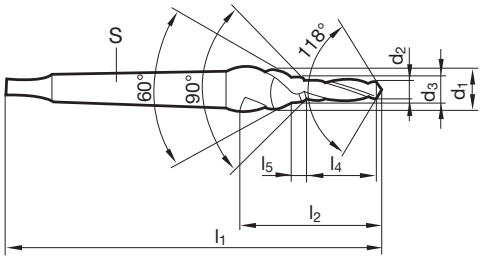
Punte a gradino per fori centraggio a DIN 332

Articolo nr. 85914

P	M	K	N	S	H
●	○	●	●		

HSS | N | WN | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 14,000 • spoglia sul cono tagliente • angolo di svasatura 60° • per fori filettati secondo DIN 332, foglio 2, forma D



d1 h7 mm	d3 h11 mm	d2 h8 mm	S	l1 mm	l2 mm	l4 mm	l5 mm	per filettatura
14,000	8,400	6,800	MK-1	110,000	41,000	19,500	3,500	M 8
16,000	10,500	8,500	MK-2	131,000	47,000	23,000	4,700	M10
20,000	13,000	10,200	MK-2	145,000	59,000	28,000	6,500	M12
25,000	17,000	14,000	MK-3	172,000	67,000	33,000	8,300	M16
31,500	21,000	17,500	MK-3	184,000	76,500	38,000	10,350	M20
40,000	25,000	21,000	MK-4	222,000	90,000	45,000	12,000	M24

HARTNER

Punte a gradino corte, cil.

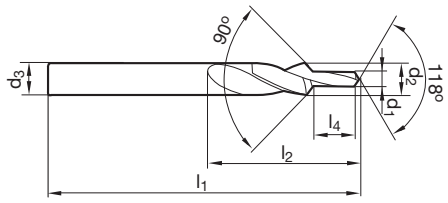
Articolo nr. 89254

P	M	K	N	S	H
○	○	○	●	○	

VHM | ○ | N | WN | 118° | h7 | R | HE | ⊛

Assott. del nocc. ≥ Ø 3,400 • affilatura su piani • grande stabilità alla torsione • per machine CNC e CN • per fori filettati secondo DIN 336 • per svasature a 90° corrispondenti a fori passanti secondo DIN EN 20273, serie media • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore

ghisa acciaiosa, ghisa grigia ghisa in conchiglia • acciai al manganese, bronzi • metalli leggeri e non ferrosi • materiali abrasivi (leghe di AlSi) • materie sintetiche a fibre rinforzate • altri materiali che esercitano un'azione abrasiva sui taglienti e sulle fasi della punta



d1 h7 mm	d2 h9 mm	d3 mm	l1 mm	l2 mm	l4 mm	per filettatura
5,500	4,200	6,000	66,000	28,000	13,600	M 5
6,600	5,000	8,000	70,000	31,000	16,500	M 6
9,000	6,800	10,000	84,000	40,000	21,000	M 8

HARTNER

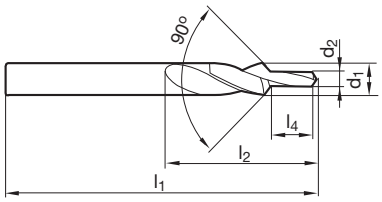
Punte a gradino corte, cil.

Articolo nr. 85916

P	M	K	N	S	H
●	○	●	●		

HSS | ◯ | N | WN | 118° | h6 | R | Cyl

Assott. del nocc. ≥ Ø 6,000 • spoglia sul cono tagliente • grande stabilità alla torsione • per machine CNC e CN • per fori passanti a DIN EN 20273, serie fine • per svasature per teste di viti 90° • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h6 mm	d2 h9 mm	l1 mm	l2 mm	l4 mm	per filettatura
6,000	3,200	66,000	28,000	9,000	M 3
8,000	4,300	79,000	37,000	11,000	M 4
10,000	5,300	89,000	43,000	13,000	M 5
11,500	6,400	95,000	47,000	15,000	M 6
15,000	8,400	111,000	56,000	19,000	M 8
19,000	10,500	127,000	64,000	23,000	M 10

HARTNER

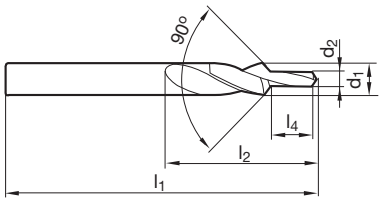
Punte a gradino corte, cil.

Articolo nr. 85917

P	M	K	N	S	H
●	○	●	●		

HSS | N | WN | 118° | h6 | R | Cyl

Assott. del nocc. ≥ Ø 6,600 • spoglia sul cono tagliente • grande stabilità alla torsione • per machine CNC e CN • per fori passanti a DIN EN 20273, serie media • per svasature per teste di viti 90° a DIN 74, forma A • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h6 mm	d2 h9 mm	l1 mm	l2 mm	l4 mm	per filettatura
6,600	3,400	70,000	31,000	9,000	M 3
9,000	4,500	84,000	40,000	11,000	M 4
11,000	5,500	95,000	47,000	13,000	M 5
13,000	6,600	102,000	51,000	15,000	M 6
17,200	9,000	123,000	62,000	19,000	M 8
21,500	11,000	141,000	70,000	23,000	M 10

HARTNER

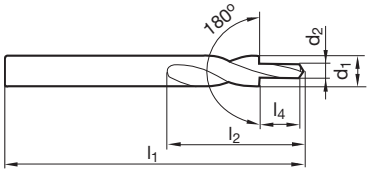
Punte a gradino corte, cil.

Articolo nr. 85918

P	M	K	N	S	H
●	○	●	●		

HSS | ◯ | N | WN | 118° | h6 | R | Cyl

Assott. del nocc. ≥ Ø 6,000 • spoglia sul cono tagliente • grande stabilità alla torsione • per machine CNC e CN • per fori passanti a DIN EN 20273, serie media • per svasature per teste di viti 180° secondo DIN 974-1, serie 1 • per viti secondo DIN 6912, 7984, 34821, DIN EN ISO 1207, 4762, 14579, 14580 • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h6 mm	d2 h9 mm	l1 mm	l2 mm	l4 mm	per filettatura
6,000	3,400	66,000	28,000	9,000	M 3
8,000	4,500	79,000	37,000	11,000	M 4
10,000	5,500	89,000	43,000	13,000	M 5
11,000	6,600	95,000	47,000	15,000	M 6
15,000	9,000	111,000	56,000	19,000	M 8
18,000	11,000	123,000	62,000	23,000	M 10

HARTNER

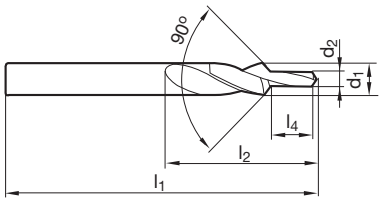
Punte a gradino corte, cil.

Articolo nr. 84445

P	M	K	N	S	H
●	○	●	●		

HSS | T | N | WN | 118° | h6 | R | Cyl

Assott. del nocc. ≥ Ø 3,400 • spoglia sul cono tagliente • grande stabilità alla torsione • per machine CNC e CN • per fori filettati secondo DIN 336 • per svasature a 90° corrispondenti a fori passanti secondo DIN EN 20273, serie media • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h6 mm	d2 h9 mm	l1 mm	l2 mm	l4 mm	per filettatura
3,400	2,500	52,000	20,000	8,800	M 3
4,500	3,300	58,000	24,000	11,400	M 4
6,600	5,000	70,000	31,000	16,500	M 6
9,000	6,800	84,000	40,000	21,000	M 8
11,000	8,500	95,000	47,000	25,500	M 10
13,500	10,200	107,000	54,000	30,000	M 12

HARTNER

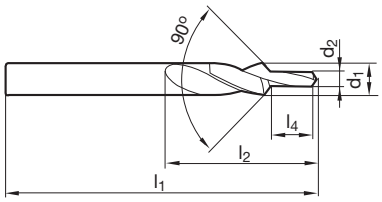
Punte a gradino corte, cil.

Articolo nr. 85920

P	M	K	N	S	H
●	○	●	●		

HSS | ◯ | N | WN | 118° | h6 | R | Cyl

Assott. del nocc. ≥ Ø 3,400 • spoglia sul cono tagliente • grande stabilità alla torsione • per machine CNC e CN • per fori filettati secondo DIN 336 • per svasature a 90° corrispondenti a fori passanti secondo DIN EN 20273, serie media • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h6 mm	d2 h9 mm	l1 mm	l2 mm	l4 mm	per filettatura
3,400	2,500	52,000	20,000	8,800	M 3
4,500	3,300	58,000	24,000	11,400	M 4
5,500	4,200	66,000	28,000	13,600	M 5
6,600	5,000	70,000	31,000	16,500	M 6
9,000	6,800	84,000	40,000	21,000	M 8
11,000	8,500	95,000	47,000	25,500	M 10
13,500	10,200	107,000	54,000	30,000	M 12

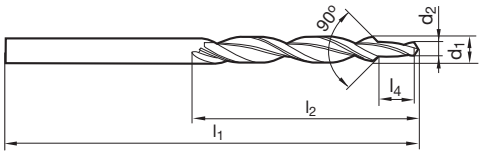
Punte a gradino ad eliche indipendenti, cil.

Articolo nr. 85010

P	M	K	N	S	H
●	○	●	○		

HSS | N | DIN 8374 | 118° | h8 | R | Cyl | A

Assott. del nocc. ≥ Ø 6,000 • spoglia sul cono tagliente • per fori passanti a DIN EN 20273, serie fine • per svasature per teste di viti 90° • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h8 mm	d2 h9 mm	l1 mm	l2 mm	l4 mm	per filettatura
6,000	3,200	93,000	57,000	9,000	M 3
8,000	4,300	117,000	75,000	11,000	M 4
10,000	5,300	133,000	87,000	13,000	M 5
11,500	6,400	142,000	94,000	15,000	M 6
15,000	8,400	169,000	114,000	19,000	M 8
19,000	10,500	198,000	135,000	23,000	M 10

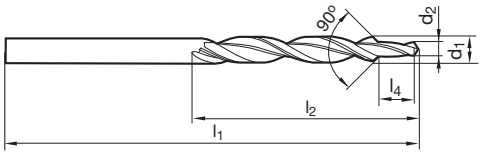
Punte a gradino ad eliche indipendenti, cil.

Articolo nr. 85110

P	M	K	N	S	H
●	○	●	○		

HSS | N | WN | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 6,600 • spoglia sul cono tagliente • per fori passanti a DIN EN 20273, serie media • per svasature per teste di viti 90° secondo DIN 74 parte 1 (ediz. 12.1980), forma A e B, esecuzione media • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h8 mm	d2 h9 mm	l1 mm	l2 mm	l4 mm	per filettatura
6,600	3,400	101,000	63,000	9,000	M 3
9,000	4,500	125,000	81,000	11,000	M 4
11,000	5,500	142,000	94,000	13,000	M 5
13,000	6,600	151,000	101,000	15,000	M 6
17,200	9,000	191,000	130,000	19,000	M 8

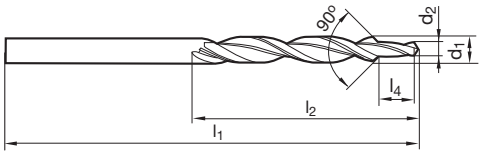
Punte a gradino ad eliche indipendenti, cil.

Articolo nr. 85310

P	M	K	N	S	H
●	○	●	○		

HSS | N | DIN 8378 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 3,400 • spoglia sul cono tagliente • per fori filettati secondo DIN 336 • per svasature a 90° corrispondenti a fori passanti secondo DIN EN 20273, serie media • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h8 mm	d2 h9 mm	l1 mm	l2 mm	l4 mm	per filettatura
3,400	2,500	70,000	39,000	8,800	M 3
4,500	3,300	80,000	47,000	11,400	M 4
5,500	4,200	93,000	57,000	13,600	M 5
6,600	5,000	101,000	63,000	16,500	M 6
9,000	6,800	125,000	81,000	21,000	M 8
11,000	8,500	142,000	94,000	25,500	M 10
13,500	10,200	160,000	108,000	30,000	M 12

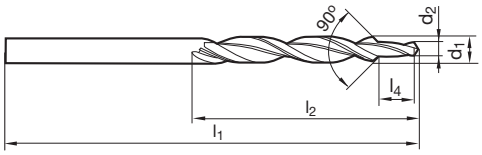
Punte a gradino ad eliche indipendenti, cil.

Articolo nr. 85218

P	M	K	N	S	H
●	○	●	○		

HSS | N | DIN 8374 | 118° | h8 | R | Cyl | B

Assott. del nocc. ≥ Ø 7,500 • spoglia sul cono tagliente • per fori passanti a DIN EN 20273, serie media • per svasature per teste di viti 90° a DIN 74, forma A e F • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h8 mm	d2 h9 mm	l1 mm	l2 mm	l4 mm	per filettatura
7,500	3,400	109,000	69,000	9,000	M 3
9,700	4,500	133,000	87,000	11,000	M 4
12,000	5,500	151,000	101,000	13,000	M 5
14,500	6,600	169,000	114,000	15,000	M 6
19,000	9,000	198,000	135,000	19,000	M 8

HARTNER

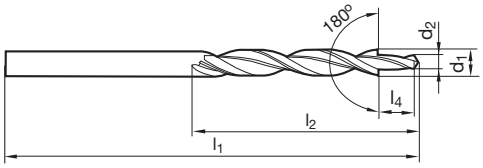
Punte a gradino ad eliche indipendenti, cil.

Articolo nr. 85210

P	M	K	N	S	H
●	○	●	○		

HSS | N | DIN 8376 | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 6,000 • spoglia sul cono tagliente • per fori passanti a DIN EN 20273, serie media • per svasature per teste di viti 180° secondo DIN 974-1, serie 1 • per viti secondo DIN 6912, 7984, 34821, DIN EN ISO 1207, 4762, 14579, 14580 e DIN 7513, 7516, 7500-1 • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h8 mm	d2 h9 mm	l1 mm	l2 mm	l4 mm	per filettatura
6,000	3,400	93,000	57,000	9,000	M 3
8,000	4,500	117,000	75,000	11,000	M 4
10,000	5,500	133,000	87,000	13,000	M 5
11,000	6,600	142,000	94,000	15,000	M 6
15,000	9,000	169,000	114,000	19,000	M 8
18,000	11,000	191,000	130,000	23,000	M 10

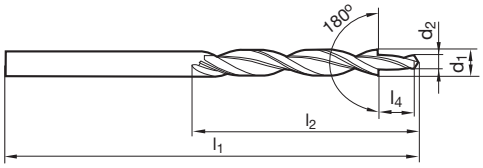
Punte a gradino ad eliche indipendenti, cil.

Articolo nr. 85216

P	M	K	N	S	H
●	○	●	○		

HSS | N | WN | 118° | h8 | R | Cyl

Assott. del nocc. ≥ Ø 5,900 • spoglia sul cono tagliente • per foratura passante con vecchie svasature forma H, J, K secondo DIN 75 Parte 2 (ediz. 04.1968), esecuzione media e fine • per viti a DIN 84, 912, 6712 • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h8 mm	d2 h9 mm	l1 mm	l2 mm	l4 mm	per filettatura
5,900	3,200	93,000	57,000	11,000	M 3
7,400	4,300	109,000	69,000	13,000	M 4
9,400	5,300	125,000	81,000	16,000	M 5
10,000	5,800	133,000	87,000	16,000	M 5
10,400	6,400	133,000	87,000	19,000	M 6
11,000	7,000	142,000	94,000	19,000	M 6
13,500	8,400	160,000	108,000	22,000	M 8
16,500	10,500	184,000	125,000	25,000	M 10

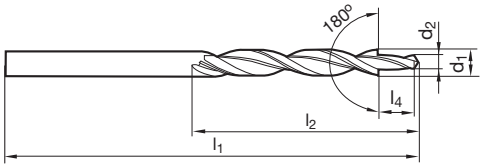
Punte a gradino ad eliche indipendenti, cil.

Articolo nr. 89252

P	M	K	N	S	H
○	○	○	○	○	○

VHM | ○ | N | 118° | h8 | R | Cyl |

Assott. del nocc. ≥ Ø 8,000 • spoglia sul cono tagliente • per fori passanti a DIN EN 20273, serie media • per svasature per teste di viti 180° secondo DIN 974-1, serie 1 • per viti secondo DIN 6912, 7984, 34821, DIN EN ISO 1207, 4762, 14579, 14580 e DIN 7513, 7516, 7500-1 • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h8 mm	d2 h9 mm	l1 mm	l2 mm	l4 mm	per filettatura
6,000	3,400	93,000	57,000	9,000	M 3
10,000	5,500	133,000	87,000	13,000	M 5
11,000	6,600	142,000	94,000	15,000	M 6

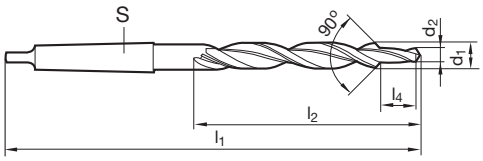
Punte a gradino ad eliche indipendenti, CM

Articolo nr. 85510

P	M	K	N	S	H
●	○	●	○		

HSS | N | WN | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 11,000 • spoglia sul cono tagliente • per fori passanti a DIN EN 20273, serie media • per svasature per teste di viti 90° secondo DIN 74 parte 1 (ediz. 12.1980), forma A e B, esecuzione media • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h8 mm	d2 h9 mm	S	l1 mm	l2 mm	l4 mm	per filettatura
11,000	5,500	MK-1	175,000	94,000	13,000	M 5
13,000	6,600	MK-1	182,000	101,000	15,000	M 6
17,200	9,000	MK-2	228,000	130,000	19,000	M 8
21,500	11,000	MK-2	248,000	150,000	23,000	M 10

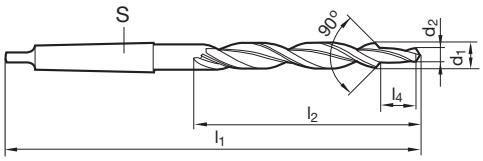
Punte a gradino ad eliche indipendenti, CM

Articolo nr. 85710

P	M	K	N	S	H
●	○	●	○		

HSS | N | DIN 8379 | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 9,000 • spoglia sul cono tagliente • per fori filettati secondo DIN 336 • per svasature a 90° corrispondenti a fori passanti secondo DIN EN 20273, serie media • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h8 mm	d2 h9 mm	S	l1 mm	l2 mm	l4 mm	per filettatura
9,000	6,800	MK-1	162,000	81,000	21,000	M 8
11,000	8,500	MK-1	175,000	94,000	25,500	M 10
13,500	10,200	MK-1	189,000	108,000	30,000	M 12
15,500	12,000	MK-2	218,000	120,000	34,500	M 14
17,500	14,000	MK-2	228,000	130,000	38,500	M 16
20,000	15,500	MK-2	238,000	140,000	43,500	M 18
22,000	17,500	MK-2	248,000	150,000	47,500	M 20

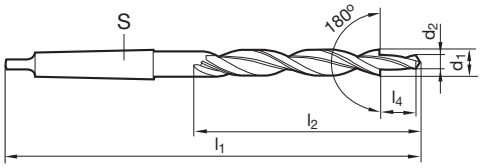
Punte a gradino ad eliche indipendenti, CM

Articolo nr. 85610

P	M	K	N	S	H
●	○	●	○		

HSS | N | DIN 8377 | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 10,000 • spoglia sul cono tagliente • per fori passanti a DIN EN 20273, serie media • per svasature per teste di viti 180° secondo DIN 974-1, serie 1 • per viti secondo DIN 6912, 7984, 34821, DIN EN ISO 1207, 4762, 14579, 14580 e DIN 7513, 7516, 7500-1 • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h8 mm	d2 h9 mm	S	l1 mm	l2 mm	l4 mm	per filettatura
10,000	5,500	MK-1	168,000	87,000	13,000	M 5
11,000	6,600	MK-1	175,000	94,000	15,000	M 6
15,000	9,000	MK-2	212,000	114,000	19,000	M 8
18,000	11,000	MK-2	228,000	130,000	23,000	M 10
20,000	13,500	MK-2	238,000	140,000	27,000	M 12
24,000	15,500	MK-3	281,000	160,000	31,000	M 14
26,000	17,500	MK-3	286,000	165,000	35,000	M 16
30,000	20,000	MK-3	296,000	175,000	39,000	M 18
33,000	22,000	MK-4	334,000	185,000	43,000	M 20

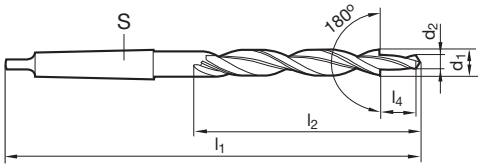
Punte a gradino ad eliche indipendenti, CM

Articolo nr. 85616

P	M	K	N	S	H
●	○	●	○		

HSS | N | WN | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 9,400 • spoglia sul cono tagliente • per foratura passante con vecchie svasature forma H, J, K secondo DIN 75 Parte 2 (ediz. 04.1968), esecuzione media e fine • per viti a DIN 84, 912, 6712 • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h8 mm	d2 h9 mm	S	l1 mm	l2 mm	l4 mm	per filettatura
9,400	5,300	MK-1	162,000	81,000	16,000	M 5
10,000	5,800	MK-1	168,000	87,000	16,000	M 5
10,400	6,400	MK-1	168,000	87,000	19,000	M 6
11,000	7,000	MK-1	175,000	94,000	19,000	M 6
14,500	9,500	MK-2	212,000	114,000	22,000	M 8
17,500	11,500	MK-2	228,000	130,000	25,000	M 10
19,000	13,000	MK-2	233,000	135,000	28,000	M 12
20,000	14,000	MK-2	238,000	140,000	28,000	M 12
23,000	15,000	MK-2	253,000	155,000	30,000	M 14
24,000	16,000	MK-3	281,000	160,000	30,000	M 14
25,000	17,000	MK-3	281,000	160,000	33,000	M 16
28,000	19,000	MK-3	291,000	170,000	36,000	M 18
29,000	20,000	MK-3	296,000	175,000	36,000	M 18
31,000	21,000	MK-3	301,000	180,000	39,000	M 20
33,000	23,000	MK-4	334,000	185,000	39,000	M 20

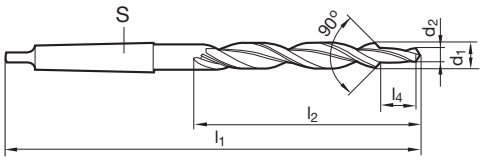
Punte a gradino ad eliche indipendenti, CM

Articolo nr. 85619

P	M	K	N	S	H
●	○	●	○		

HSS | N | DIN 8375 | 118° | h8 | R | MK

Assott. del nocc. ≥ Ø 12,000 • spoglia sul cono tagliente • per fori passanti a DIN EN 20273, serie fine • per svasature per teste di viti 90° a DIN 74, forma A e F • l'avanz. si basa sul diametro inferiore • Vc si basa sul diametro maggiore



d1 h8 mm	d2 h9 mm	S	l1 mm	l2 mm	l4 mm	per filettatura
12,000	5,500	MK-1	182,000	101,000	13,000	M 5
14,500	6,600	MK-2	212,000	114,000	15,000	M 6
19,000	9,000	MK-2	233,000	135,000	19,000	M 8
23,000	11,000	MK-2	253,000	155,000	23,000	M10

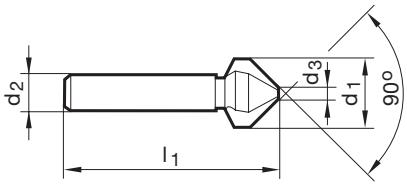
Svasatori 90°

Articolo nr. 88200

P	M	K	N	S	H
●	○	●	●		

HSS | ○ | DIN 335 | 90° | R | Cyl | C

spogliati radialmente • a tre taglienti



d1 mm	d2 h9 mm	d3 mm	l1 mm	Z	Codice
4,300	4,000	4,300	40,000	3	4,300
5,000	4,000	5,000	40,000	3	5,000
5,300	4,000	5,300	40,000	3	5,300
5,800	5,000	5,800	45,000	3	5,800
6,000	5,000	6,000	45,000	3	6,000
6,300	5,000	6,300	45,000	3	6,300
7,000	6,000	7,000	50,000	3	7,000
7,300	6,000	7,300	50,000	3	7,300
8,000	6,000	8,000	50,000	3	8,000
8,300	6,000	8,300	50,000	3	8,300
9,400	6,000	9,400	50,000	3	9,400
10,000	6,000	10,000	50,000	3	10,000
10,400	6,000	10,400	50,000	3	10,400
11,500	8,000	11,500	56,000	3	11,500
12,400	8,000	12,400	56,000	3	12,400
13,400	10,000	13,400	56,000	3	13,400
15,000	10,000	15,000	60,000	3	15,000
16,500	10,000	16,500	60,000	3	16,500
19,000	10,000	19,000	63,000	3	19,000
20,500	10,000	20,500	63,000	3	20,500
23,000	10,000	23,000	67,000	3	23,000
25,000	10,000	25,000	67,000	3	25,000
26,000	10,000	26,000	67,000	3	26,000
28,000	12,000	28,000	71,000	3	28,000
30,000	12,000	30,000	71,000	3	30,000
31,000	12,000	31,000	71,000	3	31,000

Punte a centrare senza piano

Articolo nr. 83100

P	M	K	N	S	H
●	○	●	●		

HSS | ◯ | N | DIN 333 | 118° | R | Cyl | | A

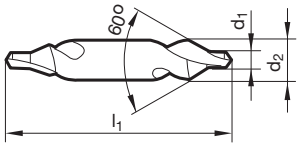
Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • senza smusso di protezione • per fori a centrare secondo DIN 332, foglio 1, forma A • d1 ≤ 0,8 mm: 1 solo lato tagliente

Articolo nr. 84450

P	M	K	N	S	H
●	○	●	●		

HSS | T | N | DIN 333 | 118° | R | Cyl | | A

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • senza smusso di protezione • per fori a centrare secondo DIN 332, foglio 1, forma A • d1 ≤ 0,8 mm: 1 solo lato tagliente • massima resistenza all'usura



d1 mm	d2 h8 mm	l1 mm	d1 mm	d2 h8 mm	l1 mm
0,500	3,150	25,000	10,000	25,000	100,000
0,800	3,150	25,000	12,500	31,500	125,000
1,000	3,150	31,500			
1,250	3,150	31,500			
1,600	4,000	35,500			
2,000	5,000	40,000			
2,500	6,300	45,000			
3,150	8,000	50,000			
4,000	10,000	56,000			
5,000	12,500	63,000			
6,300	16,000	71,000			
8,000	20,000	80,000			

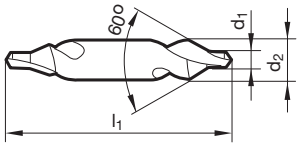
Punte a centrare senza piano

Articolo nr. 83105

P	M	K	N	S	H
●	○	●	●		

HSS | ◯ | N | DIN 333 | 118° | L | Cyl | | A

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • senza smusso di protezione • per fori a centrare secondo DIN 332, foglio 1, forma A • d1 ≤ 0,8 mm: 1 solo lato tagliente



d1 mm	d2 h8 mm	l1 mm	d1 mm	d2 h8 mm	l1 mm
0,500	3,150	25,000	2,500	6,300	45,000
0,800	3,150	25,000	3,150	8,000	50,000
1,000	3,150	31,500	4,000	10,000	56,000
1,250	3,150	31,500			
1,600	4,000	35,500			
2,000	5,000	40,000			

Punte a centrare senza piano

Articolo nr. 83000

P	M	K	N	S	H
●	○	●	●		

HSS | ◯ | N | DIN 333 | 118° | R | Cyl | | R

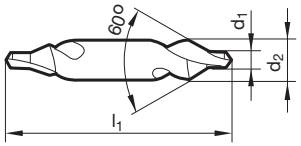
Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • corretto posizionamento fra le contropunte • per fori a centrare a DIN 332 parte 1, forma R • d1 ≤ 0,8 mm: 1 solo lato tagliente

Articolo nr. 84448

P	M	K	N	S	H
●	○	●	●		

HSS | T | N | DIN 333 | 118° | R | Cyl | | R

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • corretto posizionamento fra le contropunte • per fori a centrare a DIN 332 parte 1, forma R • d1 ≤ 0,8 mm: 1 solo lato tagliente • massima resistenza all'usura



d1 mm	d2 h8 mm	l1 mm	d1 mm	d2 h8 mm	l1 mm
0,500	3,150	25,000	10,000	25,000	100,000
0,800	3,150	25,000			
1,000	3,150	31,500			
1,250	3,150	31,500			
1,600	4,000	35,500			
2,000	5,000	40,000			
2,500	6,300	45,000			
3,150	8,000	50,000			
4,000	10,000	56,000			
5,000	12,500	63,000			
6,300	16,000	71,000			
8,000	20,000	80,000			

HARTNER

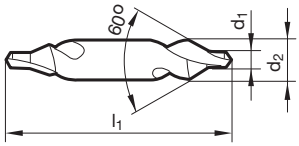
Punte a centrare senza piano

Articolo nr. 83005

P	M	K	N	S	H
●	○	●	●		

HSS | ◯ | N | DIN 333 | 118° | L | Cyl | R

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • corretto posizionamento fra le contropunte • per fori a centrare a DIN 332 parte 1, forma R • d1 ≤ 0,8 mm: 1 solo lato tagliente



d1 mm	d2 h8 mm	l1 mm	d1 mm	d2 h8 mm	l1 mm
1,000	3,150	31,500			
1,250	3,150	31,500			
1,600	4,000	35,500			
2,000	5,000	40,000			
3,150	8,000	50,000			
4,000	10,000	56,000			

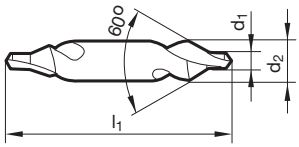
Punte a centrare senza piano

Articolo nr. 83300

P	M	K	N	S	H
●	○	●	●		

HSS | N | DIN 333 | 118° | R | Cyl | A

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • maggiore resistenza alla rottura grazie al rigonfiamento • senza smusso di protezione • la cavità tra la svasatura e il foro serve da contenitore addizionale di lubrificante • per fori a centrare secondo DIN 332, foglio 1, forma A



d1 mm	d2 h8 mm	l1 mm	d1 mm	d2 h8 mm	l1 mm
1,000	3,150	31,500	4,000	10,000	56,000
1,250	3,150	31,500	5,000	12,500	63,000
1,600	4,000	35,500	6,300	16,000	71,000
2,000	5,000	40,000	8,000	20,000	80,000
2,500	6,300	45,000	10,000	25,000	100,000
3,150	8,000	50,000			

HARTNER

Punte a centrare senza piano

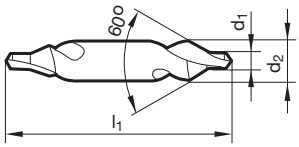
Articolo nr. 83101

P	M	K	N	S	H
●	●	●	●	○	

HSS-E | ◯ | N | DIN 333 | 118° | R | Cyl | | A

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • senza smusso di protezione • massima resistenza all'usura • per fori a centrare secondo DIN 332, foglio 1, forma A

materiali con R superiore a 800 N/mm² • acciai al CrNi inossidabili e resistenti al calore



d1 mm	d2 h8 mm	l1 mm	d1 mm	d2 h8 mm	l1 mm
1,000	3,150	31,500			
1,600	4,000	35,500			
2,000	5,000	40,000			
2,500	6,300	45,000			
3,150	8,000	50,000			
4,000	10,000	56,000			

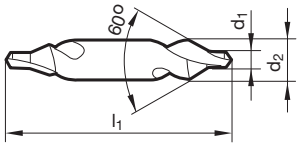
Punte a centrare senza piano

Articolo nr. 83110

P	M	K	N	S	H
●	○	●	●		

HSS | N | WN | 118° | R | Cyl | A

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • punte da centro extra lunghe • senza smusso di protezione • per fori a centrare simili a DIN 332 foglio 1, forma A • per centrature molto profonde



d1 mm	d2 h8 mm	l1 mm	d1 mm	d2 h8 mm	l1 mm
1,000	4,000	120,000			
1,600	5,000	120,000			
2,000	6,000	120,000			
2,500	8,000	120,000			
3,150	10,000	120,000			

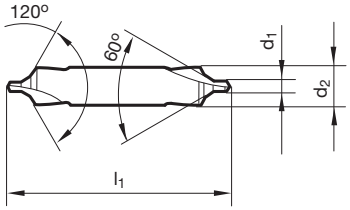
Punte a centrare senza piano

Articolo nr. 83200

P	M	K	N	S	H
●	○	●	●	○	

HSS | ◯ | N | DIN 333 | 118° | R | Cyl | | B

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • per fori a centrare secondo DIN 332, foglio 1, forma B • con smusso di protezione 120°



d1 mm	d2 h8 mm	l1 mm
1,000	4,000	35,500
1,250	5,000	40,000
1,600	6,300	45,000
2,000	8,000	50,000
2,500	10,000	56,000
3,150	11,200	60,000

d1 mm	d2 h8 mm	l1 mm
4,000	14,000	67,000
5,000	18,000	75,000
6,300	20,000	80,000
8,000	25,000	100,000
10,000	31,500	125,000

HARTNER

Punte a centrare senza piano

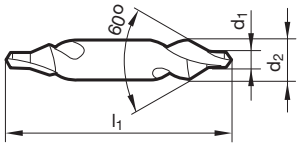
Articolo nr. 83370

P	M	K	N	S	H
○	○	○	○	○	○

VHM | ◯ | N | WN | 118° | R | Cyl | A

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • senza smusso di protezione • per fori a centrare secondo DIN 332, foglio 1, forma A • d1 ≤ 0,8 mm: 1 solo lato tagliente

di impiego universale



d1 mm	d2 h8 mm	l1 mm	d1 mm	d2 h8 mm	l1 mm
0,500	3,150	25,000	2,500	6,300	45,000
0,800	3,150	25,000	3,150	8,000	50,000
1,000	3,150	31,500	4,000	10,000	56,000
1,250	3,150	31,500	5,000	12,500	63,000
1,600	4,000	35,500	6,300	16,000	71,000
2,000	5,000	40,000			

Punte a centrare con piano

Articolo nr. 83600

P	M	K	N	S	H
●	○	●	●		

HSS | ◯ | N | DIN 333 | 118° | R | Cyl | A

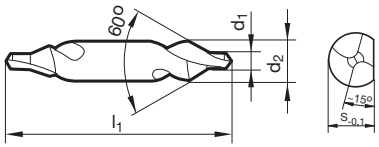
Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • per fori a centrare secondo DIN 332, foglio 1, forma A • senza smusso di protezione

Articolo nr. 83500

P	M	K	N	S	H
●	○	●	●		

HSS | ◯ | N | DIN 333 | 118° | R | Cyl | R

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • corretto posizionamento fra le contropunte • per fori a centrare a DIN 332 parte 1, forma R



d1 mm	d2 h8 mm	l1 mm	S mm
1,600	4,000	35,500	3,250
2,000	5,000	40,000	4,200
2,500	6,300	45,000	5,350
3,150	8,000	50,000	6,950
4,000	10,000	56,000	8,400
5,000	12,500	63,000	10,950

d1 mm	d2 h8 mm	l1 mm	S mm
6,300	16,000	71,000	14,000
8,000	20,000	80,000	17,900
10,000	25,000	100,000	22,500
12,500	31,500	125,000	28,400

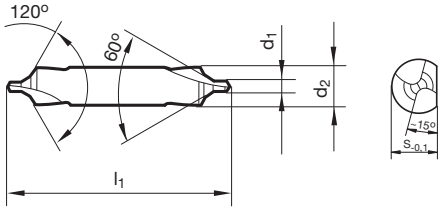
Punte a centrare con piano

Articolo nr. 83700

P	M	K	N	S	H
●	○	●	●		

HSS | N | DIN 333 | 118° | R | Cyl | B

Assott. del nocc. ≥ Ø 2,000 • spoglia sul cono tagliente • per fori a centrare secondo DIN 332, foglio 1, forma B • con smusso di protezione 120°



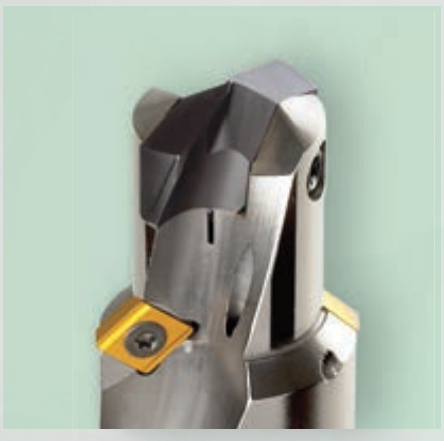
d1 mm	d2 h8 mm	l1 mm	S mm
1,600	6,300	45,000	5,350
2,000	8,000	50,000	6,950
2,500	10,000	56,000	8,400
3,150	11,200	60,000	10,000
4,000	14,000	67,000	12,650
5,000	18,000	75,000	16,400

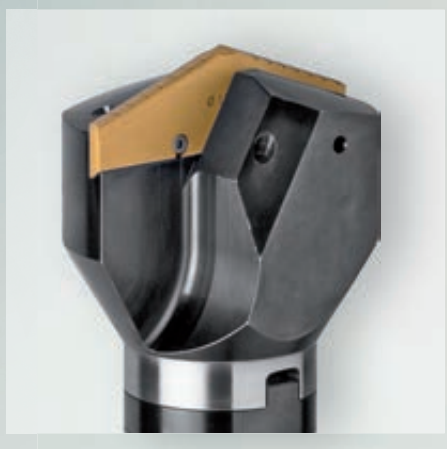
d1 mm	d2 h8 mm	l1 mm	S mm
6,300	20,000	80,000	17,900
8,000	25,000	100,000	22,500

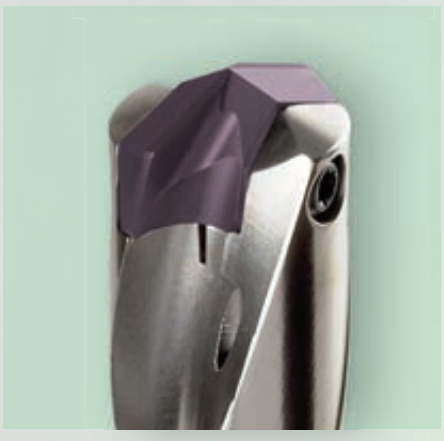
HARTNER

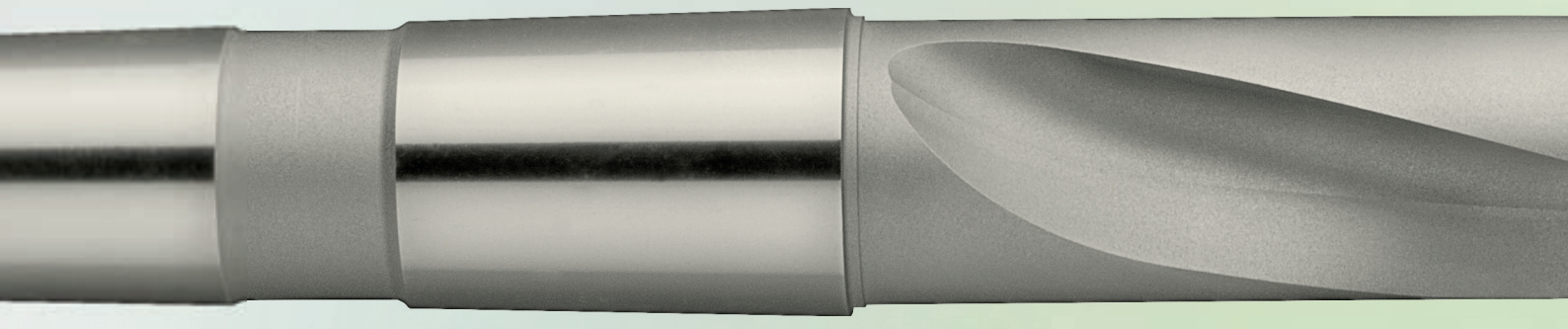
Precision Cutting Tools

TOOL MANAGEMENT







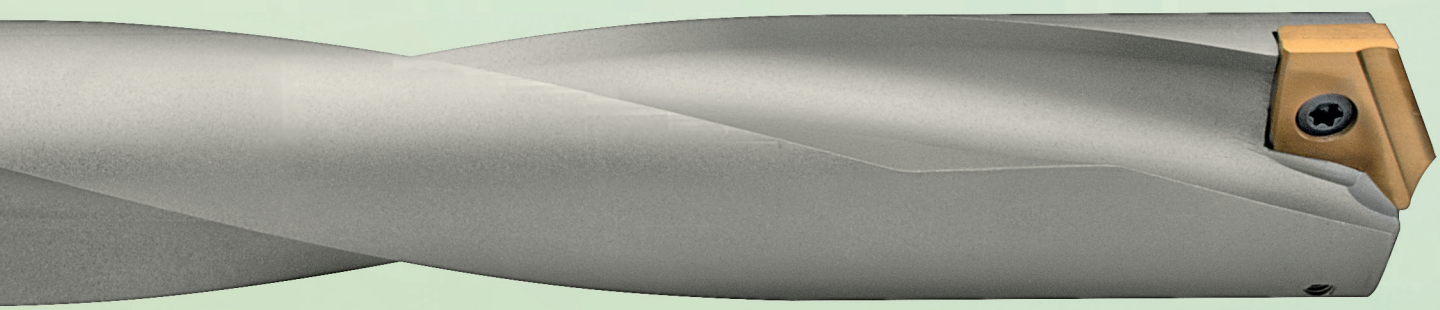


HARTNER

Precision Cutting Tools

MULTIPLEX
MULTIPLEX HPC

Punte elicoidali con inserti intercambiabili con refrigerazione
Inserti intercambiabili in HSS-E, HSS-E PM, metallo duro ricoperte



P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Refrige-razione interna	Profondi-tà di foro	d1/mm	Articolo nr.	Pagina

Corpo portaplacchette con attacco cilindrico

Norma di fab.		Ni	destra	con	<3xD		**86612**	349

Norma di fab.		Ni	destra	con	<5xD		**86622**	350

Norma di fab.		Ni	destra	con	<7xD		**86624**	351

Corpo portaplacchette con attacco cono morse

Norma di fab.		Ni	destra	con			**86630**	352

Norma di fab.		Ni	destra	con			**86650**	354

Norma di fab.		Ni	destra	con			**86670**	353

Norma di fab.		Ni	destra	con			**86680**	355

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Refrige-razione interna	Profondi-tà di foro	d1/mm	Articolo nr.	Pagina

Corpo portaplacchette speciale con attacco cilindrico

						Norma di fab.			Ni	destra	con			**86628**	356

Corpo portaplacchette speciale con attacco cono morse

						Norma di fab.			Ni	destra	con			**86678**	358

Inserti intercambiabili

●	○	●	○			Norma di fab.		**HSS-E-PM**	T	destra				**86602**	361

●	○	●	○			Norma di fab.		**HSS-E-PM**	F	destra				**86608**	362

●	○	●	○			Norma di fab.		**HSS-E-PM**	A	destra				**86609**	363

●	○	●	○			Norma di fab.		**Metallo duro**	F	destra				**86701**	367

●	○	●	○			Norma di fab.		**Metallo duro**	F	destra				**86702**	365

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Refrige-razione interna	Profondi-tà di foro	d1/mm	Articolo nr.	Pagina

Inserti intercambiabili

						Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Refrige-razione interna	Profondi-tà di foro	d1/mm	Articolo nr.	Pagina
•	○	•	○			Norma di fab.		**Metallo duro**	T	destra				**86708**	364

						Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Refrige-razione interna	Profondi-tà di foro	d1/mm	Articolo nr.	Pagina
•	○	•	○			Norma di fab.		**Metallo duro**	T	destra				**86709**	366

Alimentatori per punte con fori di refrigerazione

						Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Refrige-razione interna	Profondi-tà di foro	d1/mm	Articolo nr.	Pagina
						Norma di fab.								**86690**	368

Tubi di adduzione

						Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Refrige-razione interna	Profondi-tà di foro	d1/mm	Articolo nr.	Pagina
						Norma di fab.			●					**82571**	369

Attacco rapido

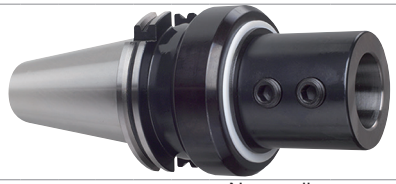
						Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Refrige-razione interna	Profondi-tà di foro	d1/mm	Articolo nr.	Pagina
						Norma di fab.								**82578**	370

Giravite Torx

						Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Refrige-razione interna	Profondi-tà di foro	d1/mm	Articolo nr.	Pagina
						Norma di fab.								**86842**	371

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Refrige-razione interna	Profondi-tà di foro	d1/mm	Articolo nr.	Pagina

Mandrino di alimentazione del refrigerante per Multiplex



						Norma di fab.			Ⓑ					**86691**	372

						Norma di fab.			Ⓑ					**86692**	373

						Norma di fab.			Ⓑ					**86693**	374

						Norma di fab.			Ⓑ					**86694**	375

Bussole di riduzione per attacchi cilindrici

						Norma di fab.			Ⓑ					**86699**	376

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Refrige-razione interna	Profondi-tà di foro	d1/mm	Articolo nr.	Pagina

Corpo portaplacchette Multiplex-HPC

	Norma di fab.	HPC		Ni	destra	con	1xD		**86681**	378

	Norma di fab.	HPC		Ni	destra	con	1,5xD		**86682**	379

	Norma di fab.	HPC		Ni	destra	con	3xD		**86683**	381

	Norma di fab.	HPC		Ni	destra	con	5xD		**86684**	383

	Norma di fab.	HPC		Ni	destra	con	7xD		**86685**	385

	Norma di fab.	HPC		Ni	destra	con	10xD		**86686**	387

Inserti intercambiabili per Multiplex HPC

○	○	○	○	○	○	Norma di fab.	HPC	**Metallo duro**	a	destra		11,000 - 40,000	**86721**	389

•	○	○				Norma di fab.	HPC	**Metallo duro**	F	destra		11,000 - 40,000	**86722**	392

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Refrige-razione interna	Profondi-tà di foro	d1/mm	Articolo nr.	Pagina

Inserti intercambiabili per Multiplex HPC

○		●				Norma di fab.	HPC	**Metallo duro**	F	destra			11,000 - 40,000	**86723**	395

			●			Norma di fab.	HPC	**Metallo duro**	◯	destra			11,000 - 40,000	**86724**	398

○	●			○	○	Norma di fab.	HPC	**Metallo duro**	a	destra			11,000 - 40,000	**86725**	401

Inserti a svasare Multiplex HPC

○		●				Norma di fab.		**Metallo duro**	A	neutrale				**86726**	404

			●			Norma di fab.		**Metallo duro**	◯	destra				**86727**	404

●	○	○		○	○	Norma di fab.		**Metallo duro**	T	destra				**86728**	405

Viti di serraggio per placchette 1.5-10xD

						Norma di fab.								**86843**	406

P	M	K	N	S	H	Norma	Tipo	Materiale tagliente	Superficie	Direzione di taglio	Refrige-razione interna	Profondi-tà di foro	d1/mm	Articolo nr.	Pagina

Chiavi dinamometriche

						Norma di fab.								**86844**	407

Inserti Torx

						Norma di fab.								**86845**	408

Viti di serraggio per svasatori Multiplex HPC

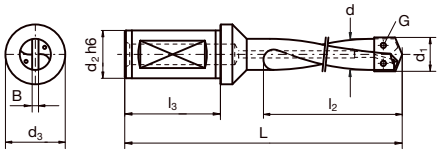
						Norma di fab.								**86846**	409

HARTNER

Corpo portaplacchette con attacco cilindrico

Articolo nr. 86612

nichelato • Corpo per placchette. Il corpo con codolo cilindrico ha un'alimentazione di refrigerante interna. Larghe scanalature garantiscono una evacuazione del truciolo ottimale. Sostituzione degli inserti semplice grazie alle viti di arresto. Non è necessario alcun aggiustamento delle placchette. La punta con gli inserti può essere utilizzata nel materiale pieno. Questo utensile non é adatto per finire forature ricavate da fusione oppure per allargare fori preesistenti.i. Comprese viti di serraggio Art.Nr. 86807.



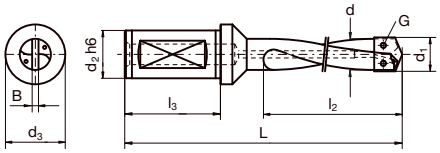
d1 mm	d mm	d2 h6 mm	d3 mm	L mm	l2 mm	l3 mm	B mm	G	Codice
10,00-11,7	9,500	20,000	25,000	108,000	50,000	40,000	2,500	86807 2.000	**9,500**
11,71-13,4	11,500	20,000	25,000	109,000	53,000	40,000	2,500	86807 2.000	**11,500**
13,41-16,4	13,000	20,000	25,000	116,000	60,000	40,000	3,500	86807 2.500	**13,000**
16,41-18,9	16,000	20,000	25,000	118,000	65,000	40,000	3,500	86807 2.501	**16,000**
18,91-22,4	18,500	20,000	25,000	124,000	73,000	40,000	4,000	86807 3.000	**18,500**
22,41-25,4	22,000	20,000	25,000	127,000	78,000	40,000	4,000	86807 3.001	**22,000**
25,41-29,0	24,000	32,000	40,000	178,000	105,000	60,000	5,000	86807 3.500	**24,000**
29,01-35,0	28,000	32,000	40,000	178,000	108,000	60,000	5,000	86807 3.500	**28,000**
35,01-45,0	34,000	32,000	40,000	223,000	152,000	60,000	7,000	86807 4.001	**34,000**
45,01-55,0	44,000	40,000	50,000	233,000	152,000	70,000	7,000	86807 4.001	**44,000**
55,01-65,0	54,000	40,000	50,000	233,000	152,000	70,000	7,000	86807 4.001	**54,000**

HARTNER

Corpo portaplacchette con attacco cilindrico

Articolo nr. 86622

nichelato • Corpo per placchette. Il corpo con codolo cilindrico ha un'alimentazione di refrigerante interna. Larghe scanalature garantiscono una evacuazione del truciolo ottimale. Sostituzione degli inserti semplice grazie alle viti di arresto. Non è necessario alcun aggiustamento delle placchette. La punta con gli inserti può essere utilizzata nel materiale pieno. Questo utensile non é adatto per finire forature ricavate da fusione oppure per allargare fori preesistenti.i. Comprese viti di serraggio Art.Nr. 86807.



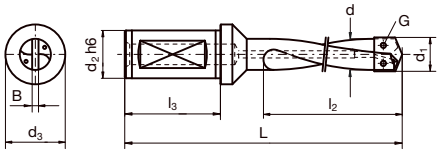
d1 mm	d mm	d2 h6 mm	d3 mm	L mm	l2 mm	l3 mm	B mm	G	Codice
10,00-11,7	9,500	20,000	25,000	140,000	83,000	40,000	2,500	86807 2.000	**9,500**
11,71-13,4	11,500	20,000	25,000	150,000	94,000	40,000	2,500	86807 2.000	**11,500**
13,41-16,4	13,000	20,000	25,000	160,000	104,000	40,000	3,500	86807 2.500	**13,000**
16,41-18,9	16,000	20,000	25,000	170,000	117,000	40,000	3,500	86807 2.501	**16,000**
18,91-22,4	18,500	20,000	25,000	180,000	129,000	40,000	4,000	86807 3.000	**18,500**
22,41-25,4	22,000	20,000	25,000	180,000	131,000	40,000	4,000	86807 3.001	**22,000**
25,41-29,0	24,000	32,000	40,000	240,000	166,000	60,000	5,000	86807 3.500	**24,000**
29,01-35,0	28,000	32,000	40,000	240,000	170,000	60,000	5,000	86807 3.500	**28,000**
35,01-45,0	34,000	32,000	40,000	280,000	210,000	60,000	7,000	86807 4.001	**34,000**
45,01-55,0	44,000	40,000	50,000	290,000	210,000	70,000	7,000	86807 4.001	**44,000**
55,01-65,0	54,000	40,000	50,000	290,000	210,000	70,000	7,000	86807 4.001	**54,000**

HARTNER

Corpo portaplacchette con attacco cilindrico

Articolo nr. 86624

nichelato • Corpo per placchette. Il corpo con codolo cilindrico ha un'alimentazione di refrigerante interna. Larghe scanalature garantiscono una evacuazione del truciolo ottimale. Sostituzione degli inserti semplice grazie alle viti di arresto. Non è necessario alcun aggiustamento delle placchette. La punta con gli inserti può essere utilizzata nel materiale pieno. Questo utensile non é adatto per finire forature ricavate da fusione oppure per allargare fori preesistenti.i. Comprese viti di serraggio Art.Nr. 86807.



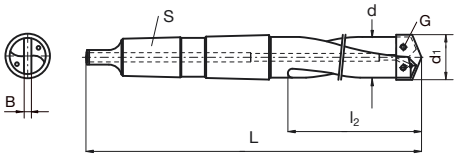
d1 mm	d mm	d2 h6 mm	d3 mm	L mm	l2 mm	l3 mm	B mm	G	Codice
10,00-11,7	9,500	20,000	25,000	180,000	123,000	40,000	2,500	86807 2.000	**9,500**
11,71-13,4	11,500	20,000	25,000	190,000	134,000	40,000	2,500	86807 2.000	**11,500**
13,41-16,4	13,000	20,000	25,000	210,000	155,000	40,000	3,500	86807 2.500	**13,000**
16,41-18,9	16,000	20,000	25,000	220,000	168,000	40,000	3,500	86807 2.501	**16,000**
18,91-22,4	18,500	20,000	25,000	250,000	199,000	40,000	4,000	86807 3.000	**18,500**
22,41-25,4	22,000	20,000	25,000	250,000	201,000	40,000	4,000	86807 3.001	**22,000**
25,41-29,0	24,000	32,000	40,000	320,000	246,000	60,000	5,000	86807 3.500	**24,000**
29,01-35,0	28,000	32,000	40,000	320,000	250,000	60,000	5,000	86807 3.500	**28,000**
35,01-45,0	34,000	32,000	40,000	380,000	310,000	60,000	7,000	86807 4.001	**34,000**
45,01-55,0	44,000	40,000	50,000	390,000	310,000	70,000	7,000	86807 4.001	**44,000**
55,01-65,0	54,000	40,000	50,000	390,000	310,000	70,000	7,000	86807 4.001	**54,000**

HARTNER

Corpo portaplacchette con attacco cono morse

Articolo nr. 86630

nichelato • Supporto per placchette in esecuzione corta. Il supporto con codolo conico ha un'alimentazione di refrigerante interna. Larghe scanalature garantiscono un trasporto del truciolo ottimale. Sostituzione degli inserti semplice grazie alle viti di arresto. Non è necessario alcun aggiustamento delle placchette. La punta con gli inserti può essere utilizzata in materiale solido. Questo utensile non é adatto per foratura di fori pre-fusi o pre-forati. Alimentazione refrigerante: assiale (radiale su richiesta). Comprese viti di serraggio Art.Nr. 86807.



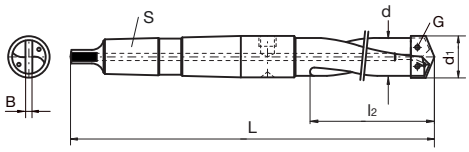
d1 **mm**	d mm	S	L mm	l2 mm	B mm	G	**Codice**
10,00-11,7	9,500	MK-2	139,000	56,000	2,500	86807 2.000	**9,500**
11,71-13,4	11,500	MK-2	141,000	58,000	2,500	86807 2.000	**11,500**
13,41-16,4	13,000	MK-2	148,000	63,000	3,500	86807 2.500	**13,000**
16,41-18,9	16,000	MK-2	150,000	67,000	3,500	86807 2.501	**16,000**
18,91-22,4	18,500	MK-3	178,000	76,000	4,000	86807 3.000	**18,500**
22,41-25,4	22,000	MK-3	181,000	80,000	4,000	86807 3.001	**22,000**

HARTNER

Corpo portaplacchette con attacco cono morse

Articolo nr. 86670

≤ Ø 28 mm: nichelato; Ø 28 mm: brunito • Corpo per placchette in esecuzione corta con sede per anello di alimentazione refrigerante. Il corpo con codolo conico ha un'alimentazione del refrigerante interna. Larghe scanalature garantiscono una evacuazione del truciolo ottimale. Sostituzione degli inserti semplice grazie alle viti di arresto. Non è necessario alcun aggiustamento delle placchette. La punta con gli inserti può essere utilizzata nel materiale pieno. Questo utensile non é adatto per finire forature ricavate da fusione oppure per allargare fori preesistenti.
Alimentazione refrigerante: radiale (assiale su richiesta).
Da Ø corpo 63,0 mm: esecuzione diritta.
Dimensione codolo CM 5: con trascinatore.
Comprese viti di serraggio Art.Nr. 86807.



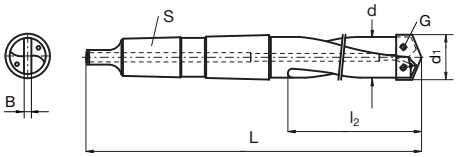
d1 mm	d mm	S	L mm	l2 mm	B mm	G	Codice
25,01-29,0	24,000	MK-4	279,000	108,000	5,000	86807 3.500	**24,000**
29,01-35,0	28,000	MK-4	279,000	108,000	5,000	86807 3.500	**28,000**
35,01-45,0	34,000	MK-4	324,000	152,000	7,000	86807 4.001	**34,000**
45,01-55,0	44,000	MK-4	324,000	152,000	7,000	86807 4.001	**44,000**
55,01-65,0	54,000	MK-4	324,000	152,000	7,000	86807 4.001	**54,000**
65,01-78,0	63,000	MK-5	436,000	216,000	9,000	86807 5.000	**63,000**
78,01-90,0	77,000	MK-5	436,000	216,000	9,000	86807 5.000	**77,000**
90,01-102,0	89,000	MK-5	436,000	216,000	9,000	86807 5.000	**89,000**

HARTNER

Corpo portaplacchette con attacco cono morse

Articolo nr. 86650

nichelato • Supporto per placchette in esecuzione lunga. Il supporto con codolo conico ha un'alimentazione di refrigerante interna. Larghe scanalature garantiscono un trasporto del truciolo ottimale. Sostituzione degli inserti semplice grazie alle viti di arresto. Non è necessario alcun aggiustamento delle placchette. La punta con gli inserti può essere utilizzata in materiale solido. Questo utensile non é adatto per foratura di fori pre-fusi o pre-forati.
Alimentazione refrigerante: assiale (radiale su richiesta).
Comprese viti di serraggio Art.Nr. 86807.



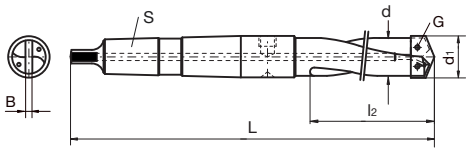
d1 **mm**	d mm	S	L mm	l2 mm	B mm	G	**Codice**
10,00-11,7	9,500	MK-2	186,000	103,000	2,500	86807 2.000	**9,500**
11,71-13,4	11,500	MK-2	191,000	108,000	2,500	86807 2.000	**11,500**
13,41-16,4	13,000	MK-2	210,000	125,000	3,500	86807 2.500	**13,000**
16,41-18,9	16,000	MK-2	218,000	135,000	3,500	86807 2.501	**16,000**
18,91-22,4	18,500	MK-3	258,000	156,000	4,000	86807 3.000	**18,500**
22,41-25,4	22,000	MK-3	266,000	166,000	4,000	86807 3.001	**22,000**

HARTNER

Corpo portaplacchette con attacco cono morse

Articolo nr. 86680

≤ Ø 28 mm: nichelato; Ø 28 mm: brunito • Supporto per placchette in esecuzione lunga con superficie circolare per anello con alimentazione refrigerante. Il supporto con codolo conico ha un'alimentazione di refrigerante interna. Larghe scanalature garantiscono un trasporto del truciolo ottimale. Sostituzione degli inserti semplice grazie alle viti di arresto. Non è necessario alcun aggiustamento delle placchette. La punta con gli inserti può essere utilizzata in materiale solido. Questo utensile non é adatto per foratura di fori pre-fusi o pre-forati.
Alimentazione refrigerante: radiale (assiale su richiesta).
Da supporto Ø 63,0 mm: dritto.
Dimensione codolo CM 5: con chiavetta trasversale.
Comprese viti di serraggio Art.Nr. 86807.



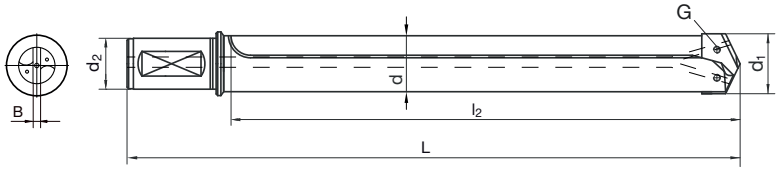
d1 mm	d mm	S	L mm	l2 mm	B mm	G	Codice
25,01-29,0	24,000	MK-4	379,000	208,000	5,000	86807 3.500	**24,000**
29,01-35,0	28,000	MK-4	379,000	208,000	5,000	86807 3.500	**28,000**
35,01-45,0	34,000	MK-4	429,000	257,000	7,000	86807 4.001	**34,000**
45,01-55,0	44,000	MK-4	429,000	257,000	7,000	86807 4.001	**44,000**
55,01-65,0	54,000	MK-4	429,000	257,000	7,000	86807 4.001	**54,000**
65,01-78,0	63,000	MK-5	536,000	316,000	9,000	86807 5.000	**63,000**
78,01-90,0	77,000	MK-5	536,000	316,000	9,000	86807 5.000	**77,000**
90,01-102,0	89,000	MK-5	536,000	316,000	9,000	86807 5.000	**89,000**

HARTNER

Corpo portaplacchette speciale con attacco cilindrico

Articolo nr. 86628

nichelato • Supporto per placchette. Il supporto extra lungo con codolo cilindrico ha un'alimentazione di refrigerante interna. Larghe scanalature garantiscono un trasporto del truciolo ottimale. Sostituzione degli inserti semplice grazie alle viti di arresto. Non è necessario alcun aggiustamento delle placchette. La punta con gli inserti può essere utilizzata in materiale solido. Questo utensile non é adatto per foratura di fori pre-fusi o pre-forati. Comprese viti di serraggio Art.Nr. 86807.



d1 mm	d mm	d2 h6 mm	L mm	l2 mm	B mm	G	**Codice**
13,41-16,4	13,000	20,000	198,500	156,500	3,500	86807 2.500	**13,157**
13,41-16,4	13,000	20,000	238,500	196,500	3,500	86807 2.500	**13,197**
13,41-16,4	13,000	20,000	318,500	276,500	3,500	86807 2.500	**13,277**
15,00-16,4	14,500	20,000	95,000	52,000	3,500	86807 2.500	**14,052**
15,00-16,4	14,500	20,000	125,000	82,000	3,500	86807 2.500	**14,082**
15,00-16,4	14,500	20,000	178,500	136,500	3,500	86807 2.500	**14,137**
15,00-16,4	14,500	20,000	198,500	156,500	3,500	86807 2.500	**14,157**
15,00-16,4	14,500	20,000	238,500	196,500	3,500	86807 2.500	**14,197**
15,00-16,4	14,500	20,000	268,500	226,500	3,500	86807 2.500	**14,227**
15,00-16,4	14,500	20,000	398,500	356,500	3,500	86807 2.500	**14,357**
16,41-18,9	16,000	20,000	260,500	218,500	3,500	86807 2.500	**16,219**
16,41-18,9	16,000	20,000	295,500	253,500	3,500	86807 2.500	**16,254**
16,41-18,9	16,000	20,000	410,500	368,500	3,500	86807 2.501	**16,369**
18,91-22,4	18,500	20,000	304,000	262,000	4,000	86807 3.000	**18,262**
18,91-22,4	18,500	20,000	344,000	302,000	4,000	86807 3.000	**18,302**
18,91-22,4	18,500	20,000	464,000	422,000	4,000	86807 3.000	**18,422**
22,41-25,4	22,000	20,000	285,000	243,000	4,000	86807 3.001	**22,243**
22,41-25,4	22,000	20,000	345,000	303,000	4,000	86807 3.001	**22,303**
22,41-25,4	22,000	20,000	385,000	343,000	4,000	86807 3.001	**22,343**
22,41-25,4	22,000	20,000	535,000	493,000	4,000	86807 3.001	**22,493**
25,41-29,0	23,000	32,000	138,000	63,000	5,000	86807 3.001	**23,063**
25,41-29,0	23,000	32,000	173,000	98,000	5,000	86807 3.001	**23,098**
25,41-29,0	23,000	32,000	225,000	150,000	5,000	86807 3.001	**23,150**
25,41-29,0	23,000	32,000	273,000	198,000	5,000	86807 3.001	**23,198**
25,41-29,0	23,000	32,000	343,000	268,000	5,000	86807 3.001	**23,268**
25,41-29,0	23,000	32,000	433,000	358,000	5,000	86807 3.001	**23,358**
25,41-29,0	23,000	32,000	503,000	428,000	5,000	86807 3.001	**23,428**
25,41-29,0	23,000	32,000	683,000	608,000	5,000	86807 3.001	**23,608**
29,01-35,0	28,000	32,000	393,000	321,500	5,000	86807 3.500	**28,322**
29,01-35,0	28,000	32,000	473,000	401,500	5,000	86807 3.500	**28,402**
29,01-35,0	28,000	32,000	553,000	481,500	5,000	86807 3.500	**28,482**
29,01-35,0	28,000	32,000	763,000	691,500	5,000	86807 3.500	**28,692**
33,20-36,0	33,000	32,000	148,000	80,500	5,000	86807 3.500	**33,081**
33,20-36,0	33,000	32,000	173,000	105,500	5,000	86807 3.500	**33,106**
33,20-36,0	33,000	32,000	223,000	155,500	5,000	86807 3.500	**33,156**
33,20-36,0	33,000	32,000	273,000	205,500	5,000	86807 3.500	**33,206**
33,20-36,0	33,000	32,000	393,000	325,500	5,000	86807 3.500	**33,326**
33,20-36,0	33,000	32,000	503,000	435,500	5,000	86807 3.500	**33,436**
33,20-36,0	33,000	32,000	603,000	535,500	5,000	86807 3.500	**33,536**
33,20-36,0	33,000	32,000	823,000	755,500	5,000	86807 3.500	**33,756**
35,01-45,0	34,000	32,000	457,000	388,000	7,000	86807 4.001	**34,388**
35,01-45,0	34,000	32,000	607,000	538,000	7,000	86807 4.001	**34,538**

Corpo portaplacchette speciale con attacco cilindrico

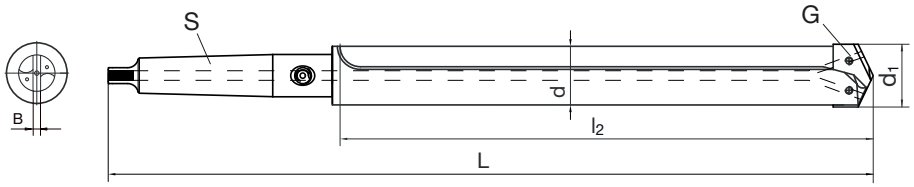
d1 mm	d mm	d2 h6 mm	L mm	l2 mm	B mm	G	Codice
35,01-45,0	34,000	32,000	907,000	838,000	7,000	86807 4.001	**34,838**
45,01-55,0	44,000	40,000	467,000	394,000	7,000	86807 4.001	**44,394**
45,01-55,0	44,000	40,000	617,000	544,000	7,000	86807 4.001	**44,544**
45,01-55,0	44,000	40,000	917,000	844,000	7,000	86807 4.001	**44,844**
55,01-65,0	54,000	40,000	467,000	393,000	7,000	86807 4.001	**54,393**
55,01-65,0	54,000	40,000	617,000	543,000	7,000	86807 4.001	**54,543**
55,01-65,0	54,000	40,000	917,000	843,000	7,000	86807 4.001	**54,843**
65,01-78,0	63,000	40,000	230,000	155,000	9,000	86807 5.000	**63,155**
65,01-78,0	63,000	40,000	340,000	265,000	9,000	86807 5.000	**63,265**
65,01-78,0	63,000	40,000	470,000	395,000	9,000	86807 5.000	**63,395**
65,01-78,0	63,000	40,000	620,000	545,000	9,000	86807 5.000	**63,545**
65,01-78,0	63,000	40,000	920,000	845,000	9,000	86807 5.000	**63,845**
78,01-90,0	77,000	50,000	240,000	155,000	9,000	86807 5.000	**77,155**
78,01-90,0	77,000	50,000	350,000	265,000	9,000	86807 5.000	**77,265**
78,01-90,0	77,000	50,000	480,000	395,000	9,000	86807 5.000	**77,395**
78,01-90,0	77,000	50,000	630,000	545,000	9,000	86807 5.000	**77,545**
78,01-90,0	77,000	50,000	930,000	845,000	9,000	86807 5.000	**77,845**
90,01-102,0	89,000	50,000	240,000	155,000	9,000	86807 5.000	**89,155**
90,01-102,0	89,000	50,000	350,000	265,000	9,000	86807 5.000	**89,265**
90,01-102,0	89,000	50,000	480,000	395,000	9,000	86807 5.000	**89,395**
90,01-102,0	89,000	50,000	630,000	545,000	9,000	86807 5.000	**89,545**
90,01-102,0	89,000	50,000	930,000	845,000	9,000	86807 5.000	**89,845**

HARTNER

Corpo portaplacchette speciale con attacco cono morse

Articolo nr. 86678

Superficie ≤ 1000 mm lunghezza totale nichelata; > 1000 mm lunghezza totale brunita • Supporto per placchette. Il supporto extra lungo con codolo cilindrico ha un'alimentazione di refrigerante interna. Larghe scanalature garantiscono un trasporto del truciolo ottimale. Sostituzione degli inserti semplice grazie alle viti di arresto. Non è necessario alcun aggiustamento delle placchette. La punta con gli inserti può essere utilizzata in materiale solido. Questo utensile non é adatto per foratura di fori pre-fusi o pre-forati.
Alimentazione refrigerante: radiale (assiale su richiesta).
Comprese viti di serraggio Art.Nr. 86807.



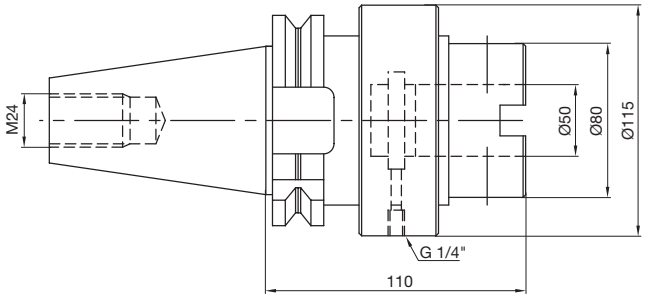
d1 mm	d mm	S	L mm	l2 mm	B mm	G	**Codice**
35,01-45,0	34,000	MK-4	566,000	393,000	7,000	86807 4.001	**34,393**
35,01-45,0	34,000	MK-4	716,000	543,000	7,000	86807 4.001	**34,543**
35,01-45,0	34,000	MK-4	1016,000	843,000	7,000	86807 4.001	**34,843**
45,01-55,0	44,000	MK-4	716,000	544,500	7,000	86807 4.001	**44,545**
45,01-55,0	44,000	MK-4	1016,000	844,500	7,000	86807 4.001	**44,845**
55,01-65,0	54,000	MK-4	560,000	387,000	7,000	86807 4.001	**54,387**
55,01-65,0	54,000	MK-4	716,000	543,000	7,000	86807 4.001	**54,543**
55,01-65,0	54,000	MK-4	1016,000	843,000	7,000	86807 4.001	**54,843**
65,01-78,0	63,000	MK-5	766,000	547,000	9,000	86807 5.000	**63,547**
65,01-78,0	63,000	MK-5	1066,000	847,000	9,000	86807 5.000	**63,847**
78,01-90,0	77,000	MK-5	766,000	544,000	9,000	86807 5.000	**77,544**
78,01-90,0	77,000	MK-5	1066,000	844,000	9,000	86807 5.000	**77,844**
90,01-102,0	89,000	MK-5	766,000	544,000	9,000	86807 5.000	**89,544**
90,01-102,0	89,000	MK-5	1066,000	844,000	9,000	86807 5.000	**89,844**

Programma speciale Multiplex sistema modulare Ø 97 mm fino 210 mm

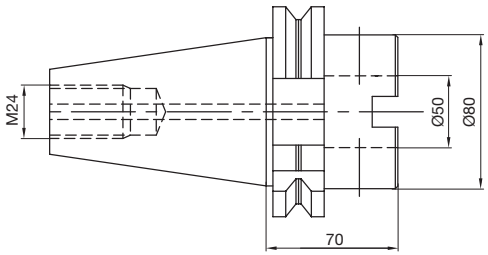
Mandrini

Sono fornibili a richiesta le seguenti esecuzioni:

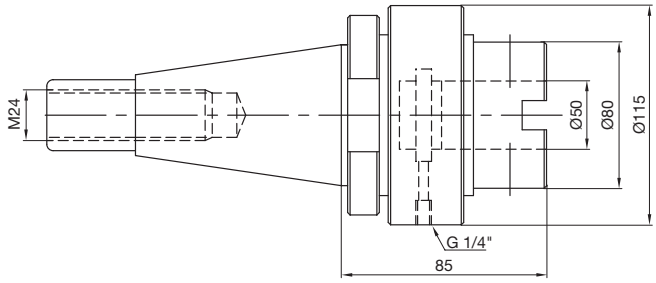
- SK50 DIN 69871 con anello adduttore



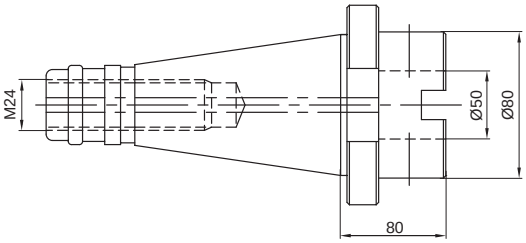
- SK50 DIN 69871 senza anello adduttore



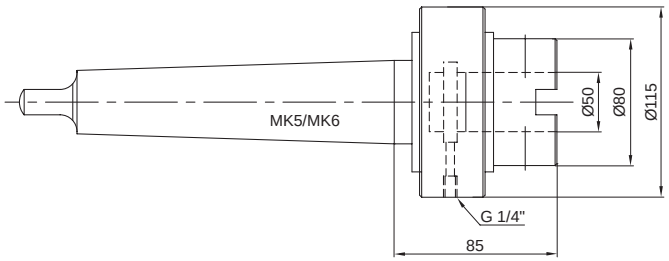
- SK50 DIN 2080 con anello adduttore



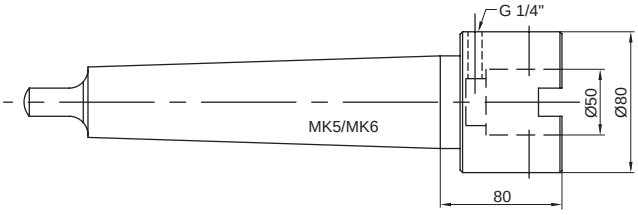
- SK50 DIN 2080 senza anello adduttore



- CM 5/CM 6 con anello adduttore



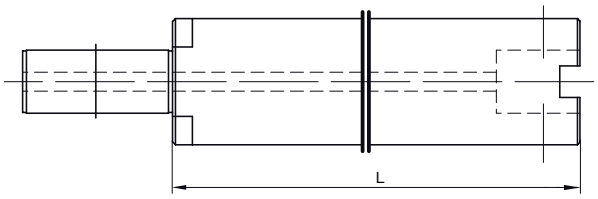
- CM 5/CM 6 senza anello adduttore



Programma speciale Multiplex sistema modulare Ø 97 mm fino 210 mm

Prolunghe per testa foratrice

Prolunghe per testa foratrice
Ø 97 mm - Ø 130 mm
L = 186 mm
L = 300 mm



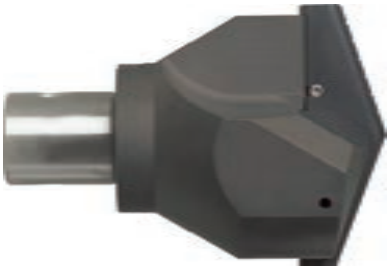
Prolunghe per testa foratrice
Ø 131 mm - Ø 165 mm und Ø 164 mm - Ø 210 mm
L = 204 mm
L = 300 mm
L = 500 mm

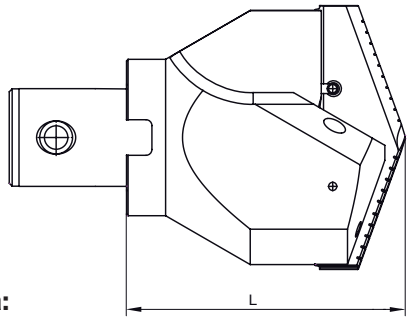
Trascinatore

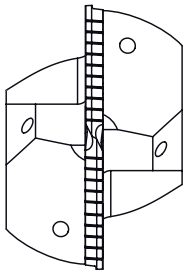
piccolo, per testa foratrice
Ø 97 mm - Ø 130 mm,
larghezza 14 mm

grande, per testa foratrice Ø 131 mm - Ø 165 mm
e Ø 164 mm - Ø 210 mm, larghezza 16 mm

Teste foratrici







Le seguenti grandezze sono fornibili a richiesta:
- Ø 97 mm fino Ø 130 mm, L = 118,5 mm
- Ø 131 mm fino Ø 165 mm, L = 142,5 mm
- Ø 164 mm fino Ø 210 mm, L = 142,5 mm

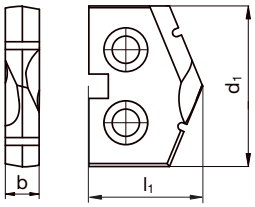
Inserti intercambiabili

Articolo nr. 86602

P	M	K	N	S	H
●	○	●	○		

HSS-E-PM | T | WN | 135° | R

Assott. del nocc. ≥ Ø 9,800 • inserti con scanalature truciolo divise. Angolo di affilatura 135°. Per utilizzo universale.



d1 mm	l1 mm	b mm	Codice
10,000	8,700	2,500	**10,000**
10,200	8,700	2,500	**10,200**
10,500	8,700	2,500	**10,500**
11,000	8,700	2,500	**11,000**
11,110	8,700	2,500	**11,110**
11,500	8,700	2,500	**11,500**
11,750	8,700	2,500	**11,750**
12,000	8,700	2,500	**12,000**
12,300	8,700	2,500	**12,300**
12,500	8,700	2,500	**12,500**
12,750	8,700	2,500	**12,750**
13,000	8,700	2,500	**13,000**
13,250	8,700	2,500	**13,250**
13,500	11,700	3,500	**13,500**
13,750	11,700	3,500	**13,750**
14,000	11,700	3,500	**14,000**
14,250	11,700	3,500	**14,250**
14,500	11,700	3,500	**14,500**
14,750	11,700	3,500	**14,750**
15,000	11,700	3,500	**15,000**
15,250	11,700	3,500	**15,250**
15,500	11,700	3,500	**15,500**
15,750	11,700	3,500	**15,750**
16,000	11,700	3,500	**16,000**
16,500	11,700	3,500	**16,500**
16,750	11,700	3,500	**16,750**
17,000	11,700	3,500	**17,000**
17,250	11,700	3,500	**17,250**
17,500	11,700	3,500	**17,500**
17,750	11,700	3,500	**17,750**

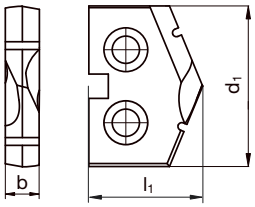
d1 mm	l1 mm	b mm	Codice
18,000	11,700	3,500	**18,000**
18,250	11,700	3,500	**18,250**
18,500	11,700	3,500	**18,500**
18,750	11,700	3,500	**18,750**
19,000	13,700	4,000	**19,000**
19,500	13,700	4,000	**19,500**
19,750	13,700	4,000	**19,750**
20,000	13,700	4,000	**20,000**
20,250	13,700	4,000	**20,250**
20,500	13,700	4,000	**20,500**
21,000	13,700	4,000	**21,000**
21,250	13,700	4,000	**21,250**
21,500	13,700	4,000	**21,500**
21,750	13,700	4,000	**21,750**
22,000	13,700	4,000	**22,000**
22,500	13,700	4,000	**22,500**
23,000	13,700	4,000	**23,000**
23,500	13,700	4,000	**23,500**
24,000	13,700	4,000	**24,000**
24,500	13,700	4,000	**24,500**
24,750	13,700	4,000	**24,750**
25,000	13,700	4,000	**25,000**

Articolo nr. 86608

P	M	K	N	S	H
●	○	●	○		

HSS-E-PM | F | WN | 135° | R

Assott. del nocc. ≥ Ø 10,000 • inserti con scanalature truciolo divise. Angolo di affilatura 135°. Per utilizzo universale.



d1 mm	l1 mm	b mm	Codice
10,000	8,700	2,500	**10,000**
10,500	8,700	2,500	**10,500**
11,000	8,700	2,500	**11,000**
11,500	8,700	2,500	**11,500**
11,750	8,700	2,500	**11,750**
12,000	8,700	2,500	**12,000**
12,500	8,700	2,500	**12,500**
12,750	8,700	2,500	**12,750**
13,000	8,700	2,500	**13,000**
13,250	8,700	2,500	**13,250**
13,500	11,700	3,500	**13,500**
13,750	11,700	3,500	**13,750**
14,000	11,700	3,500	**14,000**
14,250	11,700	3,500	**14,250**
14,500	11,700	3,500	**14,500**
14,750	11,700	3,500	**14,750**
15,000	11,700	3,500	**15,000**
15,250	11,700	3,500	**15,250**
15,500	11,700	3,500	**15,500**
15,750	11,700	3,500	**15,750**
16,000	11,700	3,500	**16,000**
16,500	11,700	3,500	**16,500**
17,000	11,700	3,500	**17,000**
17,500	11,700	3,500	**17,500**

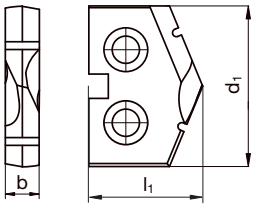
d1 mm	l1 mm	b mm	Codice
17,750	11,700	3,500	**17,750**
18,000	11,700	3,500	**18,000**
18,250	11,700	3,500	**18,250**
18,500	11,700	3,500	**18,500**
18,750	11,700	3,500	**18,750**
19,000	13,700	4,000	**19,000**
19,500	13,700	4,000	**19,500**
19,750	13,700	4,000	**19,750**
20,000	13,700	4,000	**20,000**
20,250	13,700	4,000	**20,250**
20,500	13,700	4,000	**20,500**
21,000	13,700	4,000	**21,000**
21,250	13,700	4,000	**21,250**
21,500	13,700	4,000	**21,500**
21,750	13,700	4,000	**21,750**
22,000	13,700	4,000	**22,000**
22,500	13,700	4,000	**22,500**
23,000	13,700	4,000	**23,000**
23,500	13,700	4,000	**23,500**
24,000	13,700	4,000	**24,000**
24,500	13,700	4,000	**24,500**
24,750	13,700	4,000	**24,750**
25,000	13,700	4,000	**25,000**

Articolo nr. 86609

P	M	K	N	S	H
●	○	●	○		

HSS-E-PM | A | WN | 132° | R

Assott. del nocc. ≥ Ø 25,000 • inserti con scanalature truciolo divise. Per utilizzo universale.
angolo di affilatura:
≥ Ø 25,0 mm = 132°
> Ø 66,0 mm = 140°
materiale tagliente:
≤ Ø 66,0 mm HSS-E-PM
> Ø 66,0 mm HSS-E



d1 mm	inch	l1 mm	b mm	**Codice**
25,000		18,000	5,000	**25,000**
25,500		18,000	5,000	**25,500**
26,000		18,000	5,000	**26,000**
26,500		18,000	5,000	**26,500**
27,000		18,000	5,000	**27,000**
28,000		18,000	5,000	**28,000**
29,000		18,000	5,000	**29,000**
29,500		18,000	5,000	**29,500**
30,000		18,000	5,000	**30,000**
31,000		18,000	5,000	**31,000**
32,000		18,000	5,000	**32,000**
33,000		18,000	5,000	**33,000**
34,000		18,000	5,000	**34,000**
35,000		18,000	5,000	**35,000**
36,000		25,000	7,000	**36,000**
37,000		25,000	7,000	**37,000**
38,000		25,000	7,000	**38,000**
39,000		25,000	7,000	**39,000**
40,000		25,000	7,000	**40,000**
41,000		25,000	7,000	**41,000**
42,000		25,000	7,000	**42,000**
43,000		25,000	7,000	**43,000**
44,000		25,000	7,000	**44,000**
45,000		25,000	7,000	**45,000**
46,000		25,000	7,000	**46,000**
47,000		25,000	7,000	**47,000**
48,000		25,000	7,000	**48,000**
49,000		25,000	7,000	**49,000**
50,000		25,000	7,000	**50,000**
51,000		25,000	7,000	**51,000**
52,000		25,000	7,000	**52,000**
53,000		25,000	7,000	**53,000**
54,000		25,000	7,000	**54,000**
55,000		25,000	7,000	**55,000**
56,000		25,000	7,000	**56,000**
57,000		25,000	7,000	**57,000**
58,000		25,000	7,000	**58,000**
59,000		25,000	7,000	**59,000**
60,000		25,000	7,000	**60,000**
62,000		25,000	7,000	**62,000**
64,000		25,000	7,000	**64,000**
65,000		25,000	7,000	**65,000**

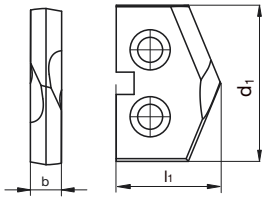
d1 mm	inch	l1 mm	b mm	**Codice**
66,000		37,000	9,000	**66,000**
68,000		37,000	9,000	**68,000**
70,000		37,000	9,000	**70,000**
74,000		37,000	9,000	**74,000**
75,000		37,000	9,000	**75,000**
78,000		37,000	9,000	**78,000**
80,000		37,000	9,000	**80,000**
82,000		37,000	9,000	**82,000**
84,000		37,000	9,000	**84,000**
85,000		37,000	9,000	**85,000**
88,000		37,000	9,000	**88,000**
90,000		37,000	9,000	**90,000**
93,000		37,000	9,000	**93,000**
95,000		37,000	9,000	**95,000**
96,000		37,000	9,000	**96,000**
98,000		37,000	9,000	**98,000**
100,000		37,000	9,000	**100,000**
102,000		37,000	9,000	**102,000**
103,000		37,000	9,000	**103,000**
105,000		37,000	9,000	**105,000**
110,000		37,000	9,000	**110,000**
115,000		37,000	9,000	**115,000**
120,000		37,000	9,000	**120,000**
125,000		37,000	9,000	**125,000**
130,000		37,000	9,000	**130,000**
135,000		47,000	9,000	**135,000**
140,000		47,000	9,000	**140,000**
145,000		47,000	9,000	**145,000**
150,000		47,000	9,000	**150,000**
155,000		47,000	9,000	**155,000**
160,000		47,000	9,000	**160,000**
165,000		47,000	9,000	**165,000**
170,000		47,000	9,000	**170,000**
175,000		47,000	9,000	**175,000**
180,000		47,000	9,000	**180,000**
185,000		47,000	9,000	**185,000**
190,000		47,000	9,000	**190,000**
195,000		47,000	9,000	**195,000**
200,000		47,000	9,000	**200,000**
205,000		47,000	9,000	**205,000**
210,000		47,000	9,000	**210,000**

Articolo nr. 86708

P	M	K	N	S	H
●	○	●	○		

VHM | T | WN | 135° | R

Assott. del nocc. ≥ Ø 9,800 • Inserti senza scanalature truciolo divise. Per materiale fino a 600 N/mm². Per utilizzo universale.
Angolo di affilatura:
≤ Ø 25,4 mm = 135°
> Ø 25,4 mm = 132°
con smusso (vedi consigli per l'utilizzo Multiplex/parte tecnica)



d1 mm	l1 mm	b mm	Codice
10,000	8,700	2,500	**10,000**
10,200	8,700	2,500	**10,200**
10,500	8,700	2,500	**10,500**
11,000	8,700	2,500	**11,000**
11,500	8,700	2,500	**11,500**
12,000	8,700	2,500	**12,000**
12,250	8,700	2,500	**12,250**
12,500	8,700	2,500	**12,500**
12,750	8,700	2,500	**12,750**
13,000	8,700	2,500	**13,000**
13,500	11,700	3,500	**13,500**
13,750	11,700	3,500	**13,750**
14,000	11,700	3,500	**14,000**
14,250	11,700	3,500	**14,250**
14,500	11,700	3,500	**14,500**
14,750	11,700	3,500	**14,750**
15,000	11,700	3,500	**15,000**
15,500	11,700	3,500	**15,500**
15,750	11,700	3,500	**15,750**
16,000	11,700	3,500	**16,000**
16,250	11,700	3,500	**16,250**
16,500	11,700	3,500	**16,500**
16,750	11,700	3,500	**16,750**
17,000	11,700	3,500	**17,000**
17,500	11,700	3,500	**17,500**
17,750	11,700	3,500	**17,750**
18,000	11,700	3,500	**18,000**
18,250	11,700	3,500	**18,250**
18,500	11,700	3,500	**18,500**
19,000	13,700	4,000	**19,000**

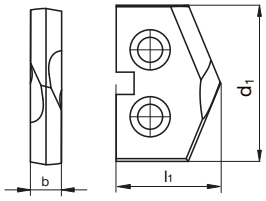
d1 mm	l1 mm	b mm	Codice
19,500	13,700	4,000	**19,500**
19,750	13,700	4,000	**19,750**
20,000	13,700	4,000	**20,000**
20,500	13,700	4,000	**20,500**
21,000	13,700	4,000	**21,000**
21,500	13,700	4,000	**21,500**
22,000	13,700	4,000	**22,000**
22,500	13,700	4,000	**22,500**
22,750	13,700	4,000	**22,750**
23,000	13,700	4,000	**23,000**
23,500	13,700	4,000	**23,500**
24,000	13,700	4,000	**24,000**
24,250	13,700	4,000	**24,250**
24,500	13,700	4,000	**24,500**
25,000	13,700	4,000	**25,000**
26,000	17,300	5,000	**26,000**
27,000	17,300	5,000	**27,000**
28,000	17,300	5,000	**28,000**
29,000	17,300	5,000	**29,000**
30,000	17,300	5,000	**30,000**
31,000	17,300	5,000	**31,000**
32,000	17,300	5,000	**32,000**
34,000	17,300	5,000	**34,000**
35,000	17,300	5,000	**35,000**

Articolo nr. 86702

P	M	K	N	S	H
●	○	●	○		

VHM | F | WN | 135° | R

Assott. del nocc. ≥ Ø 10,000 • Inserti senza scanalature truciolo divise. Per materiale fino a 600 N/mm². Per utilizzo universale.
Angolo di affilatura:
≤ Ø 25,4 mm = 135°
> Ø 25,4 mm = 132°
con smusso (vedi consigli per l'utilizzo Multiplex/parte tecnica)



d1 mm	l1 mm	b mm	Codice
10,000	8,700	2,500	**10,000**
10,200	8,700	2,500	**10,200**
10,500	8,700	2,500	**10,500**
11,000	8,700	2,500	**11,000**
12,000	8,700	2,500	**12,000**
12,500	8,700	2,500	**12,500**
12,750	8,700	2,500	**12,750**
13,000	8,700	2,500	**13,000**
13,500	11,700	3,500	**13,500**
13,750	11,700	3,500	**13,750**
14,000	11,700	3,500	**14,000**
14,100	11,700	3,500	**14,100**
14,500	11,700	3,500	**14,500**
14,750	11,700	3,500	**14,750**
15,000	11,700	3,500	**15,000**
15,500	11,700	3,500	**15,500**
16,000	11,700	3,500	**16,000**
16,250	11,700	3,500	**16,250**
16,500	11,700	3,500	**16,500**
16,750	11,700	3,500	**16,750**
17,000	11,700	3,500	**17,000**
17,500	11,700	3,500	**17,500**
17,750	11,700	3,500	**17,750**
18,000	11,700	3,500	**18,000**
18,250	11,700	3,500	**18,250**
18,500	11,700	3,500	**18,500**
19,000	13,700	4,000	**19,000**
19,500	13,700	4,000	**19,500**
19,750	13,700	4,000	**19,750**
20,000	13,700	4,000	**20,000**

d1 mm	l1 mm	b mm	Codice
20,500	13,700	4,000	**20,500**
21,000	13,700	4,000	**21,000**
21,500	13,700	4,000	**21,500**
22,000	13,700	4,000	**22,000**
22,300	13,700	4,000	**22,300**
22,750	13,700	4,000	**22,750**
23,000	13,700	4,000	**23,000**
24,250	13,700	4,000	**24,250**
24,500	13,700	4,000	**24,500**
25,000	13,700	4,000	**25,000**
26,000	17,300	5,000	**26,000**
26,500	17,300	5,000	**26,500**
27,000	17,300	5,000	**27,000**
28,000	17,300	5,000	**28,000**
29,000	17,300	5,000	**29,000**
29,800	17,300	5,000	**29,800**
30,000	17,300	5,000	**30,000**
32,000	17,300	5,000	**32,000**
33,000	17,300	5,000	**33,000**
34,000	17,300	5,000	**34,000**
35,000	17,300	5,000	**35,000**

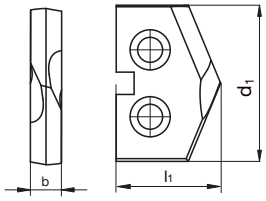
Inserti intercambiabili

Articolo nr. 86709

P	M	K	N	S	H
●	○	●	○		

VHM | T | WN | 135° | R

Assott. del nocc. ≥ Ø 9,800 • Inserti senza scanalature truciolo divise. Per materiale fino a 600 N/mm². Per utilizzo universale.
Angolo di affilatura:
≤ Ø 25,4 mm = 135°
> Ø 25,4 mm = 132°
senza smusso (vedi consigli per l'utilizzo Multiplex/parte tecnica)



d1 mm	l1 mm	b mm	Codice
10,000	8,700	2,500	**10,000**
10,200	8,700	2,500	**10,200**
10,500	8,700	2,500	**10,500**
11,000	8,700	2,500	**11,000**
11,110	8,700	2,500	**11,110**
12,000	8,700	2,500	**12,000**
12,500	8,700	2,500	**12,500**
12,700	8,700	2,500	**12,700**
12,750	8,700	2,500	**12,750**
13,000	8,700	2,500	**13,000**
13,500	11,700	3,500	**13,500**
14,000	11,700	3,500	**14,000**
14,500	11,700	3,500	**14,500**
14,750	11,700	3,500	**14,750**
15,000	11,700	3,500	**15,000**
15,880	11,700	3,500	**15,880**
16,250	11,700	3,500	**16,250**
16,500	11,700	3,500	**16,500**
16,670	11,700	3,500	**16,670**
16,750	11,700	3,500	**16,750**
17,000	11,700	3,500	**17,000**
17,500	11,700	3,500	**17,500**
17,750	11,700	3,500	**17,750**
18,000	11,700	3,500	**18,000**

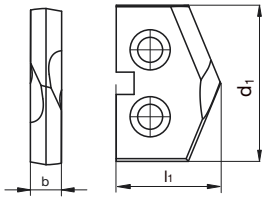
d1 mm	l1 mm	b mm	Codice
18,250	11,700	3,500	**18,250**
18,500	11,700	3,500	**18,500**
19,000	13,700	4,000	**19,000**
19,500	13,700	4,000	**19,500**
20,000	13,700	4,000	**20,000**
20,500	13,700	4,000	**20,500**
20,640	13,700	4,000	**20,640**
21,000	13,700	4,000	**21,000**
21,500	13,700	4,000	**21,500**
22,000	13,700	4,000	**22,000**
23,000	13,700	4,000	**23,000**
23,250	13,700	4,000	**23,250**
24,500	13,700	4,000	**24,500**
25,000	13,700	4,000	**25,000**
26,000	17,300	5,000	**26,000**
27,000	17,300	5,000	**27,000**
28,000	17,300	5,000	**28,000**
29,000	17,300	5,000	**29,000**
30,000	17,300	5,000	**30,000**
33,000	17,300	5,000	**33,000**
34,000	17,300	5,000	**34,000**
35,000	17,300	5,000	**35,000**

Articolo nr. 86701

P	M	K	N	S	H
●	○	●	○		

VHM | F | WN | 135° | R

Assott. del nocc. ≥ Ø 10,000 • Inserti senza scanalature truciolo divise. Per materiale fino a 600 N/mm². Per utilizzo universale.
Angolo di affilatura:
≤ Ø 25,4 mm = 135°
> Ø 25,4 mm = 132°
senza smusso (vedi consigli per l'utilizzo Multiplex/parte tecnica)



d1 mm	l1 mm	b mm	Codice
10,000	8,700	2,500	**10,000**
10,200	8,700	2,500	**10,200**
10,500	8,700	2,500	**10,500**
11,000	8,700	2,500	**11,000**
11,500	8,700	2,500	**11,500**
12,000	8,700	2,500	**12,000**
12,500	8,700	2,500	**12,500**
12,750	8,700	2,500	**12,750**
13,000	8,700	2,500	**13,000**
13,500	11,700	3,500	**13,500**
13,750	11,700	3,500	**13,750**
14,000	11,700	3,500	**14,000**
14,250	11,700	3,500	**14,250**
14,500	11,700	3,500	**14,500**
14,750	11,700	3,500	**14,750**
15,000	11,700	3,500	**15,000**
15,500	11,700	3,500	**15,500**
15,750	11,700	3,500	**15,750**
16,000	11,700	3,500	**16,000**
16,250	11,700	3,500	**16,250**
16,500	11,700	3,500	**16,500**
16,750	11,700	3,500	**16,750**
17,000	11,700	3,500	**17,000**
17,500	11,700	3,500	**17,500**

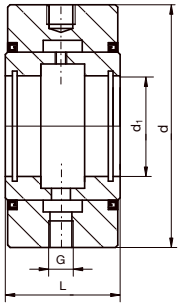
d1 mm	l1 mm	b mm	Codice
17,750	11,700	3,500	**17,750**
18,000	11,700	3,500	**18,000**
18,500	11,700	3,500	**18,500**
19,000	13,700	4,000	**19,000**
19,500	13,700	4,000	**19,500**
20,000	13,700	4,000	**20,000**
20,500	13,700	4,000	**20,500**
21,000	13,700	4,000	**21,000**
21,500	13,700	4,000	**21,500**
22,000	13,700	4,000	**22,000**
23,000	13,700	4,000	**23,000**
24,000	13,700	4,000	**24,000**
24,500	13,700	4,000	**24,500**
25,000	13,700	4,000	**25,000**
26,000	17,300	5,000	**26,000**
27,000	17,300	5,000	**27,000**
28,000	17,300	5,000	**28,000**
29,000	17,300	5,000	**29,000**
30,000	17,300	5,000	**30,000**
31,000	17,300	5,000	**31,000**
32,000	17,300	5,000	**32,000**
33,000	17,300	5,000	**33,000**
34,000	17,300	5,000	**34,000**
35,000	17,300	5,000	**35,000**

Alimentatori per punte con fori di refrigerazione

Articolo nr. 86690

WN

Anello di alimentazione del refrigerante per per corpo con attacco CM e sede per anello art. 86670 e 86680 (senza set avvitatura).

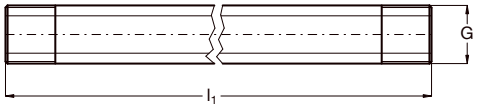


per	d1 mm	d mm	G	L mm	**Codice**
MK 4	31,750	80,000	G 1/4	45,000	**31,750**
MK 5	63,500	127,000	G 1/2	60,000	**63,500**

Tubi di adduzione

Articolo nr. 82571

Tubo di adduzione refrigerante per anello di alimentazione del refrigerante Art. nr. 86690



G	l1 mm	**Codice**
G 1/4	200,000	**13,160**
G 1/2	200,000	**20,960**

G	l1 mm	**Codice**

Attacco rapido

Articolo nr. 82578

WN

G	d mm	l1 mm	**Codice**
G 1/4	9,000	118,000	**9,000**
G 1/2	13,000	118,000	**13,000**

G	d mm	l1 mm	**Codice**

HARTNER

Giravite Torx

Articolo nr. 86842

WN

Torx	l1 mm	**Codice**
T6	150,000	**6,001**
T7	150,000	**7,001**
T8	150,000	**8,001**
T9	150,000	**9,001**
T10	170,000	**10,001**
T15	190,000	**15,001**

Torx	l1 mm	**Codice**
T20	205,000	**20,001**
T25	207,000	**25,001**

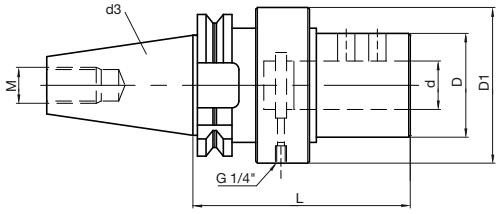
HARTNER

Mandrino di alimentazione del refrigerante per Multiplex

Articolo nr. 86691

B WN SK

Mandrino di alimentazione del refrigerante con attacco SK secondo DIN ISO 7388-1 e attacco per utensili con gambo cilindrico. Per gambi di Ø più piccoli utilizzare le bussole di riduzione.



d3	d mm	D mm	D1 mm	L mm	M	 kg	Codice
SK 40	32,000	65,000	88,000	130,000	M16	0,909	**32,040**
SK 50	40,000	65,000	98,000	135,000	M24	1,694	**40,050**
SK 50	50,000	90,000	123,000	165,000	M24	2,981	**50,050**

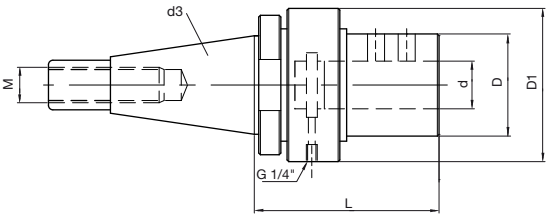
HARTNER

Mandrino di alimentazione del refrigerante per Multiplex

Articolo nr. 86692

B WN SK

Mandrino con alimentazione di refrigerante con SK a DIN 2080 e foratura cilindrica. Per codolo con differenti Ø utilizzo con bussola di riduzione.



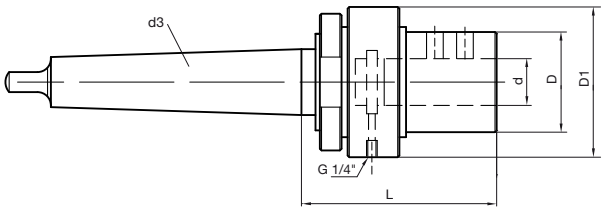
d3	d mm	D mm	D1 mm	L mm	M	 kg	Codice
SK 40	32,000	65,000	88,000	110,000	M16	0,931	**32,040**
SK 50	40,000	65,000	98,000	120,000	M24	5,825	**40,050**
SK 50	50,000	90,000	123,000	145,000	M24	3,037	**50,050**

Mandrino di alimentazione del refrigerante per Multiplex

Articolo nr. 86693

B WN MK

Mandrino con alimentazione di refrigerante con CM a DIN 228 B e foratura cilindrica. Per codolo con differenti Ø utilizzo con bussola di riduzione.



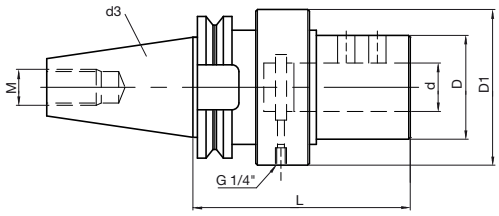
d3	d mm	D mm	D1 mm	L mm	M	 kg	Codice
MK-4	32,000	65,000	88,000	100,000	M14	1,019	**32,400**
MK-5	40,000	75,000	98,000	110,000	M16	1,899	**40,500**
MK-6	40,000	75,000	98,000	120,000	M16	2,427	**40,600**
MK-5	50,000	90,000	123,000	140,000	M20	3,293	**50,500**
MK-6	50,000	90,000	123,000	140,000	M20	3,997	**50,600**

Mandrino di alimentazione del refrigerante per Multiplex

Articolo nr. 86694

B WN MAS-BT

Mandrino per alimentazione del refrigerante con attacco MAS BT secondo DIN ISO 7388-2 e attacco per utensili con gambo cilindrico.
Per gambi di Ø più piccoli utilizzare le bussole di riduzione.



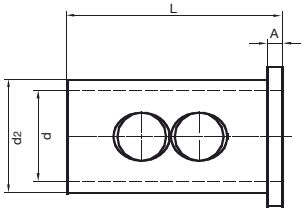
d3	d mm	D mm	D1 mm	L mm	M	 kg	Codice
BT 40	32,000	65,000	88,000	125,000	M16	0,872	**32,040**
BT 50	40,000	65,000	98,000	145,000	M24	1,766	**40,050**
BT 50	50,000	90,000	123,000	170,000	M24	3,037	**50,050**

Bussole di riduzione per attacchi cilindrici

Articolo nr. 86699

B WN Cyl

Bussola di riduzione per mandrino di alimentazione del refrigerante con attacco cilindrico



d mm	d2 mm	L mm	A mm	Codice
20,000	32,000	65,000	5,000	**20,032**
20,000	40,000	75,000	5,000	**20,040**
25,000	32,000	65,000	5,000	**25,032**
25,000	40,000	75,000	5,000	**25,040**
32,000	40,000	75,000	5,000	**32,040**

HARTNER

Precision Cutting Tools

MULTIPLEX HPC

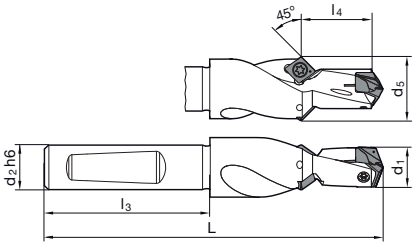
Corpo portaplacchette Multiplex-HPC

Articolo nr. 86681

Ni | HPC | 1xD | WN | R | HE

specifico per elevata resistenza all'usura • taglio trasversale della scanalatura ottimizzato • uscita dei fori di lubrificazione ottimizzata • viti Art. nr. 86843 e 86846 comprese • giravite Art. nr. 86842 compreso

per foro pilota e svasatura a 45°



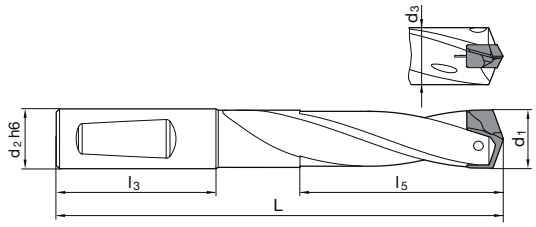
Grandezza	d1 mm	d2 h6 mm	d5 mm	L mm	l3 mm	l4 mm	Codice
110	11,00-11,99	12,000	17,000	81,000	45,000	12,000	**11,000**
110	11,00-11,99	12,700	17,000	81,000	45,000	12,000	**11,005**
120	12,00-12,99	12,000	18,000	84,000	45,000	13,000	**12,000**
120	12,00-12,99	12,700	18,000	84,000	45,000	13,000	**12,005**
130	13,00-13,99	14,000	18,000	86,000	45,000	14,000	**13,000**
130	13,00-13,99	15,875	18,000	86,000	45,000	14,000	**13,005**
140	14,00-15,99	16,000	18,000	93,000	48,000	16,000	**14,000**
140	14,00-15,99	15,875	18,000	93,000	48,000	16,000	**14,005**
160	16,00-17,99	18,000	20,000	99,000	48,000	18,000	**16,000**
160	16,00-17,99	19,050	20,000	99,000	48,000	18,000	**16,005**
180	18,00-19,99	20,000	22,000	106,000	50,000	20,000	**18,000**
180	18,00-19,99	19,050	22,000	106,000	50,000	20,000	**18,005**
200	20,00-21,99	25,000	25,000	117,000	56,000	22,000	**20,000**
200	20,00-21,99	25,400	25,400	117,000	56,000	22,000	**20,005**
220	22,00-23,99	25,000	26,000	122,000	56,000	24,000	**22,000**
220	22,00-23,99	25,400	26,000	122,000	56,000	24,000	**22,005**
240	24,00-25,99	25,000	28,000	128,000	56,000	26,000	**24,000**
240	24,00-25,99	25,400	28,000	128,000	56,000	26,000	**24,005**
260	26,00-27,99	32,000	32,000	142,000	60,000	28,000	**26,000**
260	26,00-27,99	31,750	32,000	142,000	60,000	28,000	**26,005**
280	28,00-29,99	32,000	34,000	147,000	60,000	30,000	**28,000**
280	28,00-29,99	31,750	34,000	147,000	60,000	30,000	**28,005**
300	30,00-31,99	32,000	38,000	152,000	60,000	32,000	**30,000**
300	30,00-31,99	31,750	38,000	152,000	60,000	32,000	**30,005**
320	32,00-35,99	32,000	42,000	163,000	60,000	36,000	**32,000**
320	32,00-35,99	31,750	42,000	163,000	60,000	36,000	**32,005**
360	36,00-40,00	32,000	46,000	173,000	60,000	40,000	**36,000**
360	36,00-40,00	31,750	46,000	173,000	60,000	40,000	**36,005**

Corpo portaplacchette Multiplex-HPC

Articolo nr. 86682

Ni | HPC | 1,5xD | WN | R | HE

specifico per elevata resistenza all'usura • taglio trasversale della scanalatura ottimizzato • uscita dei fori di lubrificazione ottimizzata • viti Art. nr. 86843 comprese • giravite Art. nr. 86842 compreso



Grandezza	d1 mm	d2 h6 mm	d3 mm	L mm	l3 mm	l5 mm	Codice
110	11,00-11,49	12,000	10,700	84,000	45,000	19,300	**11,000**
110	11,00-11,49	12,700	10,700	84,000	45,000	19,300	**11,005**
115	11,50-11,99	12,000	11,200	85,000	45,000	20,100	**11,500**
115	11,50-11,99	12,700	11,200	85,000	45,000	20,100	**11,505**
120	12,00-12,49	12,000	11,700	87,000	45,000	21,000	**12,000**
120	12,00-12,49	12,700	11,700	87,000	45,000	21,000	**12,005**
125	12,50-12,99	14,000	12,200	89,000	45,000	21,900	**12,500**
125	12,50-12,99	15,875	12,200	89,000	45,000	21,900	**12,505**
130	13,00-13,49	14,000	12,700	90,000	45,000	22,600	**13,000**
130	13,00-13,49	15,875	12,700	90,000	45,000	22,600	**13,005**
135	13,50-13,99	14,000	13,200	92,000	45,000	23,600	**13,500**
135	13,50-13,99	15,875	13,200	92,000	45,000	23,600	**13,505**
140	14,00-14,49	14,000	13,700	93,000	45,000	24,500	**14,000**
140	14,00-14,49	15,875	13,700	93,000	45,000	24,500	**14,005**
145	14,50-14,99	16,000	14,200	98,000	48,000	25,300	**14,500**
145	14,50-14,99	15,875	14,200	98,000	48,000	25,300	**14,505**
150	15,00-15,49	16,000	14,700	100,000	48,000	26,100	**15,000**
150	15,00-15,49	15,875	14,700	100,000	48,000	26,100	**15,005**
155	15,50-15,99	16,000	15,200	101,000	48,000	27,000	**15,500**
155	15,50-15,99	15,875	15,200	101,000	48,000	27,000	**15,505**
160	16,00-16,49	16,000	15,700	102,000	48,000	27,800	**16,000**
160	16,00-16,49	15,875	15,700	102,000	48,000	27,800	**16,005**
165	16,50-16,99	18,000	16,200	105,000	48,000	28,700	**16,500**
165	16,50-16,99	19,050	16,200	105,000	48,000	28,700	**16,505**
170	17,00-17,49	18,000	16,700	106,000	48,000	29,600	**17,000**
170	17,00-17,49	19,050	16,700	106,000	48,000	29,600	**17,005**
175	17,50-17,99	18,000	17,200	107,000	48,000	30,400	**17,500**
175	17,50-17,99	19,050	17,200	107,000	48,000	30,400	**17,505**
180	18,00-18,49	18,000	17,700	109,000	48,000	31,200	**18,000**
180	18,00-18,49	19,050	17,700	109,000	48,000	31,200	**18,005**
185	18,50-18,99	20,000	18,200	113,000	50,000	32,100	**18,500**
185	18,50-18,99	19,050	18,200	113,000	50,000	32,100	**18,505**
190	19,00-19,49	20,000	18,700	114,000	50,000	32,900	**19,000**
190	19,00-19,49	19,050	18,700	114,000	50,000	32,900	**19,005**
195	19,50-19,99	20,000	19,200	116,000	50,000	33,700	**19,500**
195	19,50-19,99	19,050	19,200	116,000	50,000	33,700	**19,505**
200	20,00-20,49	20,000	19,700	117,000	50,000	34,600	**20,000**
200	20,00-20,49	19,050	19,700	117,000	50,000	34,600	**20,005**
205	20,50-20,99	25,000	20,200	128,000	56,000	35,500	**20,500**
205	20,50-20,99	25,400	20,200	128,000	56,000	35,500	**20,505**
210	21,00-21,49	25,000	20,700	129,000	56,000	36,400	**21,000**
210	21,00-21,49	25,400	20,700	129,000	56,000	36,400	**21,005**

Corpo portaplacchette Multiplex-HPC

Grandezza	d1 mm	d2 h6 mm	d3 mm	L mm	l3 mm	l5 mm	Codice
215	21,50-21,99	25,000	21,200	130,000	56,000	37,200	**21,500**
215	21,50-21,99	25,400	21,200	130,000	56,000	37,200	**21,505**
220	22,00-22,49	25,000	21,700	131,000	56,000	38,000	**22,000**
220	22,00-22,49	25,400	21,700	131,000	56,000	38,000	**22,005**
225	22,50-22,99	25,000	22,200	134,000	56,000	38,900	**22,500**
225	22,50-22,99	25,400	22,200	134,000	56,000	38,900	**22,505**
230	23,00-23,49	25,000	22,700	135,000	56,000	39,800	**23,000**
230	23,00-23,49	25,400	22,700	135,000	56,000	39,800	**23,005**
235	23,50-23,99	25,000	23,200	137,000	56,000	40,600	**23,500**
235	23,50-23,99	25,400	23,200	137,000	56,000	40,600	**23,505**
240	24,00-24,49	25,000	23,700	138,000	56,000	41,500	**24,000**
240	24,00-24,49	25,400	23,700	138,000	56,000	41,500	**24,005**
245	24,50-24,99	25,000	24,200	140,000	56,000	42,300	**24,500**
245	24,50-24,99	25,400	24,200	140,000	56,000	42,300	**24,505**
250	25,00-25,49	25,000	24,700	142,000	56,000	43,200	**25,000**
250	25,00-25,49	25,400	24,700	142,000	56,000	43,200	**25,005**
255	25,50-25,99	32,000	25,200	148,000	60,000	44,000	**25,500**
255	25,50-25,99	31,750	25,200	148,000	60,000	44,000	**25,505**
260	26,00-26,49	32,000	25,700	151,000	60,000	44,300	**26,000**
260	26,00-26,49	31,750	25,700	151,000	60,000	44,300	**26,005**
265	26,50-26,99	32,000	26,200	153,000	60,000	45,100	**26,500**
265	26,50-26,99	31,750	26,200	153,000	60,000	45,100	**26,505**
270	27,00-27,49	32,000	26,700	155,000	60,000	46,000	**27,000**
270	27,00-27,49	31,750	26,700	155,000	60,000	46,000	**27,005**
275	27,50-27,99	32,000	27,200	156,000	60,000	46,800	**27,500**
275	27,50-27,99	31,750	27,200	156,000	60,000	46,800	**27,505**
280	28,00-28,49	32,000	27,700	157,000	60,000	47,700	**28,000**
280	28,00-28,49	31,750	27,700	157,000	60,000	47,700	**28,005**
285	28,50-28,99	32,000	28,200	159,000	60,000	48,500	**28,500**
285	28,50-28,99	31,750	28,200	159,000	60,000	48,500	**28,505**
290	29,00-29,49	32,000	28,700	161,000	60,000	49,400	**29,000**
290	29,00-29,49	31,750	28,700	161,000	60,000	49,400	**29,005**
295	29,50-29,99	32,000	29,200	162,000	60,000	50,200	**29,500**
295	29,50-29,99	31,750	29,200	162,000	60,000	50,200	**29,505**
300	30,00-30,49	32,000	29,700	164,000	60,000	50,900	**30,000**
300	30,00-30,49	31,750	29,700	164,000	60,000	50,900	**30,005**
305	30,50-30,99	32,000	30,200	166,000	60,000	51,700	**30,500**
305	30,50-30,99	31,750	30,200	166,000	60,000	51,700	**30,505**
310	31,00-31,49	32,000	30,700	167,000	60,000	52,600	**31,000**
310	31,00-31,49	31,750	30,700	167,000	60,000	52,600	**31,005**
315	31,50-31,99	32,000	31,200	168,000	60,000	53,400	**31,500**
315	31,50-31,99	31,750	31,200	168,000	60,000	53,400	**31,505**
320	32,00-32,99	32,000	31,700	172,000	60,000	55,100	**32,000**
320	32,00-32,99	31,750	31,700	172,000	60,000	55,100	**32,005**
330	33,00-33,99	32,000	32,700	175,000	60,000	56,800	**33,000**
330	33,00-33,99	31,750	32,700	175,000	60,000	56,800	**33,005**
340	34,00-34,99	32,000	33,700	178,000	60,000	58,500	**34,000**
340	34,00-34,99	31,750	33,700	178,000	60,000	58,500	**34,005**
350	35,00-35,99	32,000	34,700	181,000	60,000	60,200	**35,000**
350	35,00-35,99	31,750	34,700	181,000	60,000	60,200	**35,005**
360	36,00-36,99	32,000	35,700	184,000	60,000	61,800	**36,000**
360	36,00-36,99	31,750	35,700	184,000	60,000	61,800	**36,005**
370	37,00-37,99	32,000	36,700	188,000	60,000	63,500	**37,000**
370	37,00-37,99	31,750	36,700	188,000	60,000	63,500	**37,005**
380	38,00-38,99	32,000	37,700	191,000	60,000	65,200	**38,000**
380	38,00-38,99	31,750	37,700	191,000	60,000	65,200	**38,005**
390	39,00-40,00	32,000	38,700	194,000	60,000	66,900	**39,000**
390	39,00-40,00	31,750	38,700	194,000	60,000	66,900	**39,005**

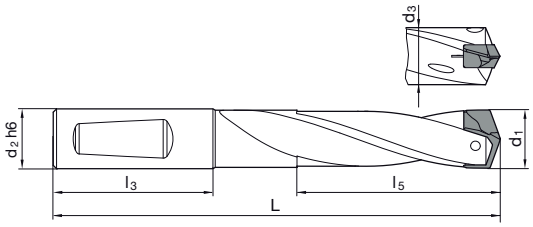
HARTNER

Corpo portaplacchette Multiplex-HPC

Articolo nr. 86683

Ni | HPC | 3xD | WN | R | HE

specifico per elevata resistenza all'usura • taglio trasversale della scanalatura ottimizzato • stabilità elevata • viti Art. nr. 86843 comprese • giravite Art. nr. 86842 compreso



Grandezza	d1 mm	d2 h6 mm	d3 mm	L mm	l3 mm	l5 mm	Codice
110	11,00-11,49	12,000	10,700	101,000	45,000	36,600	**11,000**
110	11,00-11,49	12,700	10,700	101,000	45,000	36,600	**11,005**
115	11,50-11,99	12,000	11,200	103,000	45,000	38,100	**11,500**
115	11,50-11,99	12,700	11,200	103,000	45,000	38,100	**11,505**
120	12,00-12,49	12,000	11,700	106,000	45,000	39,700	**12,000**
120	12,00-12,49	12,700	11,700	106,000	45,000	39,700	**12,005**
125	12,50-12,99	14,000	12,200	108,000	45,000	41,300	**12,500**
125	12,50-12,99	15,875	12,200	108,000	45,000	41,300	**12,505**
130	13,00-13,49	14,000	12,700	110,000	45,000	42,900	**13,000**
130	13,00-13,49	15,875	12,700	110,000	45,000	42,900	**13,005**
135	13,50-13,99	14,000	13,200	113,000	45,000	44,600	**13,500**
135	13,50-13,99	15,875	13,200	113,000	45,000	44,600	**13,505**
140	14,00-14,49	14,000	13,700	115,000	45,000	46,200	**14,000**
140	14,00-14,49	15,875	13,700	115,000	45,000	46,200	**14,005**
145	14,50-14,99	16,000	14,200	120,000	48,000	47,800	**14,500**
145	14,50-14,99	15,875	14,200	120,000	48,000	47,800	**14,505**
150	15,00-15,49	16,000	14,700	123,000	48,000	49,300	**15,000**
150	15,00-15,49	15,875	14,700	123,000	48,000	49,300	**15,005**
155	15,50-15,99	16,000	15,200	125,000	48,000	50,900	**15,500**
155	15,50-15,99	15,875	15,200	125,000	48,000	50,900	**15,505**
160	16,00-16,49	16,000	15,700	127,000	48,000	52,900	**16,000**
160	16,00-16,49	15,875	15,700	127,000	48,000	52,900	**16,005**
165	16,50-16,99	18,000	16,200	130,000	48,000	54,100	**16,500**
165	16,50-16,99	19,050	16,200	130,000	48,000	54,100	**16,505**
170	17,00-17,49	18,000	16,700	132,000	48,000	55,800	**17,000**
170	17,00-17,49	19,050	16,700	132,000	48,000	55,800	**17,005**
175	17,50-17,99	18,000	17,200	134,000	48,000	57,400	**17,500**
175	17,50-17,99	19,050	17,200	134,000	48,000	57,400	**17,505**
180	18,00-18,49	18,000	17,700	137,000	48,000	58,900	**18,000**
180	18,00-18,49	19,050	17,700	137,000	48,000	58,900	**18,005**
185	18,50-18,99	20,000	18,200	141,000	50,000	60,500	**18,500**
185	18,50-18,99	19,050	18,200	141,000	50,000	60,500	**18,505**
190	19,00-19,49	20,000	18,700	143,000	50,000	62,100	**19,000**
190	19,00-19,49	19,050	18,700	143,000	50,000	62,100	**19,005**
195	19,50-19,99	20,000	19,200	146,000	50,000	63,700	**19,500**
195	19,50-19,99	19,050	19,200	146,000	50,000	63,700	**19,505**
200	20,00-20,49	20,000	19,700	148,000	50,000	65,300	**20,000**
200	20,00-20,49	19,050	19,700	148,000	50,000	65,300	**20,005**
205	20,50-20,99	25,000	20,200	159,000	56,000	67,000	**20,500**
205	20,50-20,99	25,400	20,200	159,000	56,000	67,000	**20,505**
210	21,00-21,49	25,000	20,700	161,000	56,000	68,600	**21,000**
210	21,00-21,49	25,400	20,700	161,000	56,000	68,600	**21,005**

Corpo portaplacchette Multiplex-HPC

Grandezza	d1 mm	d2 h6 mm	d3 mm	L mm	l3 mm	l5 mm	Codice
215	21,50-21,99	25,000	21,200	163,000	56,000	70,100	**21,500**
215	21,50-21,99	25,400	21,200	163,000	56,000	70,100	**21,505**
220	22,00-22,49	25,000	21,700	165,000	56,000	71,700	**22,000**
220	22,00-22,49	25,400	21,700	165,000	56,000	71,700	**22,005**
225	22,50-22,99	25,000	22,200	168,000	56,000	73,300	**22,500**
225	22,50-22,99	25,400	22,200	168,000	56,000	73,300	**22,505**
230	23,00-23,49	25,000	22,700	170,000	56,000	74,900	**23,000**
230	23,00-23,49	25,400	22,700	170,000	56,000	74,900	**23,005**
235	23,50-23,99	25,000	23,200	173,000	56,000	76,500	**23,500**
235	23,50-23,99	25,400	23,200	173,000	56,000	76,500	**23,505**
240	24,00-24,49	25,000	23,700	175,000	56,000	78,100	**24,000**
240	24,00-24,49	25,400	23,700	175,000	56,000	78,100	**24,005**
245	24,50-24,99	25,000	24,200	177,000	56,000	79,700	**24,500**
245	24,50-24,99	25,400	24,200	177,000	56,000	79,700	**24,505**
250	25,00-25,49	25,000	24,700	180,000	56,000	81,300	**25,000**
250	25,00-25,49	25,400	24,700	180,000	56,000	81,300	**25,005**
255	25,50-25,99	32,000	25,200	187,000	60,000	82,900	**25,500**
255	25,50-25,99	31,750	25,200	187,000	60,000	82,900	**25,505**
260	26,00-26,49	32,000	25,700	191,000	60,000	84,000	**26,000**
260	26,00-26,49	31,750	25,700	191,000	60,000	84,000	**26,005**
265	26,50-26,99	32,000	26,200	193,000	60,000	86,100	**26,500**
265	26,50-26,99	31,750	26,200	193,000	60,000	86,100	**26,505**
270	27,00-27,49	32,000	26,700	196,000	60,000	87,200	**27,000**
270	27,00-27,49	31,750	26,700	196,000	60,000	87,200	**27,005**
275	27,50-27,99	32,000	27,200	198,000	60,000	88,900	**27,500**
275	27,50-27,99	31,750	27,200	198,000	60,000	88,900	**27,505**
280	28,00-28,49	32,000	27,700	200,000	60,000	90,400	**28,000**
280	28,00-28,49	31,750	27,700	200,000	60,000	90,400	**28,005**
285	28,50-28,99	32,000	28,200	202,000	60,000	92,500	**28,500**
285	28,50-28,99	31,750	28,200	202,000	60,000	92,500	**28,505**
290	29,00-29,49	32,000	28,700	205,000	60,000	94,600	**29,000**
290	29,00-29,49	31,750	28,700	205,000	60,000	94,600	**29,005**
295	29,50-29,99	32,000	29,200	207,000	60,000	95,100	**29,500**
295	29,50-29,99	31,750	29,200	207,000	60,000	95,100	**29,505**
300	30,00-30,49	32,000	29,700	210,000	60,000	96,700	**30,000**
300	30,00-30,49	31,750	29,700	210,000	60,000	96,700	**30,005**
305	30,50-30,99	32,000	30,200	212,000	60,000	98,300	**30,500**
305	30,50-30,99	31,750	30,200	212,000	60,000	98,300	**30,505**
310	31,00-31,49	32,000	30,700	214,000	60,000	99,800	**31,000**
310	31,00-31,49	31,750	30,700	214,000	60,000	99,800	**31,005**
315	31,50-31,99	32,000	31,200	216,000	60,000	101,400	**31,500**
315	31,50-31,99	31,750	31,200	216,000	60,000	101,400	**31,505**
320	32,00-32,99	32,000	31,700	221,000	60,000	104,600	**32,000**
320	32,00-32,99	31,750	31,700	221,000	60,000	104,600	**32,005**
330	33,00-33,99	32,000	32,700	226,000	60,000	107,800	**33,000**
330	33,00-33,99	31,750	32,700	226,000	60,000	107,800	**33,005**
340	34,00-34,99	32,000	33,700	230,000	60,000	111,000	**34,000**
340	34,00-34,99	31,750	33,700	230,000	60,000	111,000	**34,005**
350	35,00-35,99	32,000	34,700	235,000	60,000	114,200	**35,000**
350	35,00-35,99	31,750	34,700	235,000	60,000	114,200	**35,005**
360	36,00-36,99	32,000	35,700	240,000	60,000	117,300	**36,000**
360	36,00-36,99	31,750	35,700	240,000	60,000	117,300	**36,005**
370	37,00-37,99	32,000	36,700	245,000	60,000	120,500	**37,000**
370	37,00-37,99	31,750	36,700	245,000	60,000	120,500	**37,005**
380	38,00-38,99	32,000	37,700	249,000	60,000	123,700	**38,000**
380	38,00-38,99	31,750	37,700	249,000	60,000	123,700	**38,005**
390	39,00-40,00	32,000	38,700	254,000	60,000	126,900	**39,000**
390	39,00-40,00	31,750	38,700	254,000	60,000	126,900	**39,005**

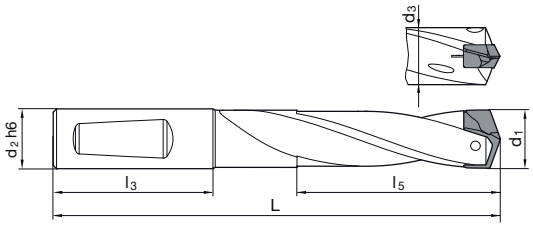
HARTNER

Corpo portaplacchette Multiplex-HPC

Articolo nr. 86684

Ni | HPC | 5xD | WN | R | HE

specifico per elevata resistenza all'usura • taglio trasversale della scanalatura ottimizzato • stabilità elevata • viti Art. nr. 86843 comprese • giravite Art. nr. 86842 compreso



Grandezza	d1 mm	d2 h6 mm	d3 mm	L mm	l3 mm	l5 mm	Codice
110	11,00-11,49	12,000	10,700	124,000	45,000	59,600	**11,000**
110	11,00-11,49	12,700	10,700	124,000	45,000	59,600	**11,005**
115	11,50-11,99	12,000	11,200	127,000	45,000	62,100	**11,500**
115	11,50-11,99	12,700	11,200	127,000	45,000	62,100	**11,505**
120	12,00-12,49	12,000	11,700	131,000	45,000	64,700	**12,000**
120	12,00-12,49	12,700	11,700	131,000	45,000	64,700	**12,005**
125	12,50-12,99	14,000	12,200	134,000	45,000	67,300	**12,500**
125	12,50-12,99	15,875	12,200	134,000	45,000	67,300	**12,505**
130	13,00-13,49	14,000	12,700	137,000	45,000	69,900	**13,000**
130	13,00-13,49	15,875	12,700	137,000	45,000	69,900	**13,005**
135	13,50-13,99	14,000	13,200	141,000	45,000	72,600	**13,500**
135	13,50-13,99	15,875	13,200	141,000	45,000	72,600	**13,505**
140	14,00-14,49	14,000	13,700	144,000	45,000	75,200	**14,000**
140	14,00-14,49	15,875	13,700	144,000	45,000	75,200	**14,005**
145	14,50-14,99	16,000	14,200	150,000	48,000	77,800	**14,500**
145	14,50-14,99	15,875	14,200	150,000	48,000	77,800	**14,505**
150	15,00-15,49	16,000	14,700	154,000	48,000	80,300	**15,000**
150	15,00-15,49	15,875	14,700	154,000	48,000	80,300	**15,005**
155	15,50-15,99	16,000	15,200	157,000	48,000	82,900	**15,500**
155	15,50-15,99	15,875	15,200	157,000	48,000	82,900	**15,505**
160	16,00-16,49	16,000	15,700	160,000	48,000	85,900	**16,000**
160	16,00-16,49	15,875	15,700	160,000	48,000	85,900	**16,005**
165	16,50-16,99	18,000	16,200	164,000	48,000	88,100	**16,500**
165	16,50-16,99	19,050	16,200	164,000	48,000	88,100	**16,505**
170	17,00-17,49	18,000	16,700	167,000	48,000	90,800	**17,000**
170	17,00-17,49	19,050	16,700	167,000	48,000	90,800	**17,005**
175	17,50-17,99	18,000	17,200	170,000	48,000	93,400	**17,500**
175	17,50-17,99	19,050	17,200	170,000	48,000	93,400	**17,505**
180	18,00-18,49	18,000	17,700	174,000	48,000	95,900	**18,000**
180	18,00-18,49	19,050	17,700	174,000	48,000	95,900	**18,005**
185	18,50-18,99	20,000	18,200	179,000	50,000	98,500	**18,500**
185	18,50-18,99	19,050	18,200	179,000	50,000	98,500	**18,505**
190	19,00-19,49	20,000	18,700	182,000	50,000	101,100	**19,000**
190	19,00-19,49	19,050	18,700	182,000	50,000	101,100	**19,005**
195	19,50-19,99	20,000	19,200	186,000	50,000	103,700	**19,500**
195	19,50-19,99	19,050	19,200	186,000	50,000	103,700	**19,505**
200	20,00-20,49	20,000	19,700	189,000	50,000	106,300	**20,000**
200	20,00-20,49	19,050	19,700	189,000	50,000	106,300	**20,005**
205	20,50-20,99	25,000	20,200	201,000	56,000	109,000	**20,500**
205	20,50-20,99	25,400	20,200	201,000	56,000	109,000	**20,505**
210	21,00-21,49	25,000	20,700	204,000	56,000	111,600	**21,000**
210	21,00-21,49	25,400	20,700	204,000	56,000	111,600	**21,005**

Corpo portaplacchette Multiplex-HPC

Grandezza	d1 mm	d2 h6 mm	d3 mm	L mm	l3 mm	l5 mm	Codice
215	21,50-21,99	25,000	21,200	207,000	56,000	114,100	**21,500**
215	21,50-21,99	25,400	21,200	207,000	56,000	114,100	**21,505**
220	22,00-22,49	25,000	21,700	210,000	56,000	116,700	**22,000**
220	22,00-22,49	25,400	21,700	210,000	56,000	116,700	**22,005**
225	22,50-22,99	25,000	22,200	214,000	56,000	119,300	**22,500**
225	22,50-22,99	25,400	22,200	214,000	56,000	119,300	**22,505**
230	23,00-23,49	25,000	22,700	217,000	56,000	121,900	**23,000**
230	23,00-23,49	25,400	22,700	217,000	56,000	121,900	**23,005**
235	23,50-23,99	25,000	23,200	221,000	56,000	124,500	**23,500**
235	23,50-23,99	25,400	23,200	221,000	56,000	124,500	**23,505**
240	24,00-24,49	25,000	23,700	224,000	56,000	127,100	**24,000**
240	24,00-24,49	25,400	23,700	224,000	56,000	127,100	**24,005**
245	24,50-24,99	25,000	24,200	227,000	56,000	129,700	**24,500**
245	24,50-24,99	25,400	24,200	227,000	56,000	129,700	**24,505**
250	25,00-25,49	25,000	24,700	231,000	56,000	132,300	**25,000**
250	25,00-25,49	25,400	24,700	231,000	56,000	132,300	**25,005**
255	25,50-25,99	32,000	25,200	239,000	60,000	134,900	**25,500**
255	25,50-25,99	31,750	25,200	239,000	60,000	134,900	**25,505**
260	26,00-26,49	32,000	25,700	244,000	60,000	137,000	**26,000**
265	26,50-26,99	32,000	26,200	247,000	60,000	140,000	**26,500**
270	27,00-27,49	32,000	26,700	251,000	60,000	142,200	**27,000**
275	27,50-27,99	32,000	27,200	254,000	60,000	144,800	**27,500**
280	28,00-28,49	32,000	27,700	257,000	60,000	147,400	**28,000**
285	28,50-28,99	32,000	28,200	260,000	60,000	150,400	**28,500**
290	29,00-29,49	32,000	28,700	264,000	60,000	153,500	**29,000**
295	29,50-29,99	32,000	29,200	267,000	60,000	155,100	**29,500**
300	30,00-30,49	32,000	29,700	271,000	60,000	157,600	**30,000**
305	30,50-30,99	32,000	30,200	274,000	60,000	160,200	**30,500**
310	31,00-31,49	32,000	30,700	277,000	60,000	162,800	**31,000**
315	31,50-31,99	32,000	31,200	280,000	60,000	165,400	**31,500**
320	32,00-32,99	32,000	31,700	287,000	60,000	170,600	**32,000**
330	33,00-33,99	32,000	32,700	294,000	60,000	175,800	**33,000**
340	34,00-34,99	32,000	33,700	300,000	60,000	181,000	**34,000**
350	35,00-35,99	32,000	34,700	307,000	60,000	186,200	**35,000**
360	36,00-36,99	32,000	35,700	314,000	60,000	191,300	**36,000**
370	37,00-37,99	32,000	36,700	321,000	60,000	196,500	**37,000**
380	38,00-38,99	32,000	37,700	327,000	60,000	201,700	**38,000**
390	39,00-40,00	32,000	38,700	334,000	60,000	206,900	**39,000**

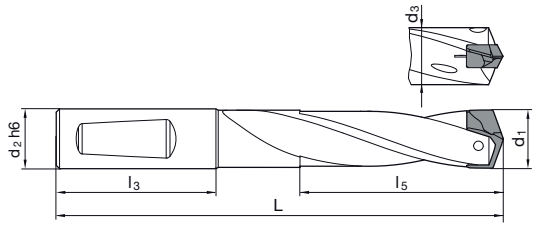
HARTNER

Corpo portaplacchette Multiplex-HPC

Articolo nr. 86685

Ni | HPC | 7xD | WN | R | HE

specifico per elevata resistenza all'usura • taglio trasversale della scanalatura ottimizzato • stabilità elevata • viti Art. nr. 86843 comprese • giravite Art. nr. 86842 compreso



Grandezza	d1 mm	d2 h6 mm	d3 mm	L mm	l3 mm	l5 mm	Codice
110	11,00-11,49	12,000	10,700	147,000	45,000	82,600	**11,000**
110	11,00-11,49	12,700	10,700	147,000	45,000	82,600	**11,005**
115	11,50-11,99	12,000	11,200	151,000	45,000	86,100	**11,500**
115	11,50-11,99	12,700	11,200	151,000	45,000	86,100	**11,505**
120	12,00-12,49	12,000	11,700	156,000	45,000	89,700	**12,000**
120	12,00-12,49	12,700	11,700	156,000	45,000	89,700	**12,005**
125	12,50-12,99	14,000	12,200	160,000	45,000	93,300	**12,500**
125	12,50-12,99	15,875	12,200	160,000	45,000	93,300	**12,505**
130	13,00-13,49	14,000	12,700	164,000	45,000	96,900	**13,000**
130	13,00-13,49	15,875	12,700	164,000	45,000	96,900	**13,005**
135	13,50-13,99	14,000	13,200	169,000	45,000	100,600	**13,500**
135	13,50-13,99	15,875	13,200	169,000	45,000	100,600	**13,505**
140	14,00-14,49	14,000	13,700	173,000	45,000	104,200	**14,000**
140	14,00-14,49	15,875	13,700	173,000	45,000	104,200	**14,005**
145	14,50-14,99	16,000	14,200	180,000	48,000	107,800	**14,500**
145	14,50-14,99	15,875	14,200	180,000	48,000	107,800	**14,505**
150	15,00-15,49	16,000	14,700	185,000	48,000	111,300	**15,000**
150	15,00-15,49	15,875	14,700	185,000	48,000	111,300	**15,005**
155	15,50-15,99	16,000	15,200	189,000	48,000	114,900	**15,500**
155	15,50-15,99	15,875	15,200	189,000	48,000	114,900	**15,505**
160	16,00-16,49	16,000	15,700	193,000	48,000	118,900	**16,000**
160	16,00-16,49	15,875	15,700	193,000	48,000	118,900	**16,005**
165	16,50-16,99	18,000	16,200	198,000	48,000	122,100	**16,500**
165	16,50-16,99	19,050	16,200	198,000	48,000	122,100	**16,505**
170	17,00-17,49	18,000	16,700	202,000	48,000	125,800	**17,000**
170	17,00-17,49	19,050	16,700	202,000	48,000	125,800	**17,005**
175	17,50-17,99	18,000	17,200	206,000	48,000	129,400	**17,500**
175	17,50-17,99	19,050	17,200	206,000	48,000	129,400	**17,505**
180	18,00-18,49	18,000	17,700	211,000	48,000	132,900	**18,000**
180	18,00-18,49	19,050	17,700	211,000	48,000	132,900	**18,005**
185	18,50-18,99	20,000	18,200	217,000	50,000	136,500	**18,500**
185	18,50-18,99	19,050	18,200	217,000	50,000	136,500	**18,505**
190	19,00-19,49	20,000	18,700	221,000	50,000	140,100	**19,000**
190	19,00-19,49	19,050	18,700	221,000	50,000	140,100	**19,005**
195	19,50-19,99	20,000	19,200	226,000	50,000	143,700	**19,500**
195	19,50-19,99	19,050	19,200	226,000	50,000	143,700	**19,505**
200	20,00-20,49	20,000	19,700	230,000	50,000	147,300	**20,000**
200	20,00-20,49	19,050	19,700	230,000	50,000	147,300	**20,005**
205	20,50-20,99	25,000	20,200	243,000	56,000	151,000	**20,500**
205	20,50-20,99	25,400	20,200	243,000	56,000	151,000	**20,505**
210	21,00-21,49	25,000	20,700	247,000	56,000	154,600	**21,000**
210	21,00-21,49	25,400	20,700	247,000	56,000	154,600	**21,005**

Corpo portaplacchette Multiplex-HPC

Grandezza	d1 mm	d2 h6 mm	d3 mm	L mm	l3 mm	l5 mm	Codice
215	21,50-21,99	25,000	21,200	251,000	56,000	158,100	**21,500**
215	21,50-21,99	25,400	21,200	251,000	56,000	158,100	**21,505**
220	22,00-22,49	25,000	21,700	255,000	56,000	161,700	**22,000**
220	22,00-22,49	25,400	21,700	255,000	56,000	161,700	**22,005**
225	22,50-22,99	25,000	22,200	260,000	56,000	165,300	**22,500**
225	22,50-22,99	25,400	22,200	260,000	56,000	165,300	**22,505**
230	23,00-23,49	25,000	22,700	264,000	56,000	168,900	**23,000**
230	23,00-23,49	25,400	22,700	264,000	56,000	168,900	**23,005**
235	23,50-23,99	25,000	23,200	269,000	56,000	172,500	**23,500**
235	23,50-23,99	25,400	23,200	269,000	56,000	172,500	**23,505**
240	24,00-24,49	25,000	23,700	273,000	56,000	176,100	**24,000**
240	24,00-24,49	25,400	23,700	273,000	56,000	176,100	**24,005**
245	24,50-24,99	25,000	24,200	277,000	56,000	179,700	**24,500**
245	24,50-24,99	25,400	24,200	277,000	56,000	179,700	**24,505**
250	25,00-25,49	25,000	24,700	282,000	56,000	183,300	**25,000**
250	25,00-25,49	25,400	24,700	282,000	56,000	183,300	**25,005**
255	25,50-25,99	32,000	25,200	291,000	60,000	186,900	**25,500**
255	25,50-25,99	31,750	25,200	291,000	60,000	186,900	**25,505**
260	26,00-26,49	32,000	25,700	297,000	60,000	190,000	**26,000**
260	26,00-26,49	31,750	25,700	297,000	60,000	190,000	**26,005**
265	26,50-26,99	32,000	26,200	301,000	60,000	194,000	**26,500**
265	26,50-26,99	31,750	26,200	301,000	60,000	194,000	**26,505**
270	27,00-27,49	32,000	26,700	306,000	60,000	197,200	**27,000**
270	27,00-27,49	31,750	26,700	306,000	60,000	197,200	**27,005**
275	27,50-27,99	32,000	27,200	310,000	60,000	200,800	**27,500**
275	27,50-27,99	31,750	27,200	310,000	60,000	200,800	**27,505**
280	28,00-28,49	32,000	27,700	314,000	60,000	204,400	**28,000**
280	28,00-28,49	31,750	27,700	314,000	60,000	204,400	**28,005**
285	28,50-28,99	32,000	28,200	318,000	60,000	208,400	**28,500**
285	28,50-28,99	31,750	28,200	318,000	60,000	208,400	**28,505**
290	29,00-29,49	32,000	28,700	323,000	60,000	212,500	**29,000**
290	29,00-29,49	31,750	28,700	323,000	60,000	212,500	**29,005**
295	29,50-29,99	32,000	29,200	327,000	60,000	215,100	**29,500**
295	29,50-29,99	31,750	29,200	327,000	60,000	215,100	**29,505**
300	30,00-30,49	32,000	29,700	332,000	60,000	218,600	**30,000**
300	30,00-30,49	31,750	29,700	332,000	60,000	218,600	**30,005**
305	30,50-30,99	32,000	30,200	336,000	60,000	222,200	**30,500**
305	30,50-30,99	31,750	30,200	336,000	60,000	222,200	**30,505**
310	31,00-31,49	32,000	30,700	340,000	60,000	225,800	**31,000**
310	31,00-31,49	31,750	30,700	340,000	60,000	225,800	**31,005**
315	31,50-31,99	32,000	31,200	344,000	60,000	229,400	**31,500**
315	31,50-31,99	31,750	31,200	344,000	60,000	229,400	**31,505**

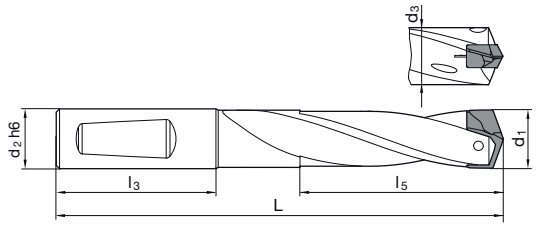
HARTNER

Corpo portaplacchette Multiplex-HPC

Articolo nr. 86686

Ni | HPC | 10xD | WN | R | HE

specifico per elevata resistenza all'usura • taglio trasversale della scanalatura ottimizzato • stabilità elevata • viti Art. nr. 86843 comprese • giravite Art. nr. 86842 compreso



Grandezza	d1 mm	d2 h6 mm	d3 mm	L mm	l3 mm	l5 mm	Codice
110	11,00-11,49	12,000	10,700	182,000	45,000	117,100	**11,000**
110	11,00-11,49	12,700	10,700	182,000	45,000	117,100	**11,005**
115	11,50-11,99	12,000	11,200	187,000	45,000	122,100	**11,500**
115	11,50-11,99	12,700	11,200	187,000	45,000	122,100	**11,505**
120	12,00-12,49	12,000	11,700	194,000	45,000	127,200	**12,000**
120	12,00-12,49	12,700	11,700	194,000	45,000	127,200	**12,005**
125	12,50-12,99	14,000	12,200	199,000	45,000	132,300	**12,500**
125	12,50-12,99	15,875	12,200	199,000	45,000	132,300	**12,505**
130	13,00-13,49	14,000	12,700	205,000	45,000	137,500	**13,000**
130	13,00-13,49	15,875	12,700	205,000	45,000	137,500	**13,005**
135	13,50-13,99	14,000	13,200	211,000	45,000	142,500	**13,500**
135	13,50-13,99	15,875	13,200	211,000	45,000	142,500	**13,505**
140	14,00-14,49	14,000	13,700	217,000	45,000	147,700	**14,000**
140	14,00-14,49	15,875	13,700	217,000	45,000	147,700	**14,005**
145	14,50-14,99	16,000	14,200	225,000	48,000	152,800	**14,500**
145	14,50-14,99	15,875	14,200	225,000	48,000	152,800	**14,505**
150	15,00-15,49	16,000	14,700	232,000	48,000	157,800	**15,000**
150	15,00-15,49	15,875	14,700	232,000	48,000	157,800	**15,005**
155	15,50-15,99	16,000	15,200	237,000	48,000	162,900	**15,500**
155	15,50-15,99	15,875	15,200	237,000	48,000	162,900	**15,505**
160	16,00-16,49	16,000	15,700	243,000	48,000	168,000	**16,000**
160	16,00-16,49	15,875	15,700	243,000	48,000	168,000	**16,005**
165	16,50-16,99	18,000	16,200	249,000	48,000	170,000	**16,500**
165	16,50-16,99	19,050	16,200	249,000	48,000	170,000	**16,505**
170	17,00-17,49	18,000	16,700	255,000	48,000	178,300	**17,000**
170	17,00-17,49	19,050	16,700	255,000	48,000	178,300	**17,005**
175	17,50-17,99	18,000	17,200	260,000	48,000	183,500	**17,500**
175	17,50-17,99	19,050	17,200	260,000	48,000	183,500	**17,505**
180	18,00-18,49	18,000	17,700	267,000	48,000	188,400	**18,000**
180	18,00-18,49	19,050	17,700	267,000	48,000	188,400	**18,005**
185	18,50-18,99	20,000	18,200	274,000	50,000	193,500	**18,500**
185	18,50-18,99	19,050	18,200	274,000	50,000	193,500	**18,505**
190	19,00-19,49	20,000	18,700	280,000	50,000	198,700	**19,000**
190	19,00-19,49	19,050	18,700	280,000	50,000	198,700	**19,005**
195	19,50-19,99	20,000	19,200	286,000	50,000	203,700	**19,500**
195	19,50-19,99	19,050	19,200	286,000	50,000	203,700	**19,505**
200	20,00-20,49	20,000	19,700	292,000	50,000	208,900	**20,000**
200	20,00-20,49	19,050	19,700	292,000	50,000	208,900	**20,005**
205	20,50-20,99	25,000	20,200	306,000	56,000	214,000	**20,500**
205	20,50-20,99	25,400	20,200	306,000	56,000	214,000	**20,505**
210	21,00-21,49	25,000	20,700	312,000	56,000	219,100	**21,000**
210	21,00-21,49	25,400	20,700	312,000	56,000	219,100	**21,005**

Corpo portaplacchette Multiplex-HPC

Grandezza	d1 mm	d2 h6 mm	d3 mm	L mm	l3 mm	l5 mm	Codice
215	21,50-21,99	25,000	21,200	317,000	56,000	224,200	**21,500**
215	21,50-21,99	25,400	21,200	317,000	56,000	224,200	**21,505**
220	22,00-22,49	25,000	21,700	323,000	56,000	229,300	**22,000**
220	22,00-22,49	25,400	21,700	323,000	56,000	229,300	**22,005**
225	22,50-22,99	25,000	22,200	329,000	56,000	234,400	**22,500**
225	22,50-22,99	25,400	22,200	329,000	56,000	234,400	**22,505**
230	23,00-23,49	25,000	22,700	335,000	56,000	239,500	**23,000**
230	23,00-23,49	25,400	22,700	335,000	56,000	239,500	**23,005**
235	23,50-23,99	25,000	23,200	341,000	56,000	244,600	**23,500**
235	23,50-23,99	25,400	23,200	341,000	56,000	244,600	**23,505**
240	24,00-24,49	25,000	23,700	347,000	56,000	249,700	**24,000**
240	24,00-24,49	25,400	23,700	347,000	56,000	249,700	**24,005**
245	24,50-24,99	25,000	24,200	352,000	56,000	254,800	**24,500**
245	24,50-24,99	25,400	24,200	352,000	56,000	254,800	**24,505**
250	25,00-25,49	25,000	24,700	359,000	56,000	259,900	**25,000**
250	25,00-25,49	25,400	24,700	359,000	56,000	259,900	**25,005**
255	25,50-25,99	32,000	25,200	369,000	60,000	265,000	**25,500**
255	25,50-25,99	31,750	25,200	369,000	60,000	265,000	**25,505**
260	26,00-26,49	32,000	25,700	377,000	60,000	270,000	**26,000**
260	26,00-26,49	31,750	25,700	377,000	60,000	270,000	**26,005**
265	26,50-26,99	32,000	26,200	382,000	60,000	275,000	**26,500**
265	26,50-26,99	31,750	26,200	382,000	60,000	275,000	**26,505**
270	27,00-27,49	32,000	26,700	388,000	60,000	280,100	**27,000**
270	27,00-27,49	31,750	26,700	388,000	60,000	280,100	**27,005**
275	27,50-27,99	32,000	27,200	394,000	60,000	285,200	**27,500**
275	27,50-27,99	31,750	27,200	394,000	60,000	285,200	**27,505**
280	28,00-28,49	32,000	27,700	400,000	60,000	290,300	**28,000**
280	28,00-28,49	31,750	27,700	400,000	60,000	290,300	**28,005**
285	28,50-28,99	32,000	28,200	405,000	60,000	295,400	**28,500**
285	28,50-28,99	31,750	28,200	405,000	60,000	295,400	**28,505**
290	29,00-29,49	32,000	28,700	412,000	60,000	300,500	**29,000**
290	29,00-29,49	31,750	28,700	412,000	60,000	300,500	**29,005**
295	29,50-29,99	32,000	29,200	418,000	60,000	305,600	**29,500**
295	29,50-29,99	31,750	29,200	418,000	60,000	305,600	**29,505**
300	30,00-30,49	32,000	29,700	424,000	60,000	310,600	**30,000**
300	30,00-30,49	31,750	29,700	424,000	60,000	310,600	**30,005**
305	30,50-30,99	32,000	30,200	429,000	60,000	315,700	**30,500**
305	30,50-30,99	31,750	30,200	429,000	60,000	315,700	**30,505**
310	31,00-31,49	32,000	30,700	435,000	60,000	320,800	**31,000**
310	31,00-31,49	31,750	30,700	435,000	60,000	320,800	**31,005**
315	31,50-31,99	32,000	31,200	441,000	60,000	325,900	**31,500**
315	31,50-31,99	31,750	31,200	441,000	60,000	325,900	**31,505**

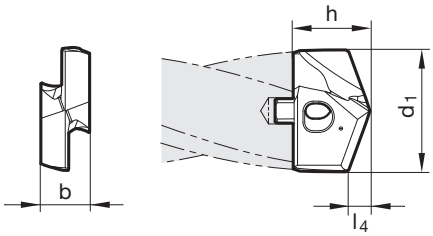
Inserti intercambiabili per Multiplex HPC

Articolo nr. 86721

P	M	K	N	S	H
○	○	○	○	○	○

VHM | a | HPC | WN | 145° | m7 | R

Assott. del nocc. ≥ Ø 11,000 • affilatura su piani • Forma del tagliente principale diritta (dopo correzione) • viti Art. nr. 86843 comprese
Per fori pilota in tutti i materiali



Grandezza	d1 mm	inch	l4 mm	b mm	h mm	Codice
110	11,000		1,800	4,500	7,200	**11,000**
110	11,200		1,800	4,500	7,200	**11,200**
110	11,500		1,900	4,500	7,200	**11,500**
110	11,510	29/64	1,900	4,500	7,200	**11,510**
110	11,700		1,900	4,500	7,200	**11,700**
110	11,800		1,900	4,500	7,200	**11,800**
110	11,910	15/32	1,900	4,500	7,200	**11,910**
120	12,000		1,900	5,000	7,400	**12,000**
120	12,100		2,000	5,000	7,400	**12,100**
120	12,200		2,000	5,000	7,400	**12,200**
120	12,300	31/64	2,000	5,000	7,400	**12,300**
120	12,500		2,000	5,000	7,400	**12,500**
120	12,600		2,000	5,000	7,400	**12,600**
120	12,700	1/2	2,100	5,000	7,400	**12,700**
120	12,800		2,100	5,000	7,400	**12,800**
120	12,900		2,100	5,000	7,400	**12,900**
130	13,000		2,100	5,500	8,200	**13,000**
130	13,100	33/64	2,100	5,500	8,200	**13,100**
130	13,490	17/32	2,200	5,500	8,200	**13,490**
130	13,500		2,200	5,500	8,200	**13,500**
130	13,600		2,200	5,500	8,200	**13,600**
130	13,700		2,200	5,500	8,200	**13,700**
130	13,800		2,200	5,500	8,200	**13,800**
130	13,890	35/64	2,200	5,500	8,200	**13,890**
140	14,000		2,300	6,000	9,400	**14,000**
140	14,100		2,300	6,000	9,400	**14,100**
140	14,290	9/16	2,300	6,000	9,400	**14,290**
140	14,400		2,300	6,000	9,400	**14,400**
140	14,500		2,300	6,000	9,400	**14,500**
140	14,600		2,400	6,000	9,400	**14,600**
140	14,680	37/64	2,400	6,000	9,400	**14,680**
140	14,700		2,400	6,000	9,400	**14,700**
140	14,800		2,400	6,000	9,400	**14,800**
140	15,000		2,400	6,000	9,400	**15,000**
140	15,080	19/32	2,400	6,000	9,400	**15,080**
140	15,100		2,400	6,000	9,400	**15,100**
140	15,200		2,400	6,000	9,400	**15,200**
140	15,300		2,500	6,000	9,400	**15,300**
140	15,480	39/64	2,500	6,000	9,400	**15,480**
140	15,500		2,500	6,000	9,400	**15,500**
140	15,600		2,500	6,000	9,400	**15,600**
140	15,700		2,500	6,000	9,400	**15,700**

Inserti intercambiabili per Multiplex HPC

Grandezza	d1 mm	 inch	l4 mm	b mm	h mm	Codice
140	15,800		2,500	6,000	9,400	**15,800**
140	15,870	5/8	2,600	6,000	9,400	**15,870**
160	16,000		2,600	7,000	10,600	**16,000**
160	16,270	41/64	2,600	7,000	10,600	**16,270**
160	16,500		2,700	7,000	10,600	**16,500**
160	16,670	21/32	2,700	7,000	10,600	**16,670**
160	17,000		2,700	7,000	10,600	**17,000**
160	17,070	43/64	2,700	7,000	10,600	**17,070**
160	17,460	11/16	2,800	7,000	10,600	**17,460**
160	17,500		2,800	7,000	10,600	**17,500**
160	17,600		2,800	7,000	10,600	**17,600**
160	17,860	45/64	2,900	7,000	10,600	**17,860**
180	18,000		2,900	8,000	12,100	**18,000**
180	18,260	23/32	2,900	8,000	12,100	**18,260**
180	18,500		3,000	8,000	12,100	**18,500**
180	18,650	47/64	3,000	8,000	12,100	**18,650**
180	19,000		3,000	8,000	12,100	**19,000**
180	19,050	3/4	3,100	8,000	12,100	**19,050**
180	19,450	49/64	3,100	8,000	12,100	**19,450**
180	19,500		3,100	8,000	12,100	**19,500**
180	19,600		3,100	8,000	12,100	**19,600**
180	19,840	25/32	3,200	8,000	12,100	**19,840**
200	20,000		3,200	9,000	13,300	**20,000**
200	20,240	51/64	3,200	9,000	13,300	**20,240**
200	20,500		3,300	9,000	13,300	**20,500**
200	20,640	13/16	3,300	9,000	13,300	**20,640**
200	21,000		3,400	9,000	13,300	**21,000**
200	21,030	53/64	3,400	9,000	13,300	**21,030**
200	21,100		3,400	9,000	13,300	**21,100**
200	21,430	27/32	3,400	9,000	13,300	**21,430**
200	21,500		3,400	9,000	13,300	**21,500**
200	21,830	55/64	3,500	9,000	13,300	**21,830**
220	22,000		3,500	10,000	14,800	**22,000**
220	22,220	7/8	3,600	10,000	14,800	**22,220**
220	22,500		3,600	10,000	14,800	**22,500**
220	22,620	57/64	3,600	10,000	14,800	**22,620**
220	23,000		3,700	10,000	14,800	**23,000**
220	23,020	29/32	3,700	10,000	14,800	**23,020**
220	23,420	59/64	3,700	10,000	14,800	**23,420**
220	23,500		3,800	10,000	14,800	**23,500**
220	23,810	15/16	3,800	10,000	14,800	**23,810**
240	24,000		3,800	11,000	15,300	**24,000**
240	24,100		3,800	11,000	15,300	**24,100**
240	24,210	61/64	3,900	11,000	15,300	**24,210**
240	24,500		3,900	11,000	15,300	**24,500**
240	24,610	31/32	3,900	11,000	15,300	**24,610**
240	25,000	63/64	4,000	11,000	15,300	**25,000**
240	25,400	1	4,100	11,000	15,300	**25,400**
240	25,500		4,100	11,000	15,300	**25,500**
240	25,700		4,100	11,000	15,300	**25,700**
260	26,000		4,100	12,000	19,400	**26,000**
260	26,190	1 1/32	4,200	12,000	19,400	**26,190**
260	26,500		4,200	12,000	19,400	**26,500**
260	26,590	1 3/64	4,200	12,000	19,400	**26,590**
260	27,000		4,300	12,000	19,400	**27,000**
260	27,500		4,400	12,000	19,400	**27,500**
260	27,700		4,400	12,000	19,400	**27,700**
260	27,780	1 3/32	4,400	12,000	19,400	**27,780**
280	28,000		4,500	13,000	20,100	**28,000**
280	28,180	1 7/64	4,500	13,000	20,100	**28,180**
280	28,500		4,500	13,000	20,100	**28,500**
280	28,580		4,600	13,000	20,100	**28,580**
280	29,000		4,600	13,000	20,100	**29,000**
280	29,370	1 5/32	4,700	13,000	20,100	**29,370**
280	29,500		4,700	13,000	20,100	**29,500**
300	30,000		4,800	14,000	21,700	**30,000**
300	30,160	1 3/16	4,800	14,000	21,700	**30,160**
300	30,500		4,900	14,000	21,700	**30,500**
300	30,960	1 7/32	4,900	14,000	21,700	**30,960**
300	31,000		4,900	14,000	21,700	**31,000**
300	31,500		5,000	14,000	21,700	**31,500**
300	31,750	1 1/4	5,100	14,000	21,700	**31,750**

Inserti intercambiabili per Multiplex HPC

Grandezza	d1 mm	 inch	l4 mm	b mm	h mm	Codice
320	32,000		5,100	15,000	22,400	**32,000**
320	32,500		5,200	15,000	22,400	**32,500**
320	32,540	1 9/32	5,200	15,000	22,400	**32,540**
320	33,000		5,300	15,000	22,400	**33,000**
320	33,340	1 5/16	5,300	15,000	22,400	**33,340**
320	33,500		5,300	15,000	22,400	**33,500**
320	34,000		5,400	15,000	22,400	**34,000**
320	34,130	1 11/32	5,400	15,000	22,400	**34,130**
320	34,500		5,500	15,000	22,400	**34,500**
320	34,930		5,600	15,000	22,400	**34,930**
320	35,000		5,600	15,000	22,400	**35,000**
320	35,500		5,600	15,000	22,400	**35,500**
320	35,720	1 13/32	5,700	15,000	22,400	**35,720**
360	36,000		5,700	16,000	23,200	**36,000**
360	36,500		5,800	16,000	23,200	**36,500**
360	36,510	1 7/16	5,800	16,000	23,200	**36,510**
360	37,000		5,900	16,000	23,200	**37,000**
360	37,310	1 15/32	5,900	16,000	23,200	**37,310**
360	37,500		6,000	16,000	23,200	**37,500**
360	38,000		6,000	16,000	23,200	**38,000**
360	38,100	1 1/2	6,100	16,000	23,200	**38,100**
360	38,500	1 33/64	6,100	16,000	23,200	**38,500**
360	39,000		6,200	16,000	23,200	**39,000**
360	39,500		6,300	16,000	23,200	**39,500**
360	40,000		6,400	16,000	23,200	**40,000**

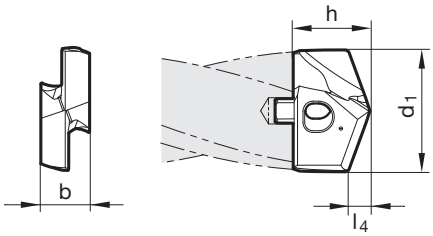
Inserti intercambiabili per Multiplex HPC

Articolo nr. 86722

P	M	K	N	S	H
●	○	○			

VHM | F | HPC | WN | 140° | h7 | R

Assott. del nocc. ≥ Ø 11,000 • affilatura su piani • Forma del tagliente principale diritta (dopo correzione) • viti Art. nr. 86843 comprese acciai da costruzione e da cementazione • acciai automatici, acciai da bonifica • acciai legati e non legati con R fino a 1200 N/mm²



Grandezza	d1 mm	inch	l4 mm	b mm	h mm	Codice
110	11,000		2,100	4,500	7,500	**11,000**
110	11,200		2,100	4,500	7,500	**11,200**
115	11,500		2,100	4,500	7,500	**11,500**
115	11,510	29/64	2,100	4,500	7,500	**11,510**
115	11,700		2,200	4,500	7,500	**11,700**
115	11,800		2,200	4,500	7,500	**11,800**
115	11,910	15/32	2,200	4,500	7,500	**11,910**
120	12,000		2,200	5,000	7,700	**12,000**
120	12,100		2,300	5,000	7,700	**12,100**
120	12,200		2,300	5,000	7,700	**12,200**
120	12,300	31/64	2,300	5,000	7,700	**12,300**
125	12,500		2,300	5,000	7,700	**12,500**
125	12,600		2,300	5,000	7,700	**12,600**
125	12,700	1/2	2,400	5,000	7,700	**12,700**
125	12,800		2,400	5,000	7,700	**12,800**
125	12,900		2,400	5,000	7,700	**12,900**
130	13,000		2,400	5,500	8,500	**13,000**
130	13,100	33/64	2,400	5,500	8,500	**13,100**
130	13,490	17/32	2,500	5,500	8,500	**13,490**
135	13,500		2,500	5,500	8,500	**13,500**
135	13,600		2,500	5,500	8,500	**13,600**
135	13,700		2,500	5,500	8,500	**13,700**
135	13,800		2,600	5,500	8,500	**13,800**
135	13,890	35/64	2,600	5,500	8,500	**13,890**
140	14,000		2,600	6,000	9,600	**14,000**
140	14,100		2,600	6,000	9,600	**14,100**
140	14,290	9/16	2,700	6,000	9,600	**14,290**
140	14,400		2,700	6,000	9,600	**14,400**
145	14,500		2,700	6,000	9,600	**14,500**
145	14,600		2,700	6,000	9,600	**14,600**
145	14,680	37/64	2,700	6,000	9,600	**14,680**
145	14,700		2,700	6,000	9,600	**14,700**
145	14,800		2,700	6,000	9,600	**14,800**
150	15,000		2,800	6,000	9,800	**15,000**
150	15,080	19/32	2,800	6,000	9,800	**15,080**
150	15,100		2,800	6,000	9,800	**15,100**
150	15,200		2,800	6,000	9,800	**15,200**
150	15,300		2,800	6,000	9,800	**15,300**
150	15,480	39/64	2,900	6,000	9,800	**15,480**
155	15,500		2,900	6,000	9,800	**15,500**
155	15,600		2,900	6,000	9,800	**15,600**
155	15,700		2,900	6,000	9,800	**15,700**

HARTNER

Inserti intercambiabili per Multiplex HPC

Grandezza	d1 mm	inch	l4 mm	b mm	h mm	Codice
155	15,800		2,900	6,000	9,800	**15,800**
155	15,870	5/8	2,900	6,000	9,800	**15,870**
160	16,000		3,000	7,000	11,000	**16,000**
160	16,270	41/64	3,000	7,000	11,000	**16,270**
165	16,500		3,100	7,000	11,000	**16,500**
165	16,670	21/32	3,100	7,000	11,000	**16,670**
170	17,000		3,100	7,000	11,000	**17,000**
170	17,070	43/64	3,200	7,000	11,000	**17,070**
170	17,460	11/16	3,200	7,000	11,000	**17,460**
175	17,500		3,200	7,000	11,000	**17,500**
175	17,600		3,300	7,000	11,000	**17,600**
175	17,860	45/64	3,300	7,000	11,000	**17,860**
180	18,000		3,300	8,000	12,600	**18,000**
180	18,260	23/32	3,400	8,000	12,600	**18,260**
185	18,500		3,400	8,000	12,600	**18,500**
185	18,650	47/64	3,400	8,000	12,600	**18,650**
190	19,000		3,500	8,000	12,600	**19,000**
190	19,050	3/4	3,500	8,000	12,600	**19,050**
190	19,250		3,600	8,000	12,600	**19,250**
190	19,450	49/64	3,600	8,000	12,600	**19,450**
195	19,500		3,600	8,000	12,600	**19,500**
195	19,600		3,600	8,000	12,600	**19,600**
195	19,840	25/32	3,700	8,000	12,600	**19,840**
200	20,000		3,700	9,000	13,900	**20,000**
200	20,240	51/64	3,700	9,000	13,900	**20,240**
205	20,500		3,800	9,000	13,900	**20,500**
205	20,640	13/16	3,800	9,000	13,900	**20,640**
210	21,000		3,900	9,000	13,900	**21,000**
210	21,030	53/64	3,900	9,000	13,900	**21,030**
210	21,100		3,900	9,000	13,900	**21,100**
210	21,430	27/32	3,900	9,000	13,900	**21,430**
215	21,500		4,000	9,000	13,900	**21,500**
215	21,830	55/64	4,000	9,000	13,900	**21,830**
220	22,000		4,100	10,000	15,300	**22,000**
220	22,220	7/8	4,100	10,000	15,300	**22,220**
225	22,500		4,100	10,000	15,300	**22,500**
225	22,620	57/64	4,200	10,000	15,300	**22,620**
230	23,000		4,200	10,000	15,300	**23,000**
230	23,020	29/32	4,200	10,000	15,300	**23,020**
230	23,420	59/64	4,300	10,000	15,300	**23,420**
235	23,500		4,300	10,000	15,300	**23,500**
235	23,810	15/16	4,400	10,000	15,300	**23,810**
240	24,000		4,400	11,000	15,800	**24,000**
240	24,100		4,400	11,000	15,800	**24,100**
240	24,210	61/64	4,500	11,000	15,800	**24,210**
245	24,500		4,500	11,000	15,800	**24,500**
245	24,610	31/32	4,500	11,000	15,800	**24,610**
250	25,000	63/64	4,600	11,000	15,800	**25,000**
250	25,400	1	4,700	11,000	15,800	**25,400**
255	25,500		4,700	11,000	15,800	**25,500**
255	25,670		4,700	11,000	15,800	**25,670**
255	25,700		4,700	11,000	15,800	**25,700**
255	25,810		4,700	11,000	15,800	**25,810**
260	26,000		4,800	12,000	20,000	**26,000**
260	26,190	1 1/32	4,800	12,000	20,000	**26,190**
265	26,500		4,900	12,000	20,000	**26,500**
265	26,590	1 3/64	4,900	12,000	20,000	**26,590**
270	27,000		5,000	12,000	20,000	**27,000**
275	27,500		5,100	12,000	20,000	**27,500**
275	27,700		5,100	12,000	20,000	**27,700**
275	27,780	1 3/32	5,100	12,000	20,000	**27,780**
280	28,000		5,100	13,000	20,700	**28,000**
280	28,180	1 7/64	5,200	13,000	20,700	**28,180**
285	28,500		5,200	13,000	20,700	**28,500**
285	28,580		5,300	13,000	20,700	**28,580**
290	29,000		5,300	13,000	20,700	**29,000**
290	29,370	1 5/32	5,400	13,000	20,700	**29,370**
295	29,500		5,400	13,000	20,700	**29,500**
295	29,770	1 11/64	5,500	13,000	20,700	**29,770**
300	30,000		5,500	14,000	22,300	**30,000**
300	30,160	1 3/16	5,500	14,000	22,300	**30,160**
305	30,500		5,600	14,000	22,300	**30,500**

Inserti intercambiabili per Multiplex HPC

Grandezza	d1 mm	 inch	l4 mm	b mm	h mm	Codice
305	30,960	1 7/32	5,700	14,000	22,300	**30,960**
310	31,000		5,700	14,000	22,300	**31,000**
315	31,500		5,800	14,000	22,300	**31,500**
315	31,750	1 1/4	5,800	14,000	22,300	**31,750**
320	32,000		5,900	15,000	23,100	**32,000**
320	32,500		6,000	15,000	23,100	**32,500**
320	32,540	1 9/32	6,000	15,000	23,100	**32,540**
320	32,940	1 19/64	6,000	15,000	23,100	**32,940**
330	33,000		6,100	15,000	23,100	**33,000**
330	33,340	1 5/16	6,100	15,000	23,100	**33,340**
330	33,500		6,100	15,000	23,100	**33,500**
340	34,000		6,200	15,000	23,100	**34,000**
340	34,130	1 11/32	6,300	15,000	23,100	**34,130**
340	34,500		6,300	15,000	23,100	**34,500**
340	34,930		6,400	15,000	23,100	**34,930**
350	35,000		6,400	15,000	23,100	**35,000**
350	35,500		6,500	15,000	23,100	**35,500**
350	35,720	1 13/32	6,600	15,000	23,100	**35,720**
360	36,000		6,600	16,000	23,900	**36,000**
360	36,500		6,700	16,000	23,900	**36,500**
360	36,510	1 7/16	6,700	16,000	23,900	**36,510**
370	37,000		6,800	16,000	23,900	**37,000**
370	37,310	1 15/32	6,800	16,000	23,900	**37,310**
370	37,500		6,900	16,000	23,900	**37,500**
380	38,000		7,000	16,000	23,900	**38,000**
380	38,100	1 1/2	7,000	16,000	23,900	**38,100**
380	38,500	1 33/64	7,100	16,000	23,900	**38,500**
390	39,000		7,100	16,000	23,900	**39,000**
390	39,500		7,200	16,000	23,900	**39,500**
400	40,000		7,300	16,000	23,900	**40,000**

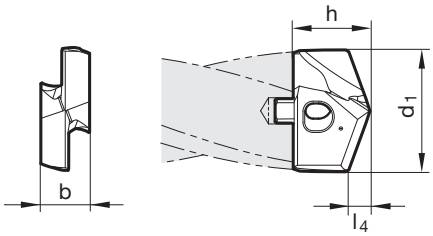
Inserti intercambiabili per Multiplex HPC

Articolo nr. 86723

P	M	K	N	S	H
○		●			

VHM | F | HPC | WN | 140° | m7 | R

Assott. del nocc. ≥ Ø 11,000 • affilatura su piani • Forma del tagliente principale diritta (dopo correzione) • viti Art. nr. 86843 comprese ghisa verimicolare GGV • ghisa grigia, ghisa malleabile, ghisa sferoidale



Grandezza	d1 mm	inch	l4 mm	b mm	h mm	Codice
110	11,000		2,700	4,500	7,500	**11,000**
110	11,200		2,700	4,500	7,500	**11,200**
115	11,500		2,800	4,500	7,500	**11,500**
115	11,510	29/64	2,800	4,500	7,500	**11,510**
115	11,700		2,800	4,500	7,500	**11,700**
115	11,800		2,800	4,500	7,500	**11,800**
115	11,910	15/32	2,800	4,500	7,500	**11,910**
120	12,000		2,900	5,000	7,700	**12,000**
120	12,100		2,900	5,000	7,700	**12,100**
120	12,200		2,900	5,000	7,700	**12,200**
120	12,300	31/64	2,900	5,000	7,700	**12,300**
125	12,500		3,100	5,000	7,700	**12,500**
125	12,600		3,100	5,000	7,700	**12,600**
125	12,700	1/2	3,100	5,000	7,700	**12,700**
125	12,800		3,100	5,000	7,700	**12,800**
125	12,900		3,100	5,000	7,700	**12,900**
130	13,000		3,200	5,500	8,500	**13,000**
130	13,100	33/64	3,200	5,500	8,500	**13,100**
130	13,490	17/32	3,200	5,500	8,500	**13,490**
135	13,500		3,300	5,500	8,500	**13,500**
135	13,600		3,300	5,500	8,500	**13,600**
135	13,700		3,300	5,500	8,500	**13,700**
135	13,800		3,300	5,500	8,500	**13,800**
135	13,890	35/64	3,300	5,500	8,500	**13,890**
140	14,000		3,400	6,000	9,600	**14,000**
140	14,100		3,400	6,000	9,600	**14,100**
140	14,290	9/16	3,400	6,000	9,600	**14,290**
140	14,400		3,400	6,000	9,600	**14,400**
145	14,500		3,600	6,000	9,600	**14,500**
145	14,600		3,600	6,000	9,600	**14,600**
145	14,680	37/64	3,600	6,000	9,600	**14,680**
145	14,700		3,600	6,000	9,600	**14,700**
145	14,800		3,600	6,000	9,600	**14,800**
150	15,000		3,700	6,000	9,800	**15,000**
150	15,080	19/32	3,700	6,000	9,800	**15,080**
150	15,100		3,700	6,000	9,800	**15,100**
150	15,200		3,700	6,000	9,800	**15,200**
150	15,300		3,700	6,000	9,800	**15,300**
150	15,480	39/64	3,700	6,000	9,800	**15,480**
155	15,500		3,800	6,000	9,800	**15,500**
155	15,600		3,800	6,000	9,800	**15,600**
155	15,700		3,800	6,000	9,800	**15,700**

HARTNER

Inserti intercambiabili per Multiplex HPC

Grandezza	d1 mm	 inch	l4 mm	b mm	h mm	Codice
155	15,800		3,800	6,000	9,800	**15,800**
155	15,870	5/8	3,800	6,000	9,800	**15,870**
160	16,000		3,900	7,000	11,000	**16,000**
160	16,270	41/64	3,900	7,000	11,000	**16,270**
165	16,500		4,100	7,000	11,000	**16,500**
165	16,670	21/32	4,100	7,000	11,000	**16,670**
170	17,000		4,200	7,000	11,000	**17,000**
170	17,070	43/64	4,200	7,000	11,000	**17,070**
170	17,460	11/16	4,200	7,000	11,000	**17,460**
175	17,500		4,300	7,000	11,000	**17,500**
175	17,600		4,300	7,000	11,000	**17,600**
175	17,860	45/64	4,300	7,000	11,000	**17,860**
180	18,000		4,400	8,000	12,600	**18,000**
180	18,260	23/32	4,400	8,000	12,600	**18,260**
185	18,500		4,500	8,000	12,600	**18,500**
185	18,650	47/64	4,500	8,000	12,600	**18,650**
190	19,000		4,700	8,000	12,600	**19,000**
190	19,050	3/4	4,700	8,000	12,600	**19,050**
190	19,250		4,700	8,000	12,600	**19,250**
190	19,450	49/64	4,700	8,000	12,600	**19,450**
195	19,500		4,800	8,000	12,600	**19,500**
195	19,600		4,800	8,000	12,600	**19,600**
195	19,840	25/32	4,800	8,000	12,600	**19,840**
200	20,000		4,900	9,000	13,900	**20,000**
200	20,240	51/64	4,900	9,000	13,900	**20,240**
205	20,500		5,100	9,000	13,900	**20,500**
205	20,640	13/16	5,100	9,000	13,900	**20,640**
210	21,000		5,200	9,000	13,900	**21,000**
210	21,030	53/64	5,200	9,000	13,900	**21,030**
210	21,100		5,200	9,000	13,900	**21,100**
210	21,430	27/32	5,200	9,000	13,900	**21,430**
215	21,500		5,300	9,000	13,900	**21,500**
215	21,830	55/64	5,300	9,000	13,900	**21,830**
220	22,000		5,400	10,000	15,300	**22,000**
220	22,220	7/8	5,400	10,000	15,300	**22,220**
225	22,500		5,600	10,000	15,300	**22,500**
225	22,620	57/64	5,600	10,000	15,300	**22,620**
230	23,000		5,700	10,000	15,300	**23,000**
230	23,020	29/32	5,700	10,000	15,300	**23,020**
230	23,420	59/64	5,700	10,000	15,300	**23,420**
235	23,500		5,800	10,000	15,300	**23,500**
235	23,810	15/16	5,800	10,000	15,300	**23,810**
240	24,000		6,000	11,000	15,800	**24,000**
240	24,100		6,000	11,000	15,800	**24,100**
240	24,210	61/64	6,000	11,000	15,800	**24,210**
245	24,500		6,100	11,000	15,800	**24,500**
245	24,610	31/32	6,100	11,000	15,800	**24,610**
250	25,000	63/64	6,200	11,000	15,800	**25,000**
250	25,400	1	6,200	11,000	15,800	**25,400**
255	25,500		6,300	11,000	15,800	**25,500**
255	25,670		6,300	11,000	15,800	**25,670**
255	25,700		6,300	11,000	15,800	**25,700**
255	25,810		6,300	11,000	15,800	**25,810**
260	26,000		6,400	12,000	20,000	**26,000**
260	26,190	1 1/32	6,400	12,000	20,000	**26,190**
265	26,500		6,500	12,000	20,000	**26,500**
265	26,590	1 3/64	6,500	12,000	20,000	**26,590**
270	27,000		6,600	12,000	20,000	**27,000**
275	27,500		6,700	12,000	20,000	**27,500**
275	27,700		6,700	12,000	20,000	**27,700**
275	27,780	1 3/32	6,700	12,000	20,000	**27,780**
280	28,000		6,800	13,000	20,700	**28,000**
280	28,180	1 7/64	6,800	13,000	20,700	**28,180**
285	28,500		6,900	13,000	20,700	**28,500**
285	28,580		6,900	13,000	20,700	**28,580**
290	29,000		7,100	13,000	20,700	**29,000**
290	29,370	1 5/32	7,100	13,000	20,700	**29,370**
295	29,500		7,200	13,000	20,700	**29,500**
295	29,770	1 11/64	7,200	13,000	20,700	**29,770**
300	30,000		7,300	14,000	22,300	**30,000**
300	30,160	1 3/16	7,300	14,000	22,300	**30,160**
305	30,500		7,400	14,000	22,300	**30,500**

Inserti intercambiabili per Multiplex HPC

Grandezza	d1 mm	 inch	l4 mm	b mm	h mm	Codice
305	30,960	1 7/32	7,400	14,000	22,300	**30,960**
310	31,000		7,500	14,000	22,300	**31,000**
315	31,500		7,600	14,000	22,300	**31,500**
315	31,750	1 1/4	7,600	14,000	22,300	**31,750**
320	32,000		7,700	15,000	23,100	**32,000**
320	32,500		7,800	15,000	23,100	**32,500**
320	32,540	1 9/32	7,800	15,000	23,100	**32,540**
320	32,940	1 19/64	7,800	15,000	23,100	**32,940**
330	33,000		7,900	15,000	23,100	**33,000**
330	33,340	1 5/16	7,900	15,000	23,100	**33,340**
330	33,500		8,100	15,000	23,100	**33,500**
340	34,000		8,200	15,000	23,100	**34,000**
340	34,130	1 11/32	8,200	15,000	23,100	**34,130**
340	34,500		8,400	15,000	23,100	**34,500**
340	34,930		8,400	15,000	23,100	**34,930**
350	35,000		8,500	15,000	23,100	**35,000**
350	35,500		8,600	15,000	23,100	**35,500**
350	35,720	1 13/32	8,600	15,000	23,100	**35,720**
360	36,000		8,700	16,000	23,900	**36,000**
360	36,500		8,800	16,000	23,900	**36,500**
360	36,510	1 7/16	8,800	16,000	23,900	**36,510**
370	37,000		9,000	16,000	23,900	**37,000**
370	37,310	1 15/32	9,000	16,000	23,900	**37,310**
370	37,500		9,100	16,000	23,900	**37,500**
380	38,000		9,200	16,000	23,900	**38,000**
380	38,100	1 1/2	9,200	16,000	23,900	**38,100**
380	38,500	1 33/64	9,400	16,000	23,900	**38,500**
390	39,000		9,500	16,000	23,900	**39,000**
390	39,500		9,700	16,000	23,900	**39,500**
400	40,000		9,700	16,000	23,900	**40,000**

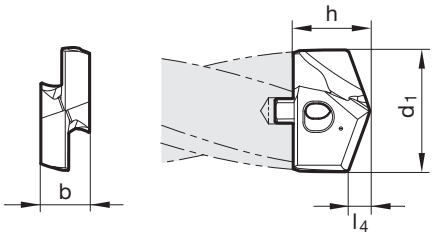
Inserti intercambiabili per Multiplex HPC

Articolo nr. 86724

P	M	K	N	S	H
			•		

VHM | HPC | WN | 140° | h7 | R

Assott. del nocc. ≥ Ø 11,000 • spoglia sul cono tagliente • viti Art. nr. 86843 comprese • main cutting edge form concave
alluminio e leghe di alluminio • metalli non ferrosi



Grandezza	d1 mm	inch	l4 mm	b mm	h mm	Codice
110	11,000		2,100	4,500	7,500	**11,000**
110	11,200		2,100	4,500	7,500	**11,200**
115	11,500		2,100	4,500	7,500	**11,500**
115	11,510	29/64	2,100	4,500	7,500	**11,510**
115	11,700		2,200	4,500	7,500	**11,700**
115	11,800		2,200	4,500	7,500	**11,800**
115	11,910	15/32	2,200	4,500	7,500	**11,910**
120	12,000		2,200	5,000	7,700	**12,000**
120	12,100		2,300	5,000	7,700	**12,100**
120	12,200		2,300	5,000	7,700	**12,200**
120	12,300	31/64	2,300	5,000	7,700	**12,300**
125	12,500		2,300	5,000	7,700	**12,500**
125	12,600		2,300	5,000	7,700	**12,600**
125	12,700	1/2	2,400	5,000	7,700	**12,700**
125	12,800		2,400	5,000	7,700	**12,800**
125	12,900		2,400	5,000	7,700	**12,900**
130	13,000		2,400	5,500	8,500	**13,000**
130	13,100	33/64	2,400	5,500	8,500	**13,100**
130	13,490	17/32	2,500	5,500	8,500	**13,490**
135	13,500		2,500	5,500	8,500	**13,500**
135	13,600		2,500	5,500	8,500	**13,600**
135	13,700		2,500	5,500	8,500	**13,700**
135	13,800		2,600	5,500	8,500	**13,800**
135	13,890	35/64	2,600	5,500	8,500	**13,890**
140	14,000		2,600	6,000	9,600	**14,000**
140	14,100		2,600	6,000	9,600	**14,100**
140	14,290	9/16	2,700	6,000	9,600	**14,290**
140	14,400		2,700	6,000	9,600	**14,400**
145	14,500		2,700	6,000	9,600	**14,500**
145	14,600		2,700	6,000	9,600	**14,600**
145	14,680	37/64	2,700	6,000	9,600	**14,680**
145	14,700		2,700	6,000	9,600	**14,700**
145	14,800		2,700	6,000	9,600	**14,800**
150	15,000		2,800	6,000	9,800	**15,000**
150	15,080	19/32	2,800	6,000	9,800	**15,080**
150	15,100		2,800	6,000	9,800	**15,100**
150	15,200		2,800	6,000	9,800	**15,200**
150	15,300		2,800	6,000	9,800	**15,300**
150	15,480	39/64	2,900	6,000	9,800	**15,480**
155	15,500		2,900	6,000	9,800	**15,500**
155	15,600		2,900	6,000	9,800	**15,600**
155	15,700		2,900	6,000	9,800	**15,700**

HARTNER

Inserti intercambiabili per Multiplex HPC

Grandezza	d1 mm	 inch	l4 mm	b mm	h mm	Codice
155	15,800		2,900	6,000	9,800	**15,800**
155	15,870	5/8	2,900	6,000	9,800	**15,870**
160	16,000		3,000	7,000	11,000	**16,000**
160	16,270	41/64	3,000	7,000	11,000	**16,270**
165	16,500		3,100	7,000	11,000	**16,500**
165	16,670	21/32	3,100	7,000	11,000	**16,670**
170	17,000		3,100	7,000	11,000	**17,000**
170	17,070	43/64	3,200	7,000	11,000	**17,070**
170	17,460	11/16	3,200	7,000	11,000	**17,460**
175	17,500		3,200	7,000	11,000	**17,500**
175	17,600		3,300	7,000	11,000	**17,600**
175	17,860	45/64	3,300	7,000	11,000	**17,860**
180	18,000		3,300	8,000	12,600	**18,000**
180	18,260	23/32	3,400	8,000	12,600	**18,260**
185	18,500		3,400	8,000	12,600	**18,500**
185	18,650	47/64	3,400	8,000	12,600	**18,650**
190	19,000		3,500	8,000	12,600	**19,000**
190	19,050	3/4	3,500	8,000	12,600	**19,050**
190	19,250		3,600	8,000	12,600	**19,250**
190	19,450	49/64	3,600	8,000	12,600	**19,450**
195	19,500		3,600	8,000	12,600	**19,500**
195	19,600		3,600	8,000	12,600	**19,600**
195	19,840	25/32	3,700	8,000	12,600	**19,840**
200	20,000		3,700	9,000	13,900	**20,000**
200	20,240	51/64	3,700	9,000	13,900	**20,240**
205	20,500		3,800	9,000	13,900	**20,500**
205	20,640	13/16	3,800	9,000	13,900	**20,640**
210	21,000		3,900	9,000	13,900	**21,000**
210	21,030	53/64	3,900	9,000	13,900	**21,030**
210	21,100		3,900	9,000	13,900	**21,100**
210	21,430	27/32	3,900	9,000	13,900	**21,430**
215	21,500		4,000	9,000	13,900	**21,500**
215	21,830	55/64	4,000	9,000	13,900	**21,830**
220	22,000		4,100	10,000	15,300	**22,000**
220	22,220	7/8	4,100	10,000	15,300	**22,220**
225	22,500		4,100	10,000	15,300	**22,500**
225	22,620	57/64	4,200	10,000	15,300	**22,620**
230	23,000		4,200	10,000	15,300	**23,000**
230	23,020	29/32	4,200	10,000	15,300	**23,020**
230	23,420	59/64	4,300	10,000	15,300	**23,420**
235	23,500		4,300	10,000	15,300	**23,500**
235	23,810	15/16	4,400	10,000	15,300	**23,810**
240	24,000		4,400	11,000	15,800	**24,000**
240	24,100		4,400	11,000	15,800	**24,100**
240	24,210	61/64	4,500	11,000	15,800	**24,210**
245	24,500		4,500	11,000	15,800	**24,500**
245	24,610	31/32	4,500	11,000	15,800	**24,610**
250	25,000	63/64	4,600	11,000	15,800	**25,000**
250	25,400	1	4,700	11,000	15,800	**25,400**
255	25,500		4,700	11,000	15,800	**25,500**
255	25,670		4,700	11,000	15,800	**25,670**
255	25,700		4,700	11,000	15,800	**25,700**
255	25,810		4,700	11,000	15,800	**25,810**
260	26,000		4,800	12,000	20,000	**26,000**
260	26,190	1 1/32	4,800	12,000	20,000	**26,190**
265	26,500		4,900	12,000	20,000	**26,500**
265	26,590	1 3/64	4,900	12,000	20,000	**26,590**
270	27,000		5,000	12,000	20,000	**27,000**
275	27,500		5,100	12,000	20,000	**27,500**
275	27,700		5,100	12,000	20,000	**27,700**
275	27,780	1 3/32	5,100	12,000	20,000	**27,780**
280	28,000		5,100	13,000	20,700	**28,000**
280	28,180	1 7/64	5,200	13,000	20,700	**28,180**
285	28,500		5,200	13,000	20,700	**28,500**
285	28,580		5,300	13,000	20,700	**28,580**
290	29,000		5,300	13,000	20,700	**29,000**
290	29,370	1 5/32	5,400	13,000	20,700	**29,370**
295	29,500		5,400	13,000	20,700	**29,500**
295	29,770	1 11/64	5,500	13,000	20,700	**29,770**
300	30,000		5,500	14,000	22,300	**30,000**
300	30,160	1 3/16	5,500	14,000	22,300	**30,160**
305	30,500		5,600	14,000	22,300	**30,500**

Inserti intercambiabili per Multiplex HPC

Grandezza	d1 mm	 inch	l4 mm	b mm	h mm	Codice
305	30,960	1 7/32	5,700	14,000	22,300	**30,960**
310	31,000		5,700	14,000	22,300	**31,000**
315	31,500		5,800	14,000	22,300	**31,500**
315	31,750	1 1/4	5,800	14,000	22,300	**31,750**
320	32,000		5,900	15,000	23,100	**32,000**
320	32,500		6,000	15,000	23,100	**32,500**
320	32,540	1 9/32	6,000	15,000	23,100	**32,540**
320	32,940	1 19/64	6,000	15,000	23,100	**32,940**
330	33,000		6,100	15,000	23,100	**33,000**
330	33,340	1 5/16	6,100	15,000	23,100	**33,340**
330	33,500		6,100	15,000	23,100	**33,500**
340	34,000		6,200	15,000	23,100	**34,000**
340	34,130	1 11/32	6,300	15,000	23,100	**34,130**
340	34,500		6,300	15,000	23,100	**34,500**
340	34,930		6,400	15,000	23,100	**34,930**
350	35,000		6,400	15,000	23,100	**35,000**
350	35,500		6,500	15,000	23,100	**35,500**
350	35,720	1 13/32	6,600	15,000	23,100	**35,720**
360	36,000		6,600	16,000	23,900	**36,000**
360	36,500		6,700	16,000	23,900	**36,500**
360	36,510	1 7/16	6,700	16,000	23,900	**36,510**
370	37,000		6,800	16,000	23,900	**37,000**
370	37,310	1 15/32	6,800	16,000	23,900	**37,310**
370	37,500		6,900	16,000	23,900	**37,500**
380	38,000		7,000	16,000	23,900	**38,000**
380	38,100	1 1/2	7,000	16,000	23,900	**38,100**
380	38,500	1 33/64	7,100	16,000	23,900	**38,500**
390	39,000		7,100	16,000	23,900	**39,000**
390	39,500		7,200	16,000	23,900	**39,500**
400	40,000		7,300	16,000	23,900	**40,000**

Inserti intercambiabili per Multiplex HPC

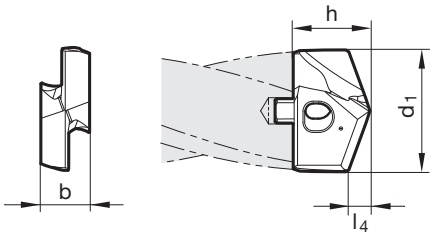
Articolo nr. 86725

P	M	K	N	S	H
○	●			○	○

VHM | a | HPC | WN | 140° | h7 | R

Assott. del nocc. ≥ Ø 11,000 • spoglia sul cono tagliente • Forma del tagliente principale diritta (dopo correzione) • viti Art. nr. 86843 comprese

acciai inossidabili



Grandezza	d1 mm	inch	l4 mm	b mm	h mm	Codice
110	11,000		2,100	4,500	7,500	**11,000**
110	11,200		2,100	4,500	7,500	**11,200**
115	11,500		2,100	4,500	7,500	**11,500**
115	11,510	29/64	2,100	4,500	7,500	**11,510**
115	11,700		2,200	4,500	7,500	**11,700**
115	11,800		2,200	4,500	7,500	**11,800**
115	11,910	15/32	2,200	4,500	7,500	**11,910**
120	12,000		2,200	5,000	7,700	**12,000**
120	12,100		2,300	5,000	7,700	**12,100**
120	12,200		2,300	5,000	7,700	**12,200**
120	12,300	31/64	2,300	5,000	7,700	**12,300**
125	12,500		2,300	5,000	7,700	**12,500**
125	12,600		2,300	5,000	7,700	**12,600**
125	12,700	1/2	2,400	5,000	7,700	**12,700**
125	12,800		2,400	5,000	7,700	**12,800**
125	12,900		2,400	5,000	7,700	**12,900**
130	13,000		2,400	5,500	8,500	**13,000**
130	13,100	33/64	2,400	5,500	8,500	**13,100**
130	13,490	17/32	2,500	5,500	8,500	**13,490**
135	13,500		2,500	5,500	8,500	**13,500**
135	13,600		2,500	5,500	8,500	**13,600**
135	13,700		2,500	5,500	8,500	**13,700**
135	13,800		2,600	5,500	8,500	**13,800**
135	13,890	35/64	2,600	5,500	8,500	**13,890**
140	14,000		2,600	6,000	9,600	**14,000**
140	14,100		2,600	6,000	9,600	**14,100**
140	14,290	9/16	2,700	6,000	9,600	**14,290**
140	14,400		2,700	6,000	9,600	**14,400**
145	14,500		2,700	6,000	9,600	**14,500**
145	14,600		2,700	6,000	9,600	**14,600**
145	14,700		2,700	6,000	9,600	**14,700**
145	14,800		2,700	6,000	9,600	**14,800**
150	15,000		2,800	6,000	9,800	**15,000**
150	15,080	19/32	2,800	6,000	9,800	**15,080**
150	15,100		2,800	6,000	9,800	**15,100**
150	15,200		2,800	6,000	9,800	**15,200**
150	15,300		2,800	6,000	9,800	**15,300**
155	15,500		2,900	6,000	9,800	**15,500**
155	15,600		2,900	6,000	9,800	**15,600**
155	15,700		2,900	6,000	9,800	**15,700**
155	15,800		2,900	6,000	9,800	**15,800**
155	15,870	5/8	2,900	6,000	9,800	**15,870**

HARTNER

Inserti intercambiabili per Multiplex HPC

Grandezza	d1 mm	inch	l4 mm	b mm	h mm	Codice
160	16,000		3,000	7,000	11,000	**16,000**
160	16,270	41/64	3,000	7,000	11,000	**16,270**
165	16,500		3,100	7,000	11,000	**16,500**
165	16,670	21/32	3,100	7,000	11,000	**16,670**
170	17,000		3,100	7,000	11,000	**17,000**
170	17,070	43/64	3,200	7,000	11,000	**17,070**
170	17,460	11/16	3,200	7,000	11,000	**17,460**
175	17,500		3,200	7,000	11,000	**17,500**
175	17,600		3,300	7,000	11,000	**17,600**
175	17,860	45/64	3,300	7,000	11,000	**17,860**
180	18,000		3,300	8,000	12,600	**18,000**
180	18,260	23/32	3,400	8,000	12,600	**18,260**
185	18,500		3,400	8,000	12,600	**18,500**
185	18,650	47/64	3,400	8,000	12,600	**18,650**
190	19,000		3,500	8,000	12,600	**19,000**
190	19,050	3/4	3,500	8,000	12,600	**19,050**
190	19,450	49/64	3,600	8,000	12,600	**19,450**
195	19,500		3,600	8,000	12,600	**19,500**
195	19,600		3,600	8,000	12,600	**19,600**
195	19,840	25/32	3,700	8,000	12,600	**19,840**
200	20,000		3,700	9,000	13,900	**20,000**
200	20,240	51/64	3,700	9,000	13,900	**20,240**
205	20,500		3,800	9,000	13,900	**20,500**
205	20,640	13/16	3,800	9,000	13,900	**20,640**
210	21,000		3,900	9,000	13,900	**21,000**
210	21,030	53/64	3,900	9,000	13,900	**21,030**
210	21,100		3,900	9,000	13,900	**21,100**
210	21,430	27/32	3,900	9,000	13,900	**21,430**
215	21,500		4,000	9,000	13,900	**21,500**
215	21,830	55/64	4,000	9,000	13,900	**21,830**
220	22,000		4,100	10,000	15,300	**22,000**
220	22,220	7/8	4,100	10,000	15,300	**22,220**
225	22,500		4,100	10,000	15,300	**22,500**
225	22,620	57/64	4,200	10,000	15,300	**22,620**
230	23,000		4,200	10,000	15,300	**23,000**
230	23,020	29/32	4,200	10,000	15,300	**23,020**
230	23,420	59/64	4,300	10,000	15,300	**23,420**
235	23,500		4,300	10,000	15,300	**23,500**
235	23,810	15/16	4,400	10,000	15,300	**23,810**
240	24,000		4,400	11,000	15,800	**24,000**
240	24,100		4,400	11,000	15,800	**24,100**
240	24,210	61/64	4,500	11,000	15,800	**24,210**
245	24,500		4,500	11,000	15,800	**24,500**
245	24,610	31/32	4,500	11,000	15,800	**24,610**
250	25,000	63/64	4,600	11,000	15,800	**25,000**
250	25,400	1	4,700	11,000	15,800	**25,400**
255	25,500		4,700	11,000	15,800	**25,500**
255	25,670		4,700	11,000	15,800	**25,670**
255	25,700		4,700	11,000	15,800	**25,700**
260	26,000		4,800	12,000	20,000	**26,000**
260	26,190	1 1/32	4,800	12,000	20,000	**26,190**
265	26,500		4,900	12,000	20,000	**26,500**
265	26,590	1 3/64	4,900	12,000	20,000	**26,590**
270	27,000		5,000	12,000	20,000	**27,000**
275	27,500		5,100	12,000	20,000	**27,500**
275	27,700		5,100	12,000	20,000	**27,700**
275	27,780	1 3/32	5,100	12,000	20,000	**27,780**
280	28,000		5,100	13,000	20,700	**28,000**
280	28,180	1 7/64	5,200	13,000	20,700	**28,180**
285	28,500		5,200	13,000	20,700	**28,500**
285	28,580		5,300	13,000	20,700	**28,580**
290	29,000		5,300	13,000	20,700	**29,000**
290	29,370	1 5/32	5,400	13,000	20,700	**29,370**
295	29,500		5,400	13,000	20,700	**29,500**
295	29,600		5,400	13,000	20,700	**29,600**
295	29,770	1 11/64	5,500	13,000	20,700	**29,770**
300	30,000		5,500	14,000	22,300	**30,000**
300	30,160	1 3/16	5,500	14,000	22,300	**30,160**
305	30,500		5,600	14,000	22,300	**30,500**
305	30,960	1 7/32	5,700	14,000	22,300	**30,960**
310	31,000		5,700	14,000	22,300	**31,000**
315	31,500		5,800	14,000	22,300	**31,500**

Inserti intercambiabili per Multiplex HPC

Grandezza	d1 mm	 inch	l4 mm	b mm	h mm	Codice
315	31,750	1 1/4	5,800	14,000	22,300	**31,750**
320	32,000		5,900	15,000	23,100	**32,000**
320	32,500		6,000	15,000	23,100	**32,500**
320	32,540	1 9/32	6,000	15,000	23,100	**32,540**
320	32,940	1 19/64	6,000	15,000	23,100	**32,940**
330	33,000		6,100	15,000	23,100	**33,000**
330	33,340	1 5/16	6,100	15,000	23,100	**33,340**
330	33,500		6,100	15,000	23,100	**33,500**
340	34,000		6,200	15,000	23,100	**34,000**
340	34,130	1 11/32	6,300	15,000	23,100	**34,130**
340	34,500		6,300	15,000	23,100	**34,500**
340	34,930		6,400	15,000	23,100	**34,930**
350	35,000		6,400	15,000	23,100	**35,000**
350	35,500		6,500	15,000	23,100	**35,500**
350	35,720	1 13/32	6,600	15,000	23,100	**35,720**
360	36,000		6,600	16,000	23,900	**36,000**
360	36,500		6,700	16,000	23,900	**36,500**
360	36,510	1 7/16	6,700	16,000	23,900	**36,510**
370	37,000		6,800	16,000	23,900	**37,000**
370	37,310	1 15/32	6,800	16,000	23,900	**37,310**
370	37,500		6,900	16,000	23,900	**37,500**
380	38,000		7,000	16,000	23,900	**38,000**
380	38,100	1 1/2	7,000	16,000	23,900	**38,100**
380	38,500	1 33/64	7,100	16,000	23,900	**38,500**
390	39,000		7,100	16,000	23,900	**39,000**
390	39,500		7,200	16,000	23,900	**39,500**
400	40,000		7,300	16,000	23,900	**40,000**

Inserti a svasare Multiplex HPC

Articolo nr. 86726

P	M	K	N	S	H
○		●			

VHM | A | WN | N

ghisa grigia, ghisa malleabile, ghisa sferoidale

ISO	Grandezza supporto	**Codice**
CPGW050202FN-K	110-140	**52,020**
CPGW050204FN-K	110-140	**52,040**
CPGW060202FN-K	160-180	**62,020**
CPGW060204FN-K	160-180	**62,040**
CPGW09T308FN-K	300-360	**93,080**

ISO	Grandezza supporto	**Codice**

Articolo nr. 86727

P	M	K	N	S	H
			●		

VHM | ○ | WN | R

alluminio e leghe di alluminio • metalli non ferrosi

ISO	Grandezza supporto	**Codice**
CPGT050202FR-AL	110-140	**52,020**
CPGT050204FR-AL	110-140	**52,040**
CPGT060202FR-AL	160-180	**62,020**
CPGT060204FR-AL	160-180	**62,040**
CPGT09T308FR-AL	300-360	**93,080**

ISO	Grandezza supporto	**Codice**

Inserti a svasare Multiplex HPC

Articolo nr. 86728

P	M	K	N	S	H
●	○	○		○	○

VHM

acciaio e ghisa acciaiosa (legati e non legati)

ISO	Grandezza supporto	Codice
CPGT050202FR-P	110-140	**52,020**
CPGT050204FR-P	110-140	**52,040**
CPGT060202FR-P	160-180	**62,020**
CPGT060204FR-P	160-180	**62,040**
CPGT09T308FR-P	300-360	**93,080**

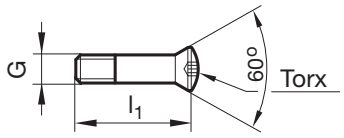
ISO	Grandezza supporto	Codice

Viti di serraggio per placchette 1.5-10xD

Articolo nr. 86843

WN

Per la corretta scelta delle viti di serraggio/corpo portaplacchetta vi inviatmo a consultare “Tecnologia e vantaggi Multiplex HPC”



G	l1 mm	Torx	**Codice**
M 2,2	9,500	T7	**2,200**
M 2,2	10,500	T7	**2,201**
M 2,5	11,400	T8	**2,500**
M 3	12,100	T9	**3,000**
M 3	13,100	T9	**3,001**
M 3,5	14,250	T10	**3,500**
M 4	16,000	T15	**4,000**
M 4,5	18,000	T15	**4,500**
M 5	19,750	T20	**5,000**
M 5	21,750	T20	**5,001**
M 5	23,400	T20	**5,003**
M 6	27,000	T25	**6,000**

G	l1 mm	Torx	**Codice**
M 6	28,500	T25	**6,001**
M 6	32,500	T25	**6,002**

Articolo nr. 86844

WN

Attacco esagonale

Esagono	Momento torcente Nm	L mm	Tipo	**Codice**
1/4”	0,8...2	160,000	A	**2,000**
1/4”	2...8	200,000	A	**8,000**
1/4”	0,4...14	200,000	A	**14,000**

Inserti Torx

Articolo nr. 86845

WN

Esagono		Torx	L mm	**Codice**
1/4	esagono	T7	25,000	**7,000**
1/4	esagono	T8	25,000	**8,000**
1/4	esagono	T9	25,000	**9,000**
1/4	esagono	T10	25,000	**10,000**
1/4	esagono	T15	25,000	**15,000**
1/4	esagono	T20	25,000	**20,000**
1/4	esagono	T25	25,000	**25,001**

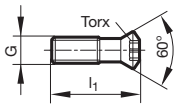
HARTNER

Viti di serraggio per svasatori Multiplex HPC

Articolo nr. 86846

WN

Per la corretta scelta delle viti di serraggio/corpo portaplacchetta vi inviatmo a consultare “Tecnologia e vantaggi Multiplex HPC”



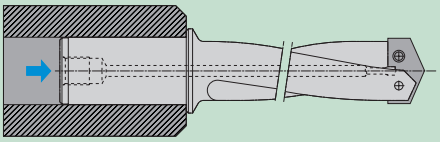
G	l1 mm	Torx	**Codice**
M 2,0X5,50	5,500	T6	**2,000**
M 2,0X5,30	5,300	T7	**2,500**
M 4 X9,50	9,500	T15	**4,006**

G	l1 mm	Torx	**Codice**

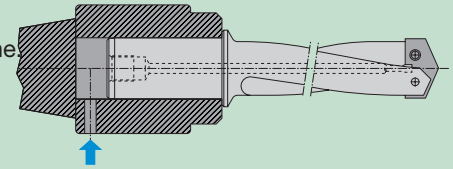
Multiplex – L‘alternativa versatile

Ogni corpo portaplacchetta Multiplex dispone di un canale interno di refrigerazione, che garantisce un’alimentazione ottimale del lubrorefrigerante ai taglienti nella foratura sia orizzontale che verticale e ne prolunga la durata.
Al contempo il refrigerante provvedere anche a uno scarico ottimizzato dei trucioli dal foro.
La refrigerazione avviene in modo differente nelle diverse versioni di codolo:

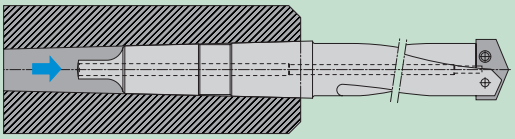
Foro di alimentazione sul lato anteriore del codolo
Per utensili **fissi** e **rotanti**:
Alimentazione assiale del refrigerante attraverso il portautensile.
Per corpi portaplacchetta con codolo cilindrico Ø foro 10 - 102 mm.
Corpo portaplacchetta Art. n. 86612/86622/86624/86730/86740/86750 e corpi extra lunghi



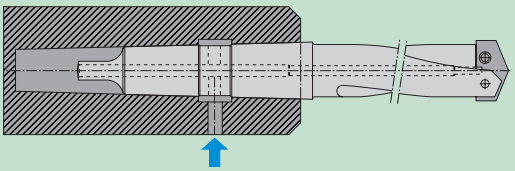
Foro di alimentazione sul lato anteriore del codolo con mandrino di alimentazione. Per utensili **rotanti**:
Alimentazione radiale del refrigerante attraverso il mandrino di alimentazione.
Per corpi portaplacchetta con codolo cilindrico e Ø foro 10 - 102 mm.
Corpo portaplacchetta Art. n. 86612/86622/86624/86730/86740/86750 e corpi extr a lunghi, mandrini SK40/50 int. cil. e MK4/5/6 int. cil.



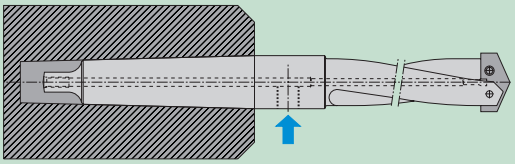
Foro di alimentazione sul dente di trascinamento
Per utensili **fissi** e **rotanti**:
Alimentazione assiale del refrigerante attraverso il portautensile.
Per corpi con codolo conico Morse e
Ø foro 10 - 25 mm.
Corpo portaplacchetta Art. n. 86630/86650



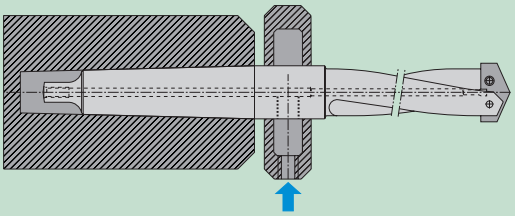
Foro di alimentazione laterale sul cono Morse
Per utensili **rotanti**:
Alimentazione radiale del refrigerante attraverso il portautensile.
Per corpi portaplacchetta con codolo conico Morse e
Ø foro 10 - 25 mm.
Corpi a richiesta



Foro di alimentazione laterale sulla sede della superficie di scorri-mento anulare. Per utensil **rotanti**:
Alimentazione del refrigerante tramite raccordo diretto tubo flessibile/rigido con filettatura R1/4” e R1/2”. Per corpi portaplacchetta con codolo conico Morse e sede per anello alimentatore per Ø foro 25 - 102 mm.
Corpo portaplacchetta Art. n. 86670/86680 e corpi extra lunghi

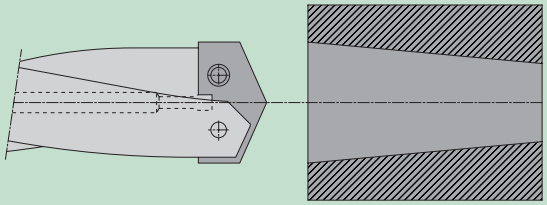


Foro di alimentazione laterale sulla sede della superficie di scorrimento anulare.
Per utensili **rotanti**:
Alimentazione radiale del refrigerante attraverso l’anello alimentatore.
Per corpi portaplacchetta con codolo conico Morse e superficie di scorrimento anulare per Ø foro da 25 mm.
Corpo portaplacchetta Art. n. 86670/86680 e corpi extra lunghi

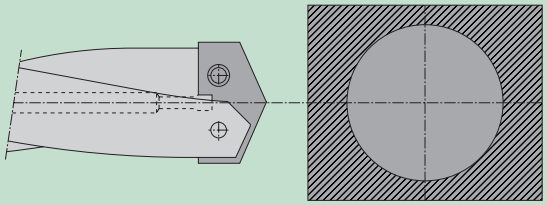


Multiplex – Consigli e trucchi

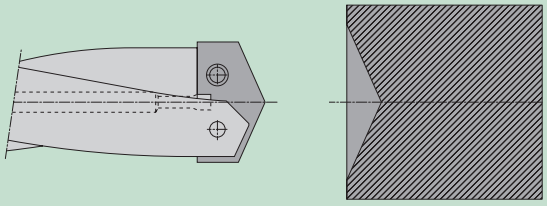
Allargatura di fori
Poiché il sistema Multiplex è guidato principalmente dal tagliente trasversale, non è idoneo per l'allargatura di fori prefusi o preforati. Se il sistema deve comunque essere utilizzato, è necessario ridurre i parametri d'impiego.



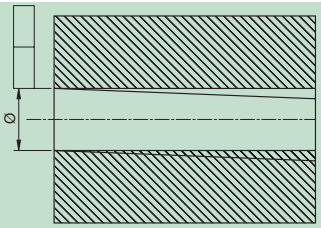
Foratura in sezione interrotta
Il sistema Multiplex non è idoneo per la foratura in sezione interrotta (per es. fori trasversali che sono più grandi del diametro del foro).



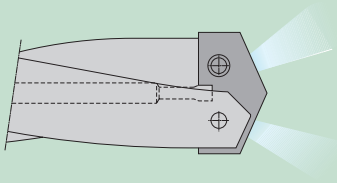
Centraggio del foro
Le placchette di foratura del sistema Multiplex sono assottigliate in punta. Il centraggio è pertanto necessario soltanto a partire da profondità maggiori del foro. Qualora il centraggio sia necessario per motivi tecnici, l'angolo al vertice del centraggio deve essere uguale o maggiore dell'angolo al vertice della placchetta di taglio. Ciò corrisponde a: < d = 25,4 mm = 135°
< d = 66,0 mm = 132°
> d = 66,0 mm = 140°
Per l'alesatura può anche essere usato un corpo portaplacchetta corto (3xD).



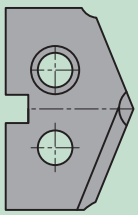
Andamento della punta
L'andamento della punta dipende da diversi fattori.
Come valore indicativo per profondità del foro fino a 7xD può essere assunto un valore di circa 0,1-0,16 mm.
Tuttavia in questo caso dovrebbe sempre essere impiegato il tipo di corpo più corto e quindi più stabile.



Pressione del refrigerante
Il refrigerante nel sistema Multiplex è estremamente importante per lo scarico trucioli. Può essere utilizzato a partire da una pressione di circa 5 bar. In generale vale tuttavia la seguente regola: più refrigerante c'è a disposizione, meglio è. Tramite l'impiego di anelli o mandrini alimentatori, il sistema Multiplex può essere utilizzato anche con il raffreddamento esterno impiegato sulle macchine più vecchie.
L'applicazione prevista può comunque essere discussa in qualunque momento con i nostri tecnici.

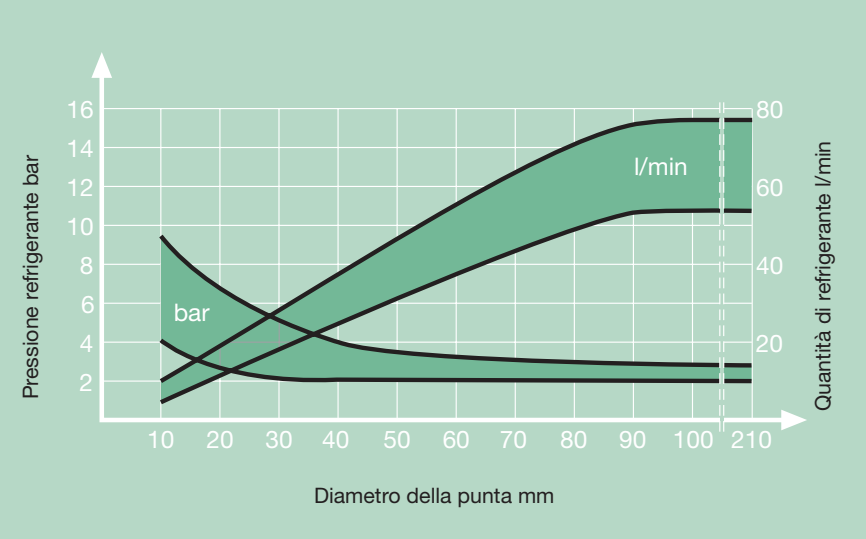


Forte usura dei taglienti
Quando sugli angoli dei taglienti si è formato un gradino, significa che la velocità di taglio è troppo elevata e deve essere ridotta. Misurate il diametro che si è consumato e calcolate nuovamente la velocità di taglio sulla base di questo valore. Sottraete il 10% da questo nuovo numero di giri e immettete il valore nella macchina.



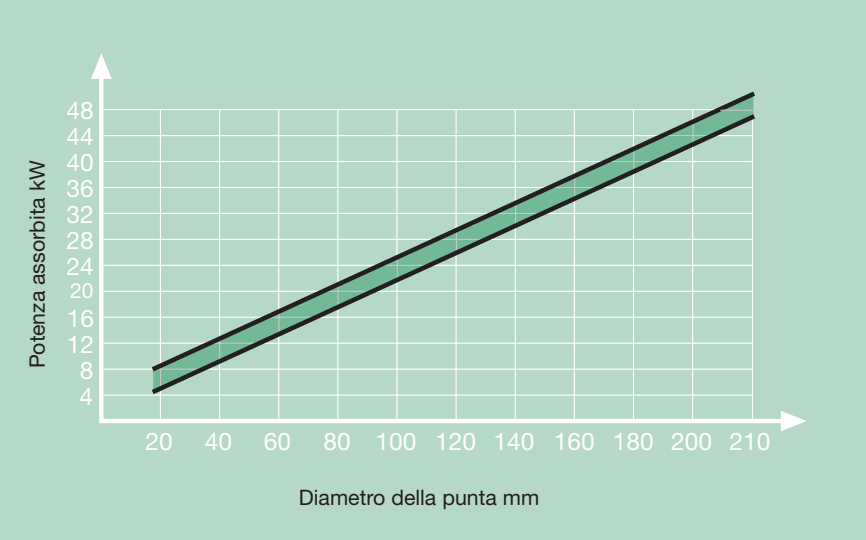
Multiplex – Il gruppo refrigerante

Un gruppo refrigerante efficiente ha un'importanza fondamentale. Qualora la pressione e la quantità del refrigerante non fossero sufficienti, ciò può produrre una superficie di foratura insoddisfacente oppure causare la rottura dell'utensile.
La dimensione delle particelle di solidi nel refrigerante non deve possibilmente superare 50 µm. Per l'impiego degli utensili Multiplex e per placchette intercambiabili sia in acciaio rapido che in metallo duro, raccomandiamo di utilizzare come liquido di refrigerazione un'emulsione per foratura nel rapporto di miscelazione consueto di 1 : 20. Ancora più importanti della composizione dell'emulsione sono la pressione e la quantità del liquido di refrigerazione. Un gruppo refrigerante efficiente è pertanto un presupposto essenziale per un raffreddamento e una lubrificazione soddisfacenti.



Macchina e pezzo in lavorazione

Soltanto la stabilità di macchina, mandrino, serraggio del pezzo e pezzo in lavorazione consentono di impiegare il metallo duro come materiale dei taglienti. Una rigidità insufficiente provoca delle vibrazioni oppure uno stallo della punta nei fori passanti, quando il tagliente trasversale fuoriesce dal pezzo. Le conseguenze possono essere lunghezze di taglio ridotte o rottura della placchetta.



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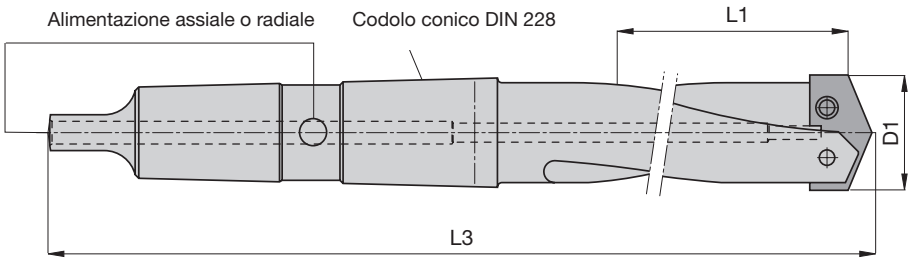
Multiplex – A richiesta forniamo soluzioni speciali

(BARRARE LE OPZIONI RICHIESTE)

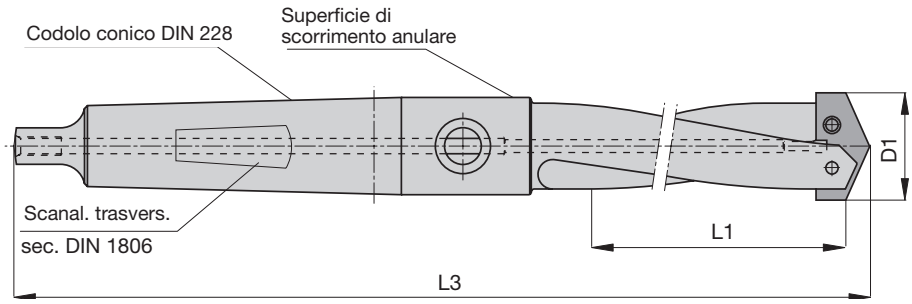
☐ **Corpo con cono morse**



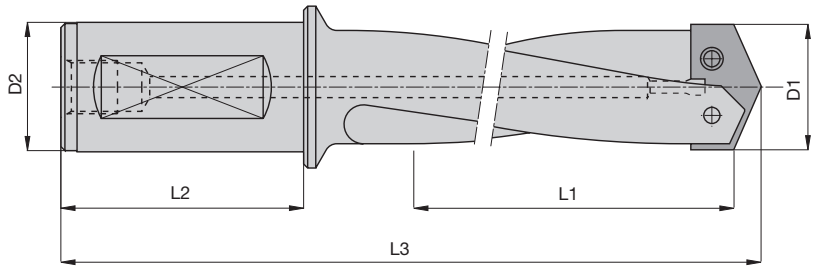
☐ **Corpo con cono morse e superficie di scorrimento anulare per anello alimentatore Art. n. 86690**

☐ **con scanalatura trasversale**

☐ **senza scanalatura trasversale**



☐ **Corpo con codolo cilindrico**



Per formulare un'offerta abbiamo bisogno anche dei seguenti dati:

Diametro foro (dia. massimo corpo 140 mm) .....

Materiale da lavorare .....

Profondità foro L1 .....

Pressione liquido di refrigerazione .....

Lunghezza scanalatura .....

Quantità (min. 2 pezzi) .....

Lunghezza totale (fino ca. 1000 mm) .....

Scanalatura trasversale (per cono Morse) .....

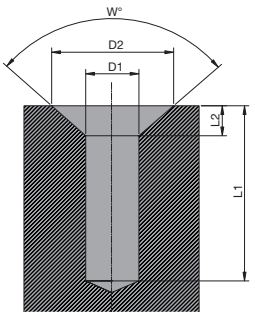
Diametro codolo (per codolo Weldon) .....

Per eventuali domande, i nostri tecnici sono a disposizione sia telefonicamente che in loco.

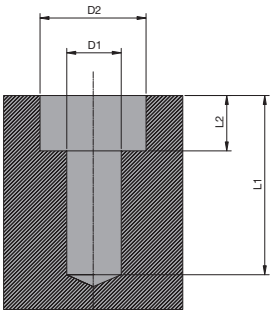
HARTNER

Multiplex – Per forature a gradino speciali abbiamo bisogno dei seguenti dati

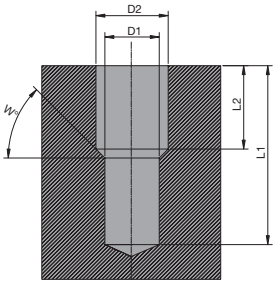
Punta a gradino
per foro maschio filettato
con svasatura 90°



Punta a gradino
con angolo gradino 180°



Punta a gradino con ang. gradino
liberamente selezionabile



Per formulare un'offerta abbiamo bisogno anche dei seguenti dati:

Forma del foro ..... Barrare una delle opzioni sopra

Angolo W° .....

Diametro D1 .....

Materiale da lavorare l .....

Diametro D2 .....

Lunghezza L1 .....

Lunghezza L2 .....

Telefono 07431/125-0 oppure inviateci un disegno quotato.

Multiplex – Geometrie speciali

Placchetta sagomata su disegno del cliente (HSS-E/HSS-E-PM o MD).

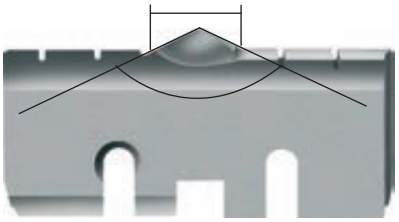
Placchetta NC (HSS-E/HSS-E-PM o MD) con angolatura a 90° o 120° (l'angolo di 90° della punta viene deformato secondo il Ø della placchetta).

Placchetta raggiata (HSS-E/HSS-E-PM o MD).

Placchetta a gradino (HSS-E/PM HSS-E oppure MD).

Geometria alluminio (MD) per la lavorazione di metalli leggeri e materie plastiche (MD).

Ø = 2x larghezza di placchetta



Placchetta a gradino (HSS-E/HSS-E-PM o MD).

Geometria ottone (MD) per la lavorazione dell'ottone e di materiali similari (MD).

Placchetta foro cieco* con punta di centraggio (HSS-E o HSS-E-PM).

Superficie levigata per materie plastiche rinforzate con fibre (MD).

*** Per utilizzo in fori ciechi e placche a modelli tenere presente quanto segue:**

- utilizzare soltanto corpi corti
- preforare con una normale placchetta Multiplex (stesso Ø oppure Ø più piccolo)
- solo in casi limitati adatte per forature dal pieno
- inviare possibilmente disegno del foro da eseguire

Geometrie speciali fornibili a richiesta con i diversi rivestimenti della nostra gamma.
Interpellateci. Tempo di consegna circa 3 settimane.

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Multiplex HPC – Tecnologia e vantaggi

Con il sistema di foratura intercambiabile Multiplex HPC Hartner offre corpi portaplacchette e inserti intercambiabili ad alte prestazioni e costi contenuti per fori con Ø da mm 11 a mm 40, i quali garantiscono i seguenti vantaggi:

- **Alta resistenza all'usura**
  Grazie a speciali taglienti microlavorati e applicazioni orientate alla finitura delle superfici gli inserti intercambiabili del sistema di foratura Multiplex HPC sono particolarmente resistenti all'usura. Anche il corpo portaplacchetta Multiplex HPC possiede una elevata resistenza all'usura. Ciò è possibile grazie a un'ottimizzazione del materiale del corpo, al trattamento di ricopertura al nickel e alla maggiorazione delle dimensioni del corpo nelle grandezze con passo mm 0,5 fino a Ø mm 31,99 e con passo mm 1 fino a Ø mm 32. Questo comporta una minore usura al corpo portaplacchetta.

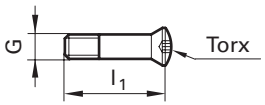
- **Scanalature ottimizzate**
  Grazie ad una ottimizzazione della sezione trasversale delle scanalature il supporto dell Multiplex HPC assicura una ottimale evacuazione del truciolo dal foro anche con grandi profondità di foratura.

- **Perfetta lubrificazione di raffreddamento**
  Una perfetta lubrificazione di raffreddamento è assicurata da condotti di lubrificazione con sezione trasversale massima, in uscita nelle scanalature. In tal modo è possibile un ottimale raffreddamento dei taglienti e un supporto addizionale all'evacuazione del truciolo dal foro.

- **Alta precisione e stabilità della sede dell'inserto**
  L'accurata esecuzione della sede consente il cambio inserto in pochi e semplici passaggi. Grazie all'ottimizzazione del materiale dei corpi portaplcchette del sistema di foratura Multiplex HPC, l'inserto può essere cambiato più frequentemente rispetto ai sistemi convenzionali, prima che il corpo stesso venga danneggiato dall'azione di usura sulla sede dell'inserto. Le viti di serraggio con chiusura a vite garantiscono un sicuro bloccaggio dell'inserto intercambiabile nel supporto anche con macchine soggette ad alti livelli di vibrazioni.

- **Supporti rigidi**
  La ridotta differenza di diametro con la dimensione del corpo non solo diminuisce l'usura. Attraverso una migliore guida dell'utensile nel foro essi aumentano la rigidità del sistema Multiplex HPC. Conseguentemente una maggiore vita utensile così come una migliore superficie del pezzo lavorato.

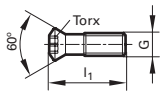
Scelta viti di serraggio per i corpi portaplacchette 1,5 - 10 x D 86843



per grandezza corpo	Torx	Codice No.
110/115	T7	2,200
120/125	T7	2,201
130/135	T8	2,500
140/145	T9	3,000
150/155	T9	3,001
160 - 175	T10	3,500
180 - 195	T15	4,000
200 - 215	T15	4,500

per grandezza corpo	Torx	Codice No.
220 - 235	T20	5,000
240 - 255	T20	5,001
260 - 295	T20	5,003
300 - 315	T25	6,000
320 - 350	T25	6,001
360 - 390	T25	6,002

per i corpi svasatori 86846



per grandezza corpo	Torx	Codice No.
110 - 140	T6	2,000
160 - 280	T7	2,500
300 - 360	T15	4,006

Quando verrà cambiato l'inserto raccomandiamo di cambiare anche la vite di bloccaggio!
Ogni supporto viene fornito con una vite di bloccaggio, art. 86843 e un giravite art. 86842.
Ogni inserto intercambiabile viene fornito con una vite di bloccaggio art. 86843.

Coppie di serraggio per vite di serraggio:

Gamma diametri	**11,0 - 12,99**	**13,0 - 13,99**	**14,0 - 15,99**	**16,0 - 17,99**	**18,0 - 19,99**	**20,0 - 21,99**	**22,0 - 29,99**	**30,0 - 40,00**
Filetto	M2,2	M2,5	M3	M3,5	M4	M4,5	M5	M6
Dimensioni Torx	T7	T8	T9	T10	T15	T15	T20	T25
Coppia di serraggio [Nm]	**0,8**	**1,0**	**1,7**	**2,7**	**4,0**	**6,0**	**8,0**	**14,0**

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Multiplex HPC – Questionario per utensili speciali

☐ **Ordine** ☐ **Richiesta**

Persona di riferimento

Nome/Nr. cliente se disponibile — New customer

Nr. ordine

Indirizzo

Città/cap

Telefono

Fax

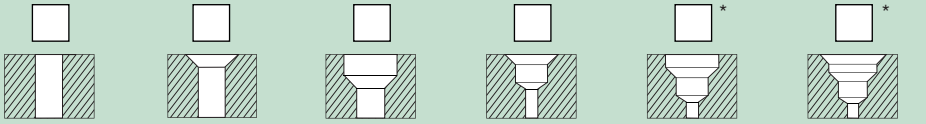
Data

Firma

Quantità ▶ corpi inserti

Materiale da lavorare ▶

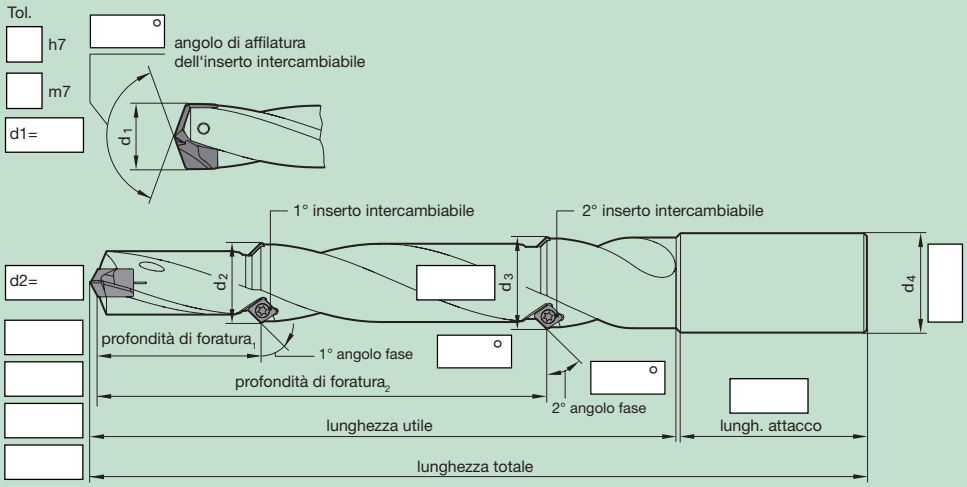
Lavorazione ▶



*please incl. separate drawing

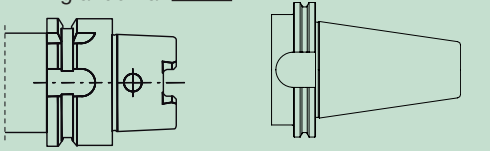
Elica ▶ ☐ a spirale ☐ parzialmente a spirale ☐ diritta

Dimensioni
Per tipo con elica a spirale e diritta ▶



Forma attacco ▶

☐ HA ☐ HE ☐ HSK, forma ____ grandezza ____ ☐ SK, grand- ____ ezza ____



Refrigerazione int. ▶ ☐ sì ☐ no

Rivestimento inserto ▶ ☐ FIRE ☐ TiAlN SuperA ☐ TiAlN ☐ TiCN ☐ TiN ☐ lucido ☐ nano FIRE ☐ AlTiN nano

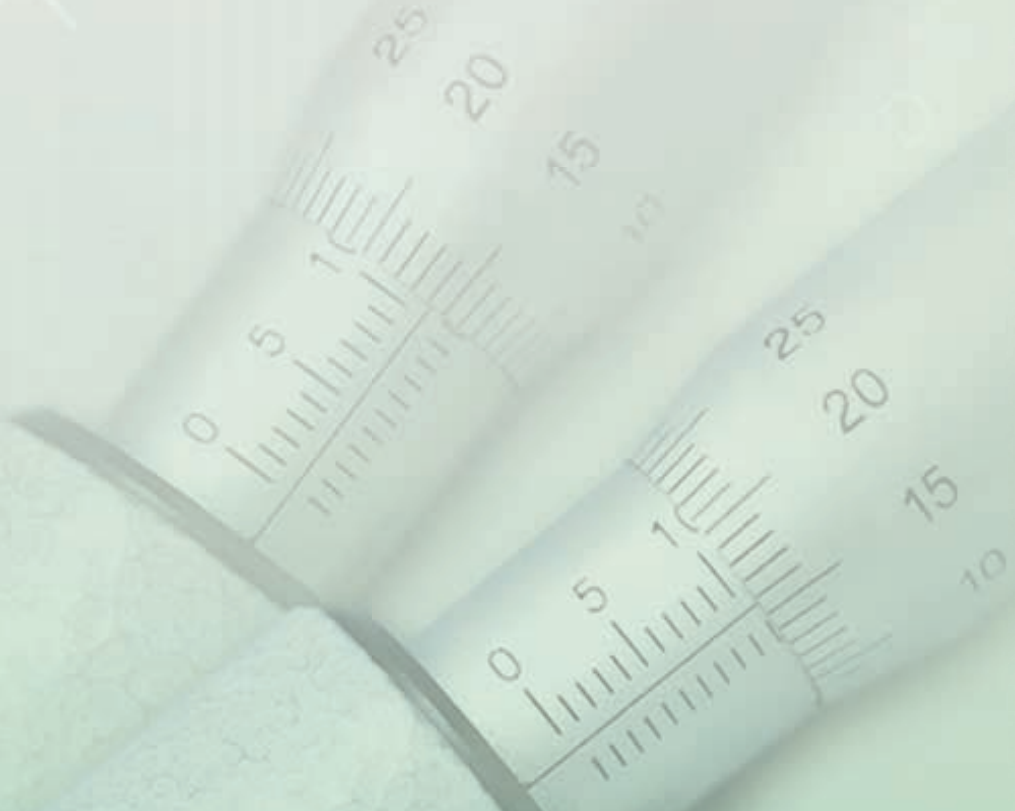
d
D

HARTNER

Precision Cutting Tools

PARTE TECNICA

Misure, Definizioni, Valori indicativi



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Indice
Misure, definizioni

Descrizione	pagina
Punte elicoidali con codolo conico Morse - Lunghezze	421
Punte elicoidali con codolo cilindrico - Lunghezze	422
Materiali taglienti per utensili Hartner	423
Rivestimenti e ricopertura	426
Tabella di conversione pollici - millimetri	430
Dimensioni di codoli cilindrici in acciaio rapido secondo DIN 1835	431
Dimensioni di codoli cilindrici in metallo duro secondo DIN 6535	432
Dimensioni di codoli conici Morse secondo DIN 228 forma B	433
Diametri dei fori di filettatura per la maschiatura	434
Diametri dei fori consigliati per maschiatura a rullare	436
Le nuove abbreviazioni per materiali (scelta)	438
Tolleranze di diametro	439
Definizione di punte elicoidali secondo DIN ISO 5419	440
Affilature normali e speciali	441
Angolo di spoglia/Indice di frequenza	442
Diagrammi del refrigerante - Pressione e volume del refrigerante	443
Consigli per l'impiego di punte convenzionali ≤ 3 x D	444
Consigli per l'impiego di punte convenzionali ≤ 5 x D	448
Consigli per l'impiego di punte convenzionali ≤ 10 x D	456
Consigli per l'impiego di punte con fori di refrigerazione ≤ 10 x D e > 10 x D	459
Consigli per l'impiego di punte convenzionali > 10 x D	460
Consigli per l'impiego di micropunte	462
Consigli per l'impiego di TS-Drills ≤ 3 x D	464
Consigli per l'impiego di TS-Drills ≤ 4 x D / ≤ 5 x D	466
Consigli per l'impiego di TS-Drills ≤ 7 x D, ≤ 10 x D e ≤ 12 x D	470
Consigli per l'impiego di TS-Drills ≤ 15 x D e TS 100 T	472
Consigli per l'impiego di punte a cannone	474
Consigli per l'impiego del sistema Multiplex di inserti intercambiabili	476
Consigli per l'impiego del sistema Multiplex di inserti intercambiabili HPC	478

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Lunghezze
Punte elicoidali con codolo cilindrico

Ø mm oltre	fino a	DIN 1897 Lung. totale mm	DIN 1897 Lung. elica mm	DIN 338 Lung. totale mm	DIN 338 Lung. elica mm	DIN 339 Lung. totale mm	DIN 339 Lung. elica mm	DIN 340 Lung. totale mm	DIN 340 Lung. elica mm	DIN 1869 Lung. totale mm	DIN 1869 Lung. elica mm	DIN 1869 Lung. totale mm	DIN 1869 Lung. elica mm	DIN 1869 Lung. totale mm	DIN 1869 Lung. elica mm
										serie 1		serie 2		serie 3	
0,19 –	0,24			19	2,5										
0,24 –	0,30			19	3										
0,30 –	0,38			19	4										
0,38 –	0,48			20	5										
0,48 –	0,53	20	3	22	6	28	12	32	12						
0,53 –	0,60	21	3,5	24	7	32	15	35	15						
0,60 –	0,67	22	4	26	8	36	18	38	18						
0,67 –	0,75	23	4,5	28	9	39	20	42	21						
0,75 –	0,85	24	5	30	10	42	22	46	25						
0,85 –	0,95	25	5,5	32	11	45	24	51	29						
0,95 –	1,06	26	6	34	12	48	26	56	33						
1,06 –	1,18	28	7	36	14	50	28	60	37						
1,18 –	1,32	30	8	38	16	52	30	65	41						
1,32 –	1,50	32	9	40	18	55	33	70	45						
1,50 –	1,70	34	10	43	20	58	35	76	50						
1,70 –	1,90	36	11	46	22	62	38	80	53						
1,90 –	2,12	38	12	49	24	66	41	85	56	125	85				
2,12 –	2,36	40	13	53	27	70	44	90	59	135	90				
2,36 –	2,65	43	14	57	30	74	47	95	62	140	95				
2,65 –	3,00	46	16	61	33	79	51	100	66	150	100	190	130		
3,00 –	3,35	49	18	65	36	84	55	106	69	155	105	200	135		
3,35 –	3,75	52	20	70	39	91	60	112	73	165	115	210	145	265	180
3,75 –	4,25	55	22	75	43	96	64	119	78	175	120	220	150	280	190
4,25 –	4,75	58	24	80	47	102	69	126	82	185	125	235	160	295	200
4,75 –	5,30	62	26	86	52	108	74	132	87	195	135	245	170	315	210
5,30 –	6,00	66	28	93	57	116	80	139	91	205	140	260	180	330	225
6,00 –	6,70	70	31	101	63	124	86	148	97	215	150	275	190	350	235
6,70 –	7,50	74	34	109	69	133	93	156	102	225	155	290	200	370	250
7,50 –	8,50	79	37	117	75	142	100	165	109	240	165	305	210	390	265
8,50 –	9,50	84	40	125	81	151	107	175	115	250	175	320	220	410	280
9,50 –	10,60	89	43	133	87	162	116	184	121	265	185	340	235	430	295
10,60 –	11,80	95	47	142	94	173	125	195	128						
11,80 –	13,20	102	51	151	101	184	134	205	134						
13,20 –	14,00	107	54	160	108	194	142	214	140						
14,00 –	15,00	111	56	169	114	202	147	220	144						
15,00 –	16,00	115	58	178	120	211	153	227	149						
16,00 –	17,00	119	60	184	125	218	159	235	154						
17,00 –	18,00	123	62	191	130	226	165	241	158						
18,00 –	19,00	127	64	198	135	234	171	247	162						
19,00 –	20,00	131	66	205	140	242	177	254	166						
20,00 –	21,20	136	68					261	171						
21,20 –	22,40	141	70					268	176						
22,40 –	23,60	146	72					275	180						
23,60 –	25,00	151	75					282	185						
25,00 –	26,50	156	78												
26,50 –	28,00	162	81												
28,00 –	30,00	168	84												
30,00 –	31,50	174	87												
31,50 –	33,50	180	90												
33,50 –	35,50	186	93												
35,50 –	37,50	193	96												
37,50 –	40,00	200	100												

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Punte elicoidali con codolo conico Morse

Ø mm oltre	fino a	DIN 345 Lung. totale mm	DIN 345 Lung. elica mm	DIN 345 CM	DIN 346 Lung. totale mm	DIN 346 Lung. elica mm	DIN 346 CM	DIN 341 Lung. totale mm	DIN 341 Lung. elica mm	DIN 341 CM	DIN 1870 Lung. totale mm	DIN 1870 Lung. elica mm	DIN 1870 CM	DIN 1870 Lung. totale mm	DIN 1870 Lung. elica mm	DIN 1870 CM
											serie 1			serie 2		
2,65	3,00	114	33	1												
3,00	3,35	117	36	1												
3,35	3,75	120	39	1												
3,75	4,25	124	43	1				145	64	1						
4,25	4,75	128	47	1				150	69	1						
4,75	5,30	133	52	1				155	74	1						
5,30	6,00	138	57	1				161	80	1						
6,00	6,70	144	63	1				167	86	1						
6,70	7,50	150	69	1				174	93	1						
7,50	8,50	156	75	1				181	100	1	265	165	1	330	210	1
8,50	9,50	162	81	1				188	107	1	275	175	1	345	220	1
9,50	10,60	168	87	1	185	87	2	197	116	1	285	185	1	360	235	1
10,60	11,80	175	94	1	192	94	2	206	125	1	300	195	1	375	250	1
11,80	13,20	182	101	1	199	101	2	215	134	1	310	205	1	395	260	1
13,20	14,00	189	108	1	206	108	2	223	142	1	325	220	1	410	275	1
14,00	15,00	212	114	2	235	114	3	245	147	2	340	220	2	425	275	2
15,00	16,00	218	120	2	241	120	3	251	153	2	355	230	2	445	295	2
16,00	17,00	223	125	2	246	125	3	257	159	2	355	230	2	445	295	2
17,00	18,00	228	130	2	251	130	3	263	165	2	370	245	2	465	310	2
18,00	19,00	233	135	2	256	135	3	269	171	2	370	245	2	465	310	2
19,00	20,00	238	140	2	261	140	3	275	177	2	385	260	2	490	325	2
20,00	21,20	243	145	2	266	145	3	282	184	2	385	260	2	490	325	2
21,20	22,40	248	150	2	271	150	3	289	191	2	405	270	2	515	345	2
22,40	23,02	253	155	2	276	155	3	296	198	2	405	270	2	515	345	2
23,02	23,60	276	155	3	276	155	3	319	198	3	425	270	3	535	345	3
23,60	25,00	281	160	3	309	160	4	327	206	3	440	290	3	555	365	3
25,00	26,50	286	165	3	314	165	4	335	214	3	440	290	3	555	365	3
26,50	28,00	291	170	3	319	170	4	343	222	3	460	305	3	580	385	3
28,00	30,00	296	175	3	324	175	4	351	230	3	460	305	3	580	385	3
30,00	31,50	301	180	3	329	180	4	360	239	3	480	320	3	610	410	3
31,50	31,75	306	185	3	334	185	4	369	248	3	480	320	3	610	410	3
31,75	33,50	334	185	4	372	185	5	397	248	4	505	320	4	635	410	4
33,50	35,50	339	190	4	377	190	5	406	257	4	530	340	4	665	430	4
35,50	37,50	344	195	4	382	195	5	416	267	4	530	340	4	665	430	4
37,50	40,00	349	200	4	387	200	5	426	277	4	555	360	4	695	460	4
40,00	42,50	354	205	4	392	205	5	436	287	4	555	360	4	695	460	4
42,50	45,00	359	210	4	397	210	5	447	298	4	585	385	4	735	490	4
45,00	47,50	364	215	4	402	215	5	459	310	4	585	385	4	735	490	4
47,50	50,00	369	220	4	407	220	5	470	321	4	605	405	4	765	510	4
50,00	50,80	374	225	4	412	225	5									
50,80	53,00	412	225	5												
53,00	56,00	417	230	5												
56,00	60,00	422	235	5												
60,00	63,00	427	240	5												
63,00	67,00	432	245	5												
67,00	71,00	437	250	5												
71,00	75,00	442	255	5												
75,00	76,20	447	260	5												
76,20	80,00	514	260	6												
80,00	85,00	519	265	6												
85,00	90,00	524	270	6												
90,00	95,00	529	275	6												
95,00	100,00	534	280	6												

Materiali taglienti per utensili Hartner

Acciai super rapidi

Designazione breve	Designazione acciaio	N. materiale (chiave x acciai)	Campo di impiego	Acciai esteri corrispondenti			
				USA	Francia	Italia	Gran Bretagna
HSS	S-6-5-2 (DMO5)	1.3343	Materiale tagliente standard per impiego universale	M 2	Z 90 WDCV 06-05-04-02	HS 6-5-2	BM 2
HSCO HSS-E	S-6-5-2-5 (EMO5CO5)	1.3243	Alta resistenza al calore, adatti soprattutto per sgrossare o con refrigerazione insufficiente	M 35	Z 90 WDKCV 06-05-05-04-02	HS 6-5-2-5	BM 35
HSS-E	S-6-5-3 (EMO5V3)	1.3344	Alta stabilità degli spigoli taglienti, importante in alesatura	M 3	Z 120 WDCV 06-05-04-03	HS 6-5-3	-
M42 HSS-E	S-2-10-1-8	1.3247	Elevata resistenza al calore e durezza, adatti per lavorare in materiali di difficile truciolabilità	M 42	Z 110 DKCWV 09-08-04-02-01	HS 2-9-1-8	BM 42
HSS-E-PM	S-6-5-3-9 ASP 30	-	Alta durezza, resistenza al calore e stabilità degli spigoli taglienti, struttura molto spessa e costante	-	-	-	-

Metalli duri

Articoli	Materiale tagliente Ricopertura		Campo di impiego	Applicazione
Placchette Multiplex	MD H22	FIRE TiN	Micrograna K20-K40	per ghisa grigia, metalli non ferrosi materiali sintetici acciai e ghisa acciaiosa
Punte elicoidali in MD	MD		K10-K20	per ghisa grigia, acciai, leghe di alluminio, materie plastiche termoindurenti, CFK, GFK
TS-Drill U in MD	MD	FIRE TiN	Micrograna K/P	per acciaio con R fino a ca. 1200 N/mm2
TS-Drill U in MD	MD	FIRE TiN	Micrograna K/P	per ghisa grigia, acciai legati e non legati a basso e alto tenore, ottone, bronzo, materiali plastici
TS-Drill U in MD	MD	FIRE TiN	Micrograna K/P	per materiali a trucioli corti p.es. ghisa grigia, ghisa sferoidale, leghe di alluminio al silicio
TS-Drill R in MD	MD	FIRE	Micrograna K/P	per GGV e ADI
TS-150 GG in MD	MD		Micrograna K	per materiali a trucioli corti p.es. ghisa, ghisa grigia, ghisa grigia bonificata, ghisa malleabile
TS 100 T in MD	MD	TiAlN	Micrograna K/P	per acciai e ghisa
TS 100 INOX in MD	MD	AlTiN nano	Micrograna K/P	per acciai non ferrosi
TS 100 H in MD	MD	TiAlSiN	Micrograna K/P	per acciai temprati e molto duri, leghe speciali

In virtù della possibilità d'impiego universale dei nostri nuovi metalli duri K, i gruppi d'impiego MD vengono ormai definiti soltanto con K (per utensili non ricoperti) o K/P (per utensili ricoperti).

Il materiale tagliente metallo duro

Metallo duro è, come acciaio, un termine molto vago per definire l'intero gruppo, poiché il metallo duro è un composto, che, con la modifica della combinazione di almeno due componenti base, può essere prodotto in infinite varianti con differenti proprietà.

La produzione del metallo duro
I metalli duri sono composti da un materiale duro portante – carburo di Volframio (VC) ed eventualmente altri carburi – e da un componente plastico: il cobalto (Co). Il cobalto funziona, per così dire, come legante, nel quale le particelle di materiale duro si distribuiscono.

Per soddisfare le varie esigenze sul metallo duro, che sorgono a seconda dell'impiego, la Hartner dispone di una scelta di oltre 20 differenti tipi di metallo duro standard. Alcuni sono particolarmente duri, altri hanno una maggiore plasticità, certi sono a grana particolarmente fine, altri, al contrario, a grana più grossa. Inoltre, su richiesta del cliente, si possono sviluppare e produrre tutti i possibili tipi di metallo duro come esecuzione speciale.

Affinchè i prodotti in metallo duro corrispondano sempre alle massime esigenze del cliente, lo stabilimento del metallo duro dispone di un laboratorio ultra moderno, nel quale si effettuano continuamente test sia sul materiale grezzo che sul prodotto finito, per potere garantire e documentare la massima qualità e sicurezza di procedimento, corrispondenti alla certificazione.

Proprietà basilari di metalli duri per forature

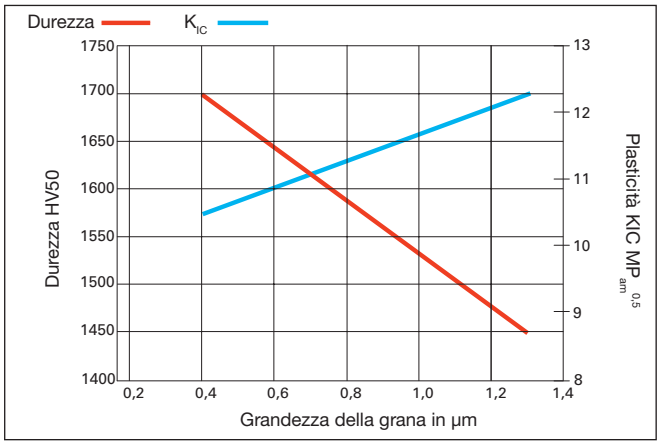
Per forature sono importanti le seguenti proprietà:

Rigidità
La rigidità è la misura della forza occorrente per ottenere una deformazione in un materiale. Nel metallo duro essa è determinata dal contenuto di cobalto. Maggiore è il contenuto di cobalto, minore la rigidità del materiale.

Per esempio, i comuni metalli duri sono mediamente rigidi più del doppio degli acciai. Quindi con punte in metallo duro si producono fori molto più diritti che con punte in acciaio. Questo effetto positivo della rigidità è tuttavia limitato, poiché la deformazione imposta alla punta – ad esempio con scentratura o squilibrio – portano ad un carico enormemente aumentato del materiale. Per questo i materiali più rigidi sono anche i più esposti a rotture.

Durezza
Con durezza si intende la resistenza di un materiale alla penetrazione di un altro. E' chiaro che il materiale dell'utensile debba essere molto più duro di quello del pezzo da lavorare, per evitare l'insorgere di una eccessiva usura.

Per regolare la durezza di un metallo duro esistono molteplici possibilità: da un lato la modifica del contenuto di cobalto, dall'altro la variazione della grandezza della grana del carburo impiegato. Se si aumenta il contenuto di cobalto, lasciando invariata la grandezza della grana, diminuisce la durezza del metallo duro. Al contrario, se si diminuisce la grandezza della grana, lasciando invariato il contenuto di cobalto, la durezza aumenta.



Plasticità
Si definisce plasticità l'opposizione di un materiale all'allargamento di una fessurazione. Un'alta opposizione a fessurazione è il segno di metalli duri "buoni", che presentano un'alta resistenza ai colpi. Purtroppo la durezza e la plasticità sono proprietà antitetiche.
Alto contenuto di cobalto e/o grana grossa del materiale duro sono indicazioni di metalli duri plastici. Un'alta plasticità è necessaria nel processo produttivo là dove insorgano carichi repentini oppure alti carichi di taglio. Alti carichi di taglio insorgono soprattutto là dove esiste un elevato valore di frizione tra utensile e materiale lavorato. Esso è determinato dalla rugosità della superficie dell'utensile e dal comportamento chimico tra superficie dell'utensile e pezzo da lavorare.
Qui bisogna anche sottolineare che plastico non significa automaticamente anche con alta resistenza alla flessione. La proprietà che porta ad una resistenza alla flessione è la resistenza degli spigoli.

Resistenza degli spigoli
La resistenza degli spigoli descrive l'opposizione di uno spigolo alle rotture o di singole grane di materiale duro e di più grosse formazioni di grana. La resistenza alla flessione rappresenta in grossa misura la resistenza degli spigoli. Nella resistenza alla flessione è compresa, accanto alla plasticità anche la grandezza degli intergrani più lunghi nella struttura caricata. In questo modo un'alta plasticità aumenta la resistenza alla flessione, tuttavia gli intergrani più lunghi (= grana più grossa) la fanno diminuire.

Reattività
Anche se attualmente la maggioranza dei metalli duri è utilizzato con una ricopertura, bisogna tenere in considerazione la tendenza alla reazione tra metallo duro e pezzo lavorato. Dato che la ricopertura si usura in fretta sui taglienti, si può avere una reazione tra utensili e pezzo lavorato.

Similarmente alla corrosione profonda con l'ossidazione, un attacco locale mostra conseguenze molto più permanenti che un danno su una grossa superficie. Particolarmente il cobalto reagisce più velocemente dei metalli acciaiosi proprio alle temperature che insorgono sui taglienti. Altri metalli, come, ad esempio, titanio o silicio, reagiscono di preferenza con il carburo di Volframio. Per questi motivi il contenuto di cobalto dell'utensile è interessante per la reattività di quest'ultimo.

Il materiale tagliente metallo duro

Scelta del materiale
Scelta del materiale
E' quindi necessario un accurato bilanciamento delle differenti proprietà per gli specifici casi di impiego. Questo comporta l'offerta di una grande varietà di metalli duri. Per trovare il metallo duro adatto per un determinato lavoro sono stati provati differenti sistemi di classificazione, poi inseriti come norma, che dovrebbero semplificare la scelta. Molto ampio è il sistema delle classi di impiego ISO secondo DIN ISO 513.
Al momento in Germania sono in uso le designazioni a DIN ISO 513. Il nuovo ordinamento è presentato in breve qui di seguito.

Gruppo principale P
Questo gruppo comprende i metalli acciaiosi a truciolo lungo, ad eccezione degli acciai inossidabili ed austenitici, ed è, a seconda del carico di taglio, suddiviso nei gruppi di impiego 01 – 50.

Gruppo principale M
Al gruppo M appartengono acciai inossidabili austenitici, acciai austenitici/ferritici ed acciai fusi. Esso è, a seconda del carico di taglio, suddiviso nei gruppi di impiego 01- 40. Alla Hartner gli utilizzi P ed M si realizzano con metalli duri K ricoperti.

Gruppo principale K
Nel gruppo K sono riunite ghisa grigia in tutte le forme e ghise malleabili. A seconda del carico di taglio si ha la suddivisione nei gruppi di impiego 01 – 40.

Gruppo principale S
"Superleghe" resistenti al calore, basate su ferro, nichel o cobalto nonché leghe di titanio appartengono al gruppo S. Qui, a seconda del carico di taglio, si hanno i gruppi di impiego 01 – 30.

Gruppo principale N
Questo gruppo contiene metalli non ferrosi, specialmente leghe di alluminio e materiali non metallici. E' suddivisa, a seconda del carico di taglio, nei gruppi di impiego 01 – 30.

Gruppo principale H
Questo gruppo comprende la lavorazione di acciai e ghise temprati. I gruppi di impiego, a seconda del carico di taglio, vanno da 01 a 30.

Molti tipi di metallo duro comprono un ampio ambito di questi gruppi principali di truciolatura, particolarmente quando si impiega una ricopertura. Perciò , ad esempio, la maggioranza delle punte ricoperte FIRE del programma Hartner, sono correlate ai gruppi di truciolatura K e P.

Singoli tipi Hartner
La tabella seguente rappresenta i metalli duri fondamentali del programma standard Hartner per utilizzi generali di foratura. Ulteriori tipi sono fornibili su richiesta.

Per oltre l'80% degli impieghi a noi conosciuti, i risultati ottenuti con utensili in DK460UF, combinati con le idonee ricoperture, rispetto ad altri tipi di metallo duro, anche ricoperti, sono imbattibili. Questo e la grande disponibilità a magazzeno di questo materiale semplificano molto la scelta dell'utensile. I nostri tecnici Vi preciseranno volentieri dove sia ragionevole impiegare gli altri tipi di metallo duro.

Tipo	Contenuto di Co [M-%]	Grandezza grana WC [µm]	Durezza [HV]	Classificazione ISO [ISO 513]	Caratteristiche
DK460UF	10	0,5	1620	K20-K40 ricoperto: P, M20-M40, H, S, N25	Tipo per impiego molto vasto, che, prevalentemente ricoperto, si impiega per lavorare acciai, leghe tenere di alluminio, ghise, ma anche superleghe come inconel 718. Questo tipo rappresenta la colonna vertebrale della nostra produzione.
DK255F	8	0,7	1720	K20 ricoperto: P, M, H, S, N20	Questo tipo è consigliato per lavorare materiali temprati, tipi di ghise molto dure e leghe dure di Al-Si. E' possibile la lavorazione a secco. E' preferibile impiegarlo ricoperto.
DK120	6	1,3	1620	K15 ricoperto: N15	Questo tipo è adatto specialmente per l'impiego con ricopertura diamantata.
DK120UF	7	0,5	1850	K05	Tipo a grana ultra fine con massima resistenza all'usura, adatto per macchine assolutamente stabili, preferito per alesatori.
DK400N	10	0,7	1580	K35M ricoperto: P, M, S, N35M	Tipo molto plastico per la lavorazione di metalli resistenti alle alte temperature.

Descrizione breve

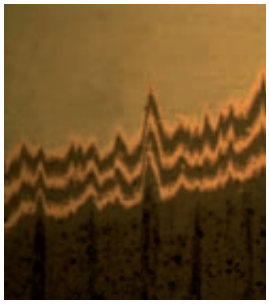
	Ⓣ	Ⓐ	Ⓐ	Ⓒ	DLC	Ⓕ	Diamante
	rivestimento TiN	rivestimento TiAlN	rivestimento AlTiN	rivestimento TiCN	rivestimento DLC	rivestimento FIRE	rivestimento Diamante
Processo	PVD	PVD	PVD	PVD	PVD	PVD	CVD
Temperatura di ricopertura max. (°C)	400° – 500°	400° – 500°	400° – 500°	400° – 500°	< 150°	400° – 500°	> 700°
Substrato	HSS, metallo duro, Cermet	HSS, metallo duro, Cermet	HSS, metallo duro	HSS, metallo duro, Cermet	metallo duro, Cermet, HSS	HSS, metallo duro, Cermet	metallo duro, Cermet
Layer	1	1	1	1	1	6	singolo strato
Colore	oro	nero-violetto	nero-violetto	grigio-violetto	nero	nero-violetto	grigio-nero
Durezza (HV 0,05)	2200	3300	3400	3000	> 6000	3000	> 8000
Temperatura di impiego max. (°C)	< 600°	< 800°	< 900°	< 450°	< 500°	< 800°	< 600°
Trasmissione di calore (kW/mK)	0,07	0,05	0,05	0,1	0,01	0,05	> 0,1
Lavorazione tipiche	universale	tornire, forare	universale	fresare, forare, maschiare	forare, alesare, maschiare	universale	tornire, forare, fresare
Materiali lavorabili di preferenza	universale	acciaio, ghisa	materiali di difficile truciolabilità come leghe al titanio, GGV, Inconel ed acciai legati	per acciai molto resistenti, Inconel, Monel	leghe di alluminio battuto, leghe di alluminio da fonderia con più del 12% in Silicio, metalli non ferrosi	universale	Diamante C: grafite Diamante F: fibre rinforzate, plastiche Diamante M: AlSi, MMC
Particolarità	conveniente	lavorazione a secco	lav. di materiali duri (> 52 HRC, MD), lavorazioni HSC	lavorazione a secco, insensibile a carichi d'urto, taglio interrotto	minima presenza di scorie sui taglienti, elevata durezza	largo campo di impiego	per materiali altamente abrasivi

Comparazione della struttura degli strati

layer singolo

Esempio
rivestimento TiAlN

multi-layer



Esempio
rivestimento FIRE

Descrizione breve

	Ⓜ	TiAlZrN	AlTiZrN	Ⓨ	TiSiN	ZrN
	rivestim. MolyGlide	rivestimento TiAlZrN	rivestimento AlTiZrN	rivestim. TiAlSiN	rivestimento TiSiN	ZrN
Processo	PVD	PVD	PVD	PVD	PVD	PVD
Temperatura di ricopertura max. (°C)	100° – 150°	400° – 500°	400° – 500°	400° – 500°	450° – 500°	400° – 500°
Substrato	HSS, metallo duro, Cermet	HSS, metallo duro, Cermet	HSS, metallo duro, Cermet	HSS, metallo duro, Cermet	HSS (maschi), metallo duro, Cermet	HSS, metallo duro, Cermet
Layer	1	7	nano-layer	multi-layer, nanocoposti	multi-layer, nanocomposite	multi-layer
Colore	grigio	oro chiaro	oro chiaro	bronzo-rosso	rame	oro chiaro
Durezza (HV 0,05)	20 – 50	3300	3400	5500	4000	2500
Temperatura di impiego max. (°C)	< 800°	< 800°	< 800°	< 800°	< 800°	< 700°
Trasmissione di calore (kW/mK)	< 0,1	0,05	0,05	0,03	0,03	0,04
Lavorazione tipiche	forare maschiare alesare, fresare	forare, fresare, maschiare	forare, fresare, maschiare	forare, fresare	forare, fresare, alesare	forare, fresare, Dekor
Materiali lavorabili di preferenza	Al, AlSi, acciaio, leghe di speciale	universale	acciai inox, leghe di nickel	ghise, acciai legati, acciai molto resistenti, CFK	acciai universali alto contenuto in C, acciai da bonifica, acciai al Mn, acciai ad elevata resistenza al calore	titanio, alluminio, leghe al nickel, acciai inox
Particolarità	lavorazione a secco, insensibile a carichi d'urto	facilita l'evacuazione del truciolo	basso attrito	largo campo di impiego	bassa tendenza all'adesione	bassa tendenza all'adesione

Superfici

lucide

Utensili in acciaio super rapido od in metallo duro sono forniti senza trattamenti di superficie, ossia lucidi, per le loro proprietà base generalmente buone.

Trattamenti di superficie
Per casi specifici tuttavia, è consigliabile, per aumentare la resistenza all'usura o per diminuire la resistenza allo scorrimento o la formazione di taglienti di riporto, ricorrere ad un trattamento di superficie. I trattamenti elencati di seguito perdono sempre più significato. Generalmente ottenete risultati migliori con le ricoperture dura e tenera.

nitrurazione a vapore

fasi nitrurate

La nitruratura è una possibilità di rendere gli utensili più resistenti all'usura. Consigliabile per la lavorazione di materia-li come ghisa grigia, alluminio con elevato contenuto di Si, materie sintetiche, acciai con alto contenuto di perlite, ecc.. Nitruriamo i nostri utensili con differenti procedimenti, secondo l'impiego.

vaporizzazione

Utensili trattati a vapore offrono a loro volta minore resistenza allo scorrimento. In questo modo si possono convenientemente ridurre saldature a freddo, che insorgono facilmente, per esempio, nella lavorazione di acciai poveri di carbonio. Utensili trattati a vapore sono adatti solo per la lavorazione di materiali ferrosi.

Le ricoperture Hartner

Ricopertura **A** o TiAlN (nitruro di titanio-alluminio)

Segno distintivo ottico: color nero-violetto
Ricopertura speciale per lavorare materiali abrasivi (ghisa, AlSi) e/o con elevate sollecitazioni termiche, quindi per impieghi senza raffreddamento o con raffreddamento limitato, come in fori profondi o con diametri piccoli. Bisogna evidenziare che solo con superiori dati di taglio la ricopertura A porta a decisivi miglioramenti di rendimento.

Ricopertura **Super A** o AlTiN (nitruro di alluminio-titanio)
Ricopertura **nanoA** o AlTiN nano (nitruro di alluminio-titanio)

Segno distintivo ottico: color nero-violetto
La sperimentata ricopertura A a base di TiAlN è stata continua-mente sviluppata. Le proprietà strutturali, chimiche e meccaniche ottimizzate della ricopertura Super A portano ad una durezza ad elevata temperatura molto alta, ad un'ottima resistenza all'ossidazione nonchè ad un'eccellente tenuta della ricopertura. Questa ricopertura è adatta per la lavorazione di materiali di difficile truciolabilità, come, ad esempio, leghe di titanio, inconel ed acciai temprati, nonché per la truciolatura di mat. temprati (> 52HRC) e per la lavorazione ad alta velocità.

Ricopertura **C** o TiCN (nitruro di titanio-carbonio)

Segno distintivo ottico: colore grigio-viola
Porta sensibili vantaggi nella lavorazione di acciaio, con tagli interrotti, materiali di difficile truciolabilità o, in generale dove sussistano esigenze superiori alla media relativamente a durezza e plasticità.

Ricopertura **F** o FIRE/nanoFIRE

Segno distintivo ottico: color nero-violetto
Ricopertura multistratificata TiAlN di costituzione gradiente. Ricopertura universale con rendimenti di almeno 2 volte superiore alla TiN. Riunisce i vantaggio di TiN, TiAlN e TiCN. Eccellente isolamento termico, per così dire „a prova di fuoco". Alta plasticità. FIRE + MolyGlide - la combinazione ideale ed il presupposto per lavorazione a secco ed ad alta velocità (HSC).

Ricopertura **T** o TiN (nitruro di titanio)

Segno distintivo ottico: color oro
Ricopertura universale sperimentata milioni di volte a prezzo conveniente. Con essa si possono ottenere in generale alti aumenti di rendimento. Non sono raggiungibili i valori massimi ottenibili con le ricoperture A e C.

Ricopertura **M** o MolyGlide® su base MoS_2

Segno distintivo ottico: color verde oliva
Ricopertura tenera di scorrimento, brevettata, sviluppata specificatamente per migliorare lo scorrimento ed eliminare i taglienti di riporto nella lavorazione di leghe di alu. In combinazione con la ricopertura dura FIRE si possono realizzare la lavorazione a secco ovvero la nebulizzazione.

Superfici

Ricopertura **Y** o **TiAlSiN**

Segno distintivo ottico: color rosso bronzo
Ricopertura multistratificata molto dura e resistente al calore adatta particolarmente per la lavorazione di acciai molto duri e ghise.

Ricopertura **AlTiZeN**

colore rivestimento: oro chiaro
Particolarmente adatto per la lavorazione di acciaio inossidabile ad alta evacuazione di truciolo, ma anche per le leghe a base di nichel.

Ricopertura **TiSiN**

colore rivestimento: rosso rame
Nanocompositi altamente resistenti al calore per la lavorazione di acciai al carbonio, acciai automatici e acciai con contenuto di manganese. Riduce l'usura adesiva. Inoltre, è molto adatto per la lavorazione di acciai altamente resistenti al calore. Per foratura e fresatura limitato a utensili in metallo duro.

Ricopertura **ZrN**

colore rivestimento: oro chiaro
Questo rivestimento multistrato è specificamente progettato per la lavorazione di titanio, leghe morbide a base di nichel, leghe di alluminio più solide e leghe di alluminio colate fino ad un contenuto del 12% di silicio. Minimizza il verificarsi di accumulo di trucioli sui bordi di taglio e massimizza una buona evacuazione degli stessi.

Ricopertura **DLC**

caratteristica ottica: colore nero
Questo rivestimento di carbonio altamente resistente (DLC-diamante-come-carbonio) riduce il verificarsi di accumulo di truciolo sui taglienti durante la lavorazione di leghe di alluminio battuto adesivo / leghe di alluminio e quindi consente un preciso controllo dimensionale e buona superficie sul pezzo.

Ricopertura **Diamante**

colore rivestimento: grigio-nero
Strato di diamante duro per la lavorazione di grafite, fibra di plastica rinforzata e leghe di alluminio da fonderia con più del 12% il contenuto di silicio. Estremamente elevata resistenza all'usura e minimo accumulo sui taglienti di truciolo.

Ricopertura **TiAlZrN**

colore rivestimento: oro chiaro
Evoluzione del FIRE. lavorazione di acciai generici. Il suo principale campo di applicazione è ovunque l'idoneità del FIRE- è limitata a causa di problemi di evacuazione del truciolo.

HARTNER

Tabella di conversione pollici - millimetri

Da 1/64 a 11 63/64

Frazioni di pollici		pollici											
		0	1	2	3	4	5	6	7	8	9	10	11
		mm											
0	0	0	25,400 0	50,800 0	76,200	101,600 0	127,000 0	152,400 0	177,800 0	203,200 0	228,600 0	254,000 0	279,400 0
1/ 64	0,015 625	0,396 9	25,796 9	51,196 9	76,596	101,996 9	127,396 9	152,796 9	178,196 9	203,596 9	228,996 9	254,396 9	279,796 9
1/ 32	0,031 25	0,793 8	26,193 8	51,593 8	76,993	102,393 8	127,793 8	153,193 8	178,593 8	203,393 8	229,393 8	254,793 8	280,193 8
3/ 64	0,046 875	1,190 6	26,590 6	51,990 6	77,390	102,790 6	128,190 6	153,590 6	178,990 6	204,390 6	229,790 6	255,190 6	280,590 6
1/ 16	0,062 5	1,587 5	26,987 5	52,387 5	77,787	103,187 5	128,587 5	153,987 5	179,387 5	204,787 5	230,187 5	255,587 5	280,987 5
5/ 64	0,078 125	1,984 4	27,384 4	52,784 4	78,181	103,584 4	128,984 4	154,384 4	179,784 4	205,184 4	230,584 4	255,984 4	281,384 4
3/ 32	0,093 75	2,381 2	27,781 2	53,181 2	78,581	103,981 2	129,381 2	154,781 2	180,181 2	205,581 2	230,981 2	256,381 2	281,781 2
7/ 64	0,109 375	2,778 1	28,178 1	53,578 1	78,978	104,378 1	129,778 1	155,178 1	180,578 1	205,978 1	231,378 1	256,778 1	282,178 1
1/ 8	0,125	3,175 0	28,575 0	53,975 0	79,375	104,775 0	130,175 0	155,575 0	180,975 0	206,375 0	231,775 0	257,175 0	282,575 0
9/ 64	0,140 625	3,571 9	28,971 9	54,371 9	79,771	105,171 9	130,571 9	155,971 9	181,371 9	206,771 9	232,171 9	257,571 9	282,971 9
5/ 32	0,156 25	3,968 8	29,368 8	54,768 8	80,168	105,568 8	130,968 8	156,368 8	181,768 8	207,168 8	232,568 8	257,968 8	283,368 8
11/ 64	0,171 875	4,365 6	29,765 6	55,165 6	80,565	105,965 6	131,365 6	156,765 6	182,165 6	207,565 6	232,965 6	258,365 6	283,765 6
3/ 16	0,187 5	4,762 5	30,162 5	55,562 5	80,962	106,362 5	131,762 5	157,162 5	182,562 5	207,962 5	233,362 5	258,762 5	284,162 5
13/ 64	0,203 125	5,159 4	30,559 4	55,959 4	81,359	106,759 4	132,159 4	157,559 4	182,959 4	208,359 4	233,759 4	259,159 4	284,559 4
7/ 32	0,218 75	5,556 2	30,956 2	56,356 2	81,756	107,156 2	132,556 2	157,956 2	183,356 2	208,756 2	234,156 2	259,556 2	284,956 2
15/ 64	0,234 375	5,953 1	31,353 1	56,753 1	82,153	107,553 1	132,953 1	158,353 1	183,753 1	209,153 1	234,553 1	259,953 1	285,353 1
1/ 4	0,25	6,350 0	31,750 0	57,150 0	82,550	107,950 0	133,350 0	158,750 0	184,150 0	209,550 0	234,950 0	260,350 0	285,750 0
17/ 64	0,265 625	6,746 9	32,146 9	57,546 9	82,946	108,346 9	133,746 9	159,146 9	184,546 9	209,946 9	235,346 9	260,746 9	286,146 9
9/ 32	0,281 25	7,143 8	32,543 8	57,943 8	83,343	108,743 8	134,143 8	159,543 8	184,943 8	210,343 8	235,743 8	261,143 8	286,543 8
19/ 64	0,296 875	7,540 6	32,940 6	58,340 6	83,740	109,140 6	134,540 6	159940 6	185,340 6	210,740 6	236,140 6	261,540 6	286,940 6
5/ 16	0,312 5	7,937 5	33,337 5	58,737 5	84,137	109,537 5	134,937 5	160,337 5	185,737 5	211,137 5	236,537 5	261,937 5	287,337 5
21/ 64	0,328 125	8,334 4	33,743 4	59,134 4	84,534	109,934 4	135,334 4	160,743 4	186,134 4	211,534 4	236,934 4	262,334 4	287,734 4
11/ 32	0,343 75	8,731 2	34,131 2	59,531 2	84,931	110,331 2	135,731 2	161,131 2	186,531 2	211,931 2	237,331 2	262,731 2	288,131 2
23/ 64	0,359 375	9,128 1	34,528 1	59,928 1	85,328	110,728 1	136,128 1	161,528 1	186,928 1	212,328 1	237,728 1	263,128 1	288,528 1
3/ 8	0,375	9,525 0	34,925 0	60,325 0	85,725	111,125 0	136,525 0	161,925 0	187,325 0	212,725 0	238,125 0	263,525 0	288,925 0
25/ 64	0,390 625	9,921 9	35,321 9	60,721 9	86,121	111,521 9	136,921 9	162,321 9	187,721 9	213,121 9	238,521 9	263,921 9	289,321 9
13/ 32	0,406 25	10,318 8	35,718 8	61,118 8	86,518	111,918 8	137,318 8	162,718 8	188,118 8	213,518 8	238,918 8	264,318 8	289,718 8
27/ 64	0,421 875	10,715 6	36,115 6	61,515 6	86,915	112,315 6	137,715 6	163,115 6	188,515 6	213,915 6	239,315 6	264,715 6	290,115 6
7/ 16	0,437 5	11,112 5	36,512 5	61,912 5	87,312	112,712 5	138,112 5	163,512 5	188,912 5	214,312 5	239,712 5	265,112 5	290,512 5
29/ 64	0,453 125	11,509 4	36,909 4	62,309 4	87,709	113,109 4	138,509 4	163,909 4	189,309 4	214,709 4	240,109 4	265,509 4	290,909 4
15/ 32	0,468 75	11,906 2	37,306 2	62,706 2	88,106	113,506 2	138,906 2	164,306 2	189,706 2	215,106 2	240,506 2	265,906 2	291,306 2
31/ 64	0,484 375	12,303 1	37,703 1	63,103 1	88,503	113,903 1	139,303 1	164,703 1	190,103 1	215,503 1	240,903 1	266,303 1	291,703 1
1/ 2	0,5	12,700 0	38,100 0	63,500 0	88,900	114,300 0	139,700 0	165,100 0	190,500 0	215,900 0	241,300 0	266,700 0	292,100 0
33/ 64	0,515 625	13,096 9	38,496 9	63,896 9	89,296	114,696 9	140,096 9	165,496 9	190,896 9	216,296 9	241,696 9	267,096 9	292,496 9
17/ 32	0,531 25	13,493 8	38,893 8	64,293 8	89,693	115,093 8	140,493 8	165,893 8	191,293 8	216,693 8	242,093 8	267,493 8	292,893 8
35/ 64	0,546 875	13,890 6	39,290 6	64,690 6	90,090	115,490 6	140,890 6	166,290 6	191,690 6	217,090 6	242,490 6	267,890 6	293,290 6
9/ 16	0,562 5	14,287 5	39,687 5	65,087 5	90,487	115,887 5	141,287 5	166,687 5	192,087 5	217,487 5	242,887 5	268,287 5	293,687 5
37/ 64	0,578 125	14,684 4	40,084 4	65,484 4	90,884	116,284 4	141,684 4	167,084 4	192,484 4	217,884 4	243,284 4	268,684 4	294,084 4
19/ 32	0,593 75	15,081 2	40,481 2	65,881 2	91,281	116,681 2	142,081 2	167,481 2	192,881 2	218,281 2	243,681 2	269,081 2	294,481 2
39/ 64	0,609 375	15,478 1	40,878 1	66,278 1	91,678	117,078 1	142,478 1	167,878 1	193,278 1	218,678 1	244,078 1	269,478 1	294,878 1
5/ 8	0,625	15,875 0	41,275 0	66,675 0	92,075	117,475 0	142,875 0	168,275 0	193,675 0	219,075 0	244,475 0	269,875 0	295,275 0
41/ 64	0,640 625	16,271 9	41,671 9	67,071 9	92,471	117,871 9	143,271 9	168,671 9	194,071 9	219,471 9	244,871 9	270,271 9	295,671 9
21/ 32	0,656 25	16,668 8	42,068 8	67,468 8	92,868	118,268 8	143,668 8	169,068 8	194,468 8	219,868 8	245,268 8	270,668 8	296,068 8
43/ 64	0,671 875	17,065 6	42,465 6	67,865 6	93,265	118,665 6	144,065 6	169,465 6	194,865 6	220,265 6	245,665 6	271,065 6	296,465 6
11/ 16	0,687 5	17,462 5	42,862 5	68,262 5	93,662	119,062 5	144,462 5	169,862 5	195,262 5	220,662 5	246,062 5	271,462 5	296,862 5
45/ 64	0,703 125	17,859 4	43,259 4	68,659 4	94,059	119,459 4	144,859 4	170,259 4	195,659 4	221,059 4	246,459 4	271,859 4	297,259 4
23/ 32	0,718 75	18,256 2	43,656 2	69,056 2	94,456	119,856 2	145,256 2	170,656 2	196,056 2	221,456 2	246,856 2	272,256 2	297,656 2
47/ 64	0,734 375	18,653 1	44,053 1	69,453 1	94,853	120,253 1	145,653 1	171,053 1	196,453 1	221,853 1	247,253 1	272,653 1	298,053 1
3/ 4	0,75	19,050 0	44,450 0	69,850 0	95,250	120,650 0	146,050 0	171,450 0	196,850 0	222,250 0	247,650 0	273,050 0	298,450 0
49/ 64	0,765 625	19,446 9	44,846 9	70,246 9	95,646	121,046 9	146,446 9	171,846 9	197,246 9	222,646 9	248,046 9	273,446 9	298,846 9
25/ 32	0,781 25	19,843 8	45,243 8	70,643 8	96,043	121,443 8	146,843 8	172,243 8	197,643 8	223,043 8	248,443 8	273,843 8	299,243 8
51/ 64	0,796 875	20,240 6	45,640 6	70,040 6	96,440	121,840 6	147,240 6	172,640 6	198,040 6	223,440 6	248,840 6	274,240 6	299,640 6
13/ 16	0,812 5	20,637 5	46,037 5	71,437 5	96,837	122,237 5	147,637 5	173,037 5	198,437 5	223,837 5	249,237 5	274,637 5	300,037 5
53/ 64	0,828 125	21,034 4	46,434 4	71,834 4	97,234	122,634 4	148,034 4	173,434 4	198,834 4	224,234 4	249,634 4	275,034 4	300,434 4
27/ 32	0,843 75	21,431 2	46,831 2	72,231 2	97,631	123,031 2	148,431 2	173,831 2	199,231 2	224,631 2	250,031 2	275,431 2	300,831 2
55/ 64	0,859 375	21,828 1	47,228 1	72,628 1	98,028	123,428 1	148,828 1	174,228 1	199,628 1	225,028 1	250,428 1	275,828 1	301,228 1
7/ 8	0,875	22,225 0	47,625 0	73,025 0	98,425	123,825 0	149,225 0	174,625 0	200,025 0	225,425 0	250,825 0	276,225 0	301,625 0
57/ 64	0,890 625	22,621 9	48,021 9	73,421 9	98,821	124,221 9	149,621 9	175,021 9	200,421 9	225,821 9	251,221 9	276,621 9	302,021 9
29/ 32	0,906 25	23,018 8	48,418 8	73,818 8	99,218	124,618 8	150,018 8	175,418 8	200,818 8	226,218 8	251,618 8	277,018 8	302,418 8
59/ 64	0,921 875	23,415 6	48,815 6	74,215 6	99,615	125,015 6	150,415 6	175,815 6	201,215 6	226,615 6	252,015 6	277,415 6	302,815 6
15/ 16	0,937 5	23,812 5	49,212 5	74,612 5	100,012	125,412 5	150,812 5	176,212 5	201,612 5	227,012 5	252,412 5	277,812 5	303,212 5
61/ 64	0,953 125	24,209 4	49,609 4	75,009 4	100,409	125,809 4	151,209 4	176,609 4	202,009 4	227,409 4	252,809 4	278,209 4	303,609 4
31/ 32	0,968 75	24,606 2	50,006 2	75,406 2	100,806	126,206 2	151,606 2	177,006 2	202,406 2	227,806 2	253,206 2	278,606 2	304,006 2
63/ 64	0,984 375	25,003 1	50,403 1	75,803 1	101,203	126,603 1	152,003 1	177,403 1	202,803 1	228,203 1	253,603 1	279,003 1	304,403 1

1 pollice = 25,400 0 mm, vedere DIN 4890 (edizione 2/75)

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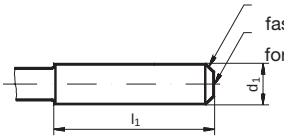
Dimensioni di codoli cilindrici in acciaio rapido secondo DIN 1835 (estratto)

Forma A, liscio

Misure in mm

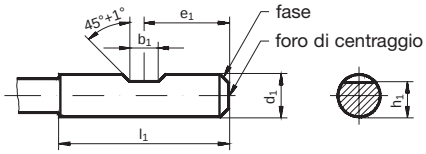


d_1 h8	l_1 +2 0	d_1 h8	l_1 +2 0	d_1 h8	l_1 +2 0
3	28	10	40	32	60
4	28	12	45	40	70
5	28	16	48	50	80
6	36	20	50	63	90
8	36	25	56		

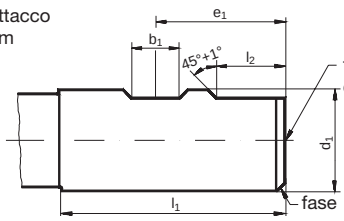
Forma B, con piano di attacco laterale

Misure in mm

con 1 piano di attacco per d_1 = 6 ... 20 mm



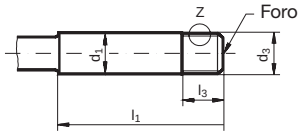
con 2 piani di attacco d_1 = 25 ... 63 mm



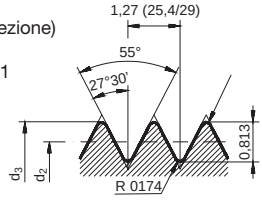
d_1 h6	b_1 +0,05 0	e_1 0 -1	h_1 h13	l_1 +2 0	l_2 +1 0	Foro di centraggio Forma R DIN 332 parte 1
6	4,2	18	4,8	36	-	1,6x2,5
8	5,5	18	6,6	36	-	1,6x3,35
10	7	20	8,4	40	-	1,6x3,35
12	8	22,5	10,4	45	-	1,6x3,35
16	10	24	14,2	48	-	2,0x4,25
20	11	25	18,2	50	-	2,5x5,3
25	12	32	23	56	17	2,5x5,3
32	14	36	30	60	19	3,15x6,7
40	14	40	38	70	19	3,15x6,7
50	18	45	47,8	80	23	3,15x6,7
63	18	50	60,8	90	23	3,15x6,7

Forma D, filettato

Misure in mm



Particolare Z
(rappresentato in sezione)
profilo del filetto a
DIN ISO 228 parte 1



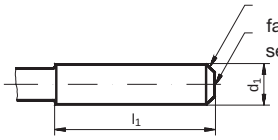
d_1 h8	d_3	d_3 scostam. limite	d_2	d_2 scostam. limite	l_1 +2 0	l_3 +2 0	Foro di centraggio Forma R DIN 332 parte 1
6	5,9	0 -0,1	5,087	0 -0,1	36	10	1,6 x 2,5
10	9,9	0 -0,1	9,087	0 -0,1	40	10	1,6 x 3,35
12	11,9	0 -0,1	11,087	0 -0,1	45	10	1,6 x 3,35
16	15,9	0 -0,1	15,087	0 -0,1	48	10	2,0 x 4,25
20	19,9	0 -0,15	19,087	0 -0,15	50	15	2,5 x 5,3
25	24,9	0 -0,15	24,087	0 -0,15	56	15	2,5 x 5,3
32	31,9	0 -0,15	31,087	0 -0,15	60	15	3,15 x 6,7

HARTNER

Dimensioni di codoli cilindrici in metallo duro secondo DIN 6535 (estratto)

Forma HA, liscio

Misure in mm

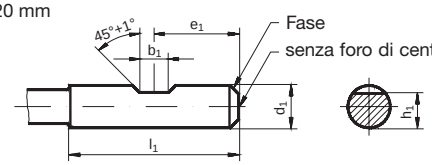


d_1 h6	l_1 +2 0	d_1 h6	l_1 +2 0	d_1 h6	l_1 +2 0
2	28	8	36	18	48
3	28	10	40	20	50
4	28	12	45	25	56
5	28	14	45	32	60
6	36	16	48		

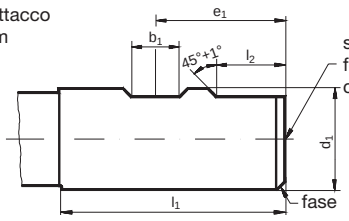
Forma HB, con piano di attacco laterale

Misure in mm

con 1 piano di attacco per d_1 = 6 - 20 mm



con 2 piani di attacco d_1 = 25 e 32 mm

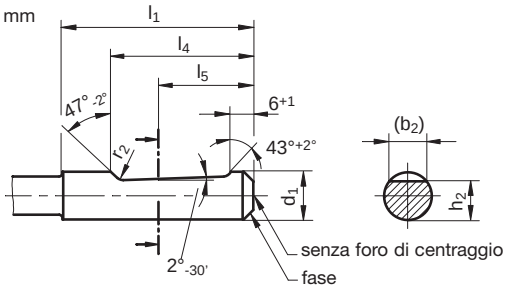


d_1 h6	b_1 +0,05 0	e_1 0 -1	h_1 h11	l_1 +2 0	l_2 +1 0
6	4,2	18	5,1	36	-
8	5,5	18	6,9	36	-
10	7	20	8,5	40	-
12	8	22,5	10,4	45	-
14	8	22,5	12,7	45	-
16	10	24	14,2	48	-
18	10	24	16,2	48	-
20	11	25	18,2	50	-
25	12	32	23	56	17
32	14	36	30	60	19

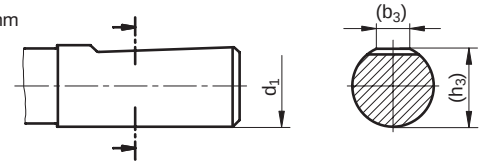
Forma HE, con piano di attacco inclinato, senza fori di refrigerazione*

*Esecuzione: codoli cilindrici a DIN 6535 sono eseguiti senza o con fori di refrigerazione. L'impiego dell'esecuzione per differenti utensili come pure dati dimensionali e designazione per la posizione dei fori di refrigerazione sono contenute nelle corrispondenti norme.

per d_1 = 6 fino 20 mm



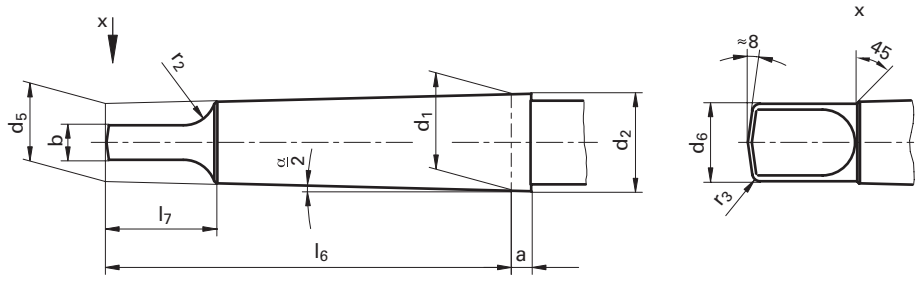
per d_1 = 25 e 32 mm



d_1 h6	(b_2) ≈	(b_3)	h_2 h13	(h_3)	l_1 +2 0	l_4 0 -1	l_5 misura nom.	r_2 min.
6	4,3	–	5,1	–	36	25	18	1,2
8	5,5	–	6,9	–	36	25	18	1,2
10	7,1	–	8,5	–	40	28	20	1,2
12	8,2	–	10,4	–	45	33	22,5	1,2
14	8,1	–	12,7	–	45	33	22,5	1,2
16	10,1	–	14,2	–	48	36	24	1,6
18	10,8	–	16,2	–	48	36	24	1,6
20	11,4	–	18,2	–	50	38	25	1,6
25	13,6	9,3	23,0	24,1	56	44	32	1,6
32	15,5	9,9	30,0	31,2	60	48	35	1,6

Dimensioni di codoli conici Morse secondo DIN 228 forma B

Codolo a DIN 228 forma B grandezza	a	Scosta. limite	b h13	d_1	d_2 ≈	d_5 ≈	d_6 max.	l_6 -1	l_7 max.	r_2 max.	r_3 ≈	$\frac{\alpha}{2}$
CM 0	3,0	+1,2 0	3,9	9,045	9,2	6,1	6	56,5	10,5	4	1	1°29′27″
CM 1	3,5	+1,4 0	5,2	12,065	12,2	9,0	8,7	62	13,5	5	1,2	1°25′43″
CM 2	5,0	+1,4 0	6,3	17,780	18,0	14,0	13,5	75	16	6	1,6	1°25′50″
CM 3	5,0	+1,7 0	7,9	23,825	24,1	19,1	18,5	94	20	7	2	1°26′16″
CM 4	6,5	+1,9 0	11,9	31,267	31,6	25,2	24,5	117,5	24	8	2,5	1°29′15″
CM 5	6,5	+1,9 0	15,9	44,399	44,7	36,5	35,7	149,5	29	10	3	1°30′26″
CM 6	8,0	+2,3 0	19,0	63,348	63,8	52,4	51,0	210,0	40	13	4	1°29′36″



HARTNER

Diametri dei fori consigliati per la maschiatura

Filettatura metrica ISO DIN 13

Ø nom.	passo P mm	Ø preforo (foro) Ø DIN 336 mm	Ø preforo madrevite 6H* min. mm	max. mm
M 1	0,25	**0,75**	0,729	0,785
M 1,1	0,25	**0,85**	0,829	0,885
M 1,2	0,25	**0,95**	0,929	0,985
M 1,4	0,30	**1,10**	1,075	1,142
M 1,6	0,35	**1,25**	1,221	1,321
M 1,8	0,35	**1,45**	1,421	1,521
M 2	0,40	**1,60**	1,567	1,679
M 2,2	0,45	**1,75**	1,713	1,838
M 2,5	0,45	**2,05**	2,013	2,138
M 3	0,50	**2,50**	2,459	2,599
M 3,5	0,60	**2,90**	2,850	3,010
M 4	0,70	**3,30**	3,242	3,422
M 4,5	0,75	**3,70**	3,688	3,878
M 5	0,80	**4,20**	4,134	4,334
M 6	1,00	**5,00**	4,917	5,153
M 7	1,00	**6,00**	5,917	6,153
M 8	1,25	**6,80**	6,647	6,912
M 9	1,25	**7,80**	7,647	7,912
M 10	1,50	**8,50**	8,376	8,676
M 11	1,50	**9,50**	9,376	9,676
M 12	1,75	**10,20**	10,106	10,441
M 14	2,00	**12,00**	11,835	12,210
M 16	2,00	**14,00**	13,835	14,210
M 18	2,50	**15,50**	15,294	15,744
M 20	2,50	**17,50**	17,294	17,744
M 22	2,50	**19,50**	19,294	19,744
M 24	3,00	**21,00**	20,752	21,252
M 27	3,00	**24,00**	23,752	24,252
M 30	3,50	**26,50**	26,211	26,771
M 33	3,50	**29,50**	29,211	29,771
M 36	4,00	**32,00**	31,670	32,270
M 39	4,00	**35,00**	34,670	35,270
M 42	4,50	**37,50**	37,129	37,799
M 45	4,50	**40,50**	40,129	40,799
M 48	5,00	**43,00**	42,587	43,297
M 52	5,00	**47,00**	46,587	47,297
M 56	5,50	**50,50**	50,046	50,796

* M 1,1 fino a M 1,4 nom.-Ø madrevite 5H

Filettatura metrica ISO, passo fine DIN 13

Ø nom.	x passo P mm	Ø preforo (foro) Ø DIN 336 mm	Ø preforo madrevite 6H min. mm	max. mm
M 2,5	x 0,35	**2,15**	2,121	2,221
M 3,0	x 0,35	**2,65**	2,621	2,721
M 3,5	x 0,35	**3,15**	3,121	3,221
M 4,0	x 0,50	**3,50**	3,459	3,599
M 4,5	x 0,50	**4,00**	3,959	4,099
M 5,0	x 0,50	**4,50**	4,459	4,599
M 5,5	x 0,50	**5,00**	4,959	5,099
M 6,0	x 0,75	**5,20**	5,188	5,378
M 7,0	x 0,75	**6,20**	6,188	6,378
M 8,0	x 0,50	**7,50**	7,459	7,599
M 8,0	x 0,75	**7,20**	7,188	7,378
M 8,0	x 1,00	**7,00**	6,917	7,153
M 9,0	x 0,75	**8,20**	8,188	8,378
M 9,0	x 1,00	**8,00**	7,917	8,153
M 10	x 0,75	**9,20**	9,188	9,378
M 10	x 1,00	**9,00**	8,917	9,153
M 10	x 1,25	**8,80**	8,647	8,912
M 11	x 0,75	**10,20**	10,188	10,378
M 11	x 1,00	**10,00**	9,917	10,153
M 12	x 1,00	**11,00**	10,917	11,153
M 12	x 1,25	**10,80**	10,647	10,912
M 12	x 1,50	**10,50**	10,376	10,676
M 14	x 1,00	**13,00**	12,917	13,153
M 14	x 1,25	**12,80**	12,647	12,912
M 14	x 1,50	**12,50**	12,376	12,676
M 15	x 1,00	**14,00**	13,917	14,153
M 15	x 1,50	**13,50**	13,376	13,676
M 16	x 1,00	**15,00**	14,917	15,153
M 16	x 1,25	**14,80**	14,647	14,912
M 16	x 1,50	**14,50**	14,376	14,676
M 17	x 1,00	**16,00**	15,917	16,153
M 17	x 1,50	**15,50**	15,376	15,676
M 18	x 1,00	**17,00**	16,917	17,153
M 18	x 1,50	**16,50**	16,376	16,676
M 20	x 1,00	**19,00**	18,917	19,153
M 20	x 1,50	**18,50**	18,376	18,676
M 20	x 2,00	**18,00**	17,835	18,210
M 22	x 1,00	**21,00**	20,917	21,153

Ø nom.	x passo P mm	Ø preforo (foro) Ø DIN 336 mm	Ø preforo madrevite 6H min. mm	max. mm
M 22	x 1,50	**20,50**	20,376	20,676
M 22	x 2,00	**20,00**	19,835	20,210
M 24	x 1,00	**23,00**	22,917	23,153
M 24	x 1,50	**22,50**	22,376	22,676
M 24	x 2,00	**22,00**	21,835	22,210
M 25	x 1,00	**24,00**	23,917	24,153
M 25	x 1,50	**23,50**	23,376	23,676
M 25	x 2,00	**23,00**	22,835	23,210
M 27	x 1,00	**26,00**	25,917	26,153
M 27	x 1,50	**25,50**	25,376	25,676
M 27	x 2,00	**25,00**	24,835	25,210
M 28	x 1,00	**27,00**	26,917	27,153
M 28	x 1,50	**26,50**	26,376	26,676
M 28	x 2,00	**26,00**	25,835	26,210
M 30	x 1,00	**29,00**	28,917	29,153
M 30	x 1,50	**28,50**	28,376	28,676
M 30	x 2,00	**28,00**	27,835	28,210
M 30	x 3,00	**27,00**	26,752	27,252
M 32	x 1,50	**30,50**	30,376	30,676
M 32	x 2,00	**30,00**	29,835	30,210
M 33	x 1,50	**31,50**	31,376	31,676
M 33	x 2,00	**31,00**	30,835	31,210
M 33	x 3,00	**30,00**	29,752	30,252
M 35	x 1,50	**33,50**	33,376	33,676
M 36	x 1,50	**34,50**	34,376	34,676

Filettatura UNC ASME B1.1

Ø nom.	filetti per pollici	Ø preforo (foro) Ø DIN 336 mm	Ø preforo madrevite 2B min. mm	max. mm
Nr. 1	- 64	**1,55**	1,425	1,580
Nr. 2	- 56	**1,85**	1,694	1,872
Nr. 3	- 48	**2,10**	1,941	2,146
Nr. 4	- 40	**2,35**	2,157	2,385
Nr. 5	- 40	**2,65**	2,487	2,698
Nr. 6	- 32	**2,85**	2,642	2,896
Nr. 8	- 32	**3,50**	3,302	3,531
Nr. 10	- 24	**3,90**	3,683	3,937
Nr. 12	- 24	**4,50**	4,343	4,597
1/4	- 20	**5,10**	4,978	5,258
5/16	- 18	**6,60**	6,401	6,731
3/8	- 16	**8,00**	7,798	8,153
7/16	- 14	**9,40**	9,144	9,550
1/2	- 13	**10,80**	10,592	11,024
9/16	- 12	**12,20**	11,989	12,446
5/8	- 11	**13,50**	13,386	13,868
3/4	- 10	**16,50**	16,307	16,840
7/8	- 9	**19,50**	19,177	19,761
1	- 8	**22,25**	21,971	22,606
1 1/8	- 7	**25,00**	24,638	25,349
1 1/4	- 7	**28,00**	27,813	28,524
1 3/8	- 6	**30,75**	30,353	31,115
1 1/2	- 6	**34,00**	33,528	34,290
1 3/4	- 5	**39,50**	38,938	39,802
2	- 4,5	**45,00**	44,679	45,593

Filettatura MJ DIN ISO 5855

Ø nom.	x passo P mm	Ø preforo (foro) Ø DIN 336 mm	Ø preforo madrevite 5H* min. mm	max. mm
MJ 3	x 0,50	**2,60**	2,513	2,653
MJ 4	x 0,70	**3,40**	3,318	3,498
MJ 5	x 0,80	**4,30**	4,221	4,421
MJ 6	x 0,50	**5,55**	5,513	5,625
MJ 6	x 0,75	**5,35**	5,269	5,419
MJ 6	x 1,00	**5,10**	5,026	5,216
MJ 8	x 0,50	**7,55**	7,513	7,625
MJ 8	x 0,75	**7,35**	7,269	7,419
MJ 8	x 1,00	**7,10**	7,026	7,216
MJ 8	x 1,25	**6,90**	6,782	6,994
MJ 10	x 1,00	**9,10**	9,026	9,216
MJ 10	x 1,25	**8,90**	8,782	8,994
MJ 10	x 1,50	**8,60**	8,539	8,775
MJ 12	x 1,75	**10,40**	10,295	10,560
MJ 16	x 2,00	**14,20**	14,051	14,351

Filettatura UNC ISO 3161

Ø nom.	filetti per pollici	Ø preforo (foro) Ø DIN 336 mm	Ø preforo madrevite 3B min. mm	max. mm
Nr. 6	- 32	**2,85**	2,733	2,939
Nr. 8	- 32	**3,55**	3,393	3,599
Nr. 10	- 24	**4,00**	3,795	4,064
Nr. 12	- 24	**4,60**	4,455	4,704
1/4	- 20	**5,30**	5,113	5,387
5/16	- 18	**6,75**	6,563	6,833
3/8	- 16	**8,20**	7,978	8,255
7/16	- 14	**9,60**	9,346	9,639
1/2	- 13	**11,00**	10,798	11,095
9/16	- 12	**12,40**	12,228	12,482
5/8	- 11	**13,80**	13,627	13,904

* MJ3 x 0,50 bis MJ 5 x 0,80 nom.-Ø madrevite 6H

Filettatura UNF ISO 3161

Ø nom.	filetti per pollici	Ø preforo (foro) Ø DIN 336 mm	Ø preforo madrevite 3B min. mm	max. mm
Nr. 6	- 40	**3,00**	2,888	3,053
Nr. 8	- 36	**3,60**	3,480	3,663
Nr. 10	- 32	**4,20**	4,054	4,255
Nr. 12	- 28	**4,75**	4,602	4,816
1/4	- 28	**5,60**	5,466	5,662
5/16	- 24	**7,00**	6,906	7,109
3/8	- 24	**8,60**	8,494	8,679
7/16	- 20	**10,00**	9,876	10,084
1/2	- 20	**11,60**	11,463	11,661
9/16	- 18	**13,00**	12,913	13,122
5/8	- 18	**14,60**	14,501	14,702

HARTNER

Diametri dei fori consigliati per la maschiatura

Filettatura UNF ASME B1.1

Ø nom.	filetti per pollici	Ø preforo (foro) Ø DIN 336 mm	Ø preforo madrevite 2B min. mm	Ø preforo madrevite 2B max. mm
Nr. 1	72	**1,55**	1,473	1,610
Nr. 2	64	**1,85**	1,755	1,910
Nr. 3	56	**2,15**	2,024	2,197
Nr. 4	48	**2,40**	2,271	2,459
Nr. 5	44	**2,70**	2,550	2,741
Nr. 6	40	**2,95**	2,819	3,023
Nr. 8	36	**3,50**	3,404	3,607
Nr. 10	32	**4,10**	3,962	4,166
Nr. 12	28	**4,60**	4,496	4,724
1/4	28	**5,50**	5,359	5,588
5/16	24	**6,90**	6,782	7,036
3/8	24	**8,50**	8,382	8,636
7/16	20	**9,90**	9,728	10,033
1/2	20	**11,50**	11,328	11,608
9/16	18	**12,90**	12,751	13,081
5/8	18	**14,50**	14,351	14,681
3/4	16	**17,50**	17,323	17,678
7/8	14	**20,40**	20,269	20,650
1	12	**23,25**	23,114	23,571
1 1/8	12	**26,50**	26,289	26,746
1 1/4	12	**29,50**	29,464	29,921
1 3/8	12	**32,75**	32,639	33,096
1 1/2	12	**36,00**	35,814	36,271

Filettatura BSW-(Whitworth) BS84

Ø nom. pollici	filetti per pollici	Ø preforo (foro) Ø DIN 336 mm	Ø preforo madrevite min. mm	Ø preforo madrevite max. mm
W 1/16	60	**1,20**	1,045	1,230
W 3/32	48	**1,80**	1,704	1,912
W 1/8	40	**2,50**	2,362	2,591
W 5/32	32	**3,20**	2,952	3,214
W 3/16	24	**3,60**	3,407	3,745
W 7/32	24	**4,50**	4,201	4,539
W 1/4	20	**5,10**	4,724	5,156
W 5/16	18	**6,50**	6,130	6,590
W 3/8	16	**7,90**	7,492	7,987
W 7/16	14	**9,20**	8,789	9,330
W 1/2	12	**10,50**	9,989	10,591
W 9/16	12	**12,00**	11,577	12,179
W 5/8	11	**13,50**	12,918	13,558
W 3/4	10	**16,25**	15,797	16,483
W 7/8	9	**19,25**	18,611	19,353
W 1	8	**22,00**	21,334	22,147
W 1 1/8	7	**24,50**	23,928	24,832
W 1 1/4	7	**27,75**	27,103	28,007
W 1 3/8	6	**30,50**	29,504	30,528
W 1 1/2	6	**33,50**	32,679	33,703
W 1 5/8	5	**35,50**	34,769	35,963
W 1 3/4	5	**39,00**	37,944	39,138
W 2	4,5	**44,50**	43,571	44,877

Filettatura (Whitworth-) (a DIN-ISO 228-1)

Ø nom. pollici	filetti per pollici	Ø preforo (foro) Ø DIN 336 mm	Ø preforo madrevite min. mm	Ø preforo madrevite max. mm
G 1/16	28	**6,80**	6,561	6,843
G 1/8	28	**8,80**	8,566	8,848
G 1/4	19	**11,80**	11,445	11,890
G 3/8	19	**15,25**	14,950	15,395
G 1/2	14	**19,00**	18,631	19,172
G 5/8	14	**21,00**	20,587	21,128
G 3/4	14	**24,50**	24,117	24,658
G 7/8	14	**28,25**	27,877	28,418
G 1	11	**30,75**	30,291	30,931
G 1 1/8	11	**35,50**	34,939	35,579
G 1 1/4	11	**39,50**	38,952	39,592
G 1 1/2	11	**45,25**	44,845	45,485
G 1 3/4	11	**51,00**	50,788	51,428
G 2	11	**57,00**	56,656	57,296

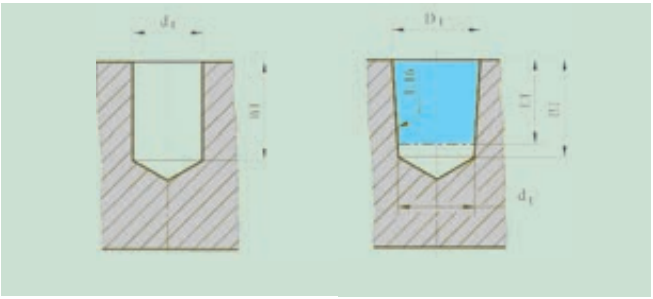
Filettatura PG a DIN 40430

Ø nom. pollici	filetti per pollici	Ø preforo (foro) Ø DIN 336 mm	Ø preforo madrevite min. mm	Ø preforo madrevite max. mm
Pg 7	20	**11,40**	11,280	11,430
Pg 9	18	**14,00**	13,860	14,010
Pg 11	18	**17,30**	17,260	17,410
Pg 13,5	18	**19,00**	19,060	19,210
Pg 16	18	**21,30**	21,160	21,310
Pg 21	16	**26,90**	26,780	27,030
Pg 29	16	**35,50**	35,480	35,730
Pg 36	16	**45,50**	45,480	45,730
Pg 42	16	**52,50**	52,480	52,730
Pg 48	16	**57,80**	57,780	58,030

Filettatura NPT ANSI B 2.1 filettatura conica americana, conicità 1:16

versione A (da evitare se possibile)

versione B



Ø nom.	filetti per pollici	Ø preforo cilindr. (A) d_1	Ø preforo conico (B) D_1	prof. t. p. ET mm	prof. fil. BT (min) mm
1/16	27	**6,15**	6,39	9,29	10,7
1/8	27	**8,40**	8,74	9,32	10,8
1/4	18	**11,10**	**11,36**	13,52	15,6
3/8	18	**14,30**	**14,80**	13,83	16,0
1/2	14	**17,90**	**18,32**	18,07	20,8
3/4	14	**23,30**	**23,67**	18,55	21,3
1	11,5	**29,00**	**29,69**	22,29	25,6
1 1/4	11,5	**37,70**	**38,45**	22,80	26,1
1 1/2	11,5	**43,70**	**44,52**	22,80	26,1
2	11,5	**55,60**	**56,56**	23,20	26,5
2 1/2	8	**66,30**	**67,62**	31,75	36,3
3	8	**82,30**	**83,52**	33,74	38,5

Filett. EG metr./metr. passo fine (EG M 14 x 1,25) per impiego di helicoil DIN 8140

Ø nom.	x passo P mm	Ø preforo (foro) Ø DIN 336 mm	Ø preforo madrevite min. mm	Ø preforo madrevite max. mm
EG M 4	0,70	**4,20**	4,152	4,292
EG M 5	0,80	**5,25**	5,174	5,334
EG M 6	1,00	**6,30**	6,217	6,407
EG M 8	1,25	**8,40**	8,271	8,483
EG M10	1,50	**10,50**	10,324	10,560
EG M12	1,75	**12,50**	12,379	12,644
EG M14 x	1,25	**14,40**	14,271	14,483
EG M16	2,00	**16,50**	16,433	16,733

Filettatura EG UNC (UNC-STI) per impiego di helicoil ASME B18.29.1

Ø nom.	filetti per pollici	Ø preforo (foro) Ø DIN 336 mm	Ø preforo madrevite min. mm	Ø preforo madrevite max. mm
EG Nr. 6	32	**3,80**	3,678	3,879
EG Nr. 8	32	**4,40**	4,338	4,524
EG Nr. 10	24	**5,20**	5,055	5,283
EG Nr. 12	24	**5,80**	5,715	5,944
EG 1/4	20	**6,70**	6,624	6,868
EG 5/16	18	**8,40**	8,242	8,489
EG 3/8	16	**10,00**	9,868	10,127
EG 7/16	14	**11,60**	11,506	11,783
EG 1/2	13	**13,30**	13,122	13,393
EG 9/16	12	**14,90**	14,747	15,032
EG 5/8	11	**16,50**	16,375	16,673

Filettatura EG UNF (UNF-STI) per impiego di helicoil ASME B18.29.1

Ø nom.	filetti per pollici	Ø preforo (foro) Ø DIN 336 mm	Ø preforo madrevite min. mm	Ø preforo madrevite max. mm
EG Nr. 6	40	**3,70**	3,644	3,818
EG Nr. 8	36	**4,40**	4,321	4,498
EG Nr. 10	32	**5,10**	4,999	5,184
EG Nr. 12	28	**5,70**	5,682	5,809
EG 1/4	28	**6,60**	6,546	6,721
EG 5/16	24	**8,25**	8,166	8,352
EG 3/8	24	**9,80**	9,754	9,931
EG 7/16	20	**11,50**	11,389	11,585
EG 1/2	20	**13,10**	12,974	13,172
EG 9/16	18	**14,70**	14,592	14,798
EG 5/8	18	**16,25**	16,180	16,386

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Diametri dei fori consigliati per maschiatura a rullare

Filettatura metrica ISO DIN 13

Ø nom.	passo	Ø foro	Ø foro		Ø preforo madrevite 7H*	
mm		mm	min. mm	max. mm	min. mm	max. mm
M 1	0,25	**0,75**	0,729	0,785		
M 1,1	0,25	**0,85**	0,829	0,885		
M 1,2	0,25	**0,95**	0,929	0,985		
M 1,4	0,30	**1,10**	1,075	1,142		
M 1,6	0,35	**1,25**	1,221	1,321		
M 1,8	0,35	**1,45**	1,421	1,521		
M 2	0,40	**1,85**	1,84	1,88	1,567	1,679
M 2,2	0,45	**2,00**	2,01	2,05	1,713	1,838
M 2,5	0,45	**2,30**	2,28	2,32	2,013	2,138
M 3	0,50	**2,80**	2,78	2,85	2,459	2,639
M 3,5	0,60	**3,25**	3,23	3,30	2,850	3,050
M 4	0,70	**3,70**	3,68	3,76	3,242	3,466
M 4,5	0,75	**4,20**				
M 5	0,80	**4,65**	4,62	4,71	4,134	4,384
M 6	1,00	**5,55**	5,52	5,62	4,917	5,217
M 7	1,00	**6,55**	6,52	6,62	5,917	6,217
M 8	1,25	**7,40**	7,36	7,47	6,647	6,982
M 9	1,25	**8,40**	8,36	8,47	7,647	7,982
M 10	1,50	**9,30**	9,26	9,38	8,376	8,751
M 11	1,50	**10,30**	10,26	10,38	9,376	9,751
M 12	1,75	**11,20**	11,15	11,29	10,106	10,531
M 14	2,00	**13,10**	13,05	13,20	11,835	12,310
M 16	2,00	**15,10**	15,05	15,20	13,835	14,310
M 18	2,50	**16,90**	16,83	17,02	15,294	15,854
M 20	2,50	**18,90**	18,83	19,02	17,294	17,854
M 22	2,50	**20,90**	20,83	21,02	19,294	19,854
M 24	3,00	**22,70**	22,62	22,80	20,752	21,382
M 27	3,00	**25,70**	25,62	25,80	23,752	24,382
M 30	3,50	**28,50**	28,40	28,60	26,211	26,921
M 33	3,50	**31,50**	31,40	31,60	29,211	29,921
M 36	4,00	**34,30**	34,17	34,40	31,670	32,420
M 39	4,00	**37,30**	37,17	37,40	34,670	35,420
M 42	4,50	**40,10**	39,95	40,20	37,129	37,979

* M 2 up to M 2.5 tapping size hole of int. thread 6H

Filettatura metrica ISO, passo fine DIN 13

Ø nom.	x passo	Ø foro	Ø foro		Ø preforo madrevite 7H*	
mm		mm	min. mm	max. mm	min. mm	max. mm
M 2,5	x 0,35	**2,35**	2,35	2,38	2,121	2,221
M 3	x 0,35	**2,85**	2,85	2,88	2,621	2,721
M 4	x 0,35	**3,85**	3,85	3,88	3,621	3,721
M 4	x 0,50	**3,80**	3,78	3,83	3,459	3,639
M 5	x 0,50	**4,80**	4,78	4,83	4,459	4,639
M 5,5	x 0,50	**5,30**	5,28	5,33	4,959	5,139
M 6	x 0,75	**5,65**	5,62	5,70	5,188	5,424
M 7	x 0,75	**6,65**	6,62	6,70	6,188	6,424
M 8	x 0,75	**7,65**	7,62	7,70	7,188	7,424
M 8	x 1,00	**7,55**	7,52	7,62	6,917	7,217
M 9	x 0,75	**8,65**	8,62	8,70	8,188	8,424
M 9	x 1,00	**8,55**	8,52	8,62	7,917	8,217
M 10	x 0,75	**9,65**	9,62	9,70	9,188	9,424
M 10	x 1,00	**9,55**	9,52	9,62	8,917	9,217
M 10	x 1,25	**9,40**	9,36	9,47	8,647	8,982
M 11	x 0,75	**10,65**	10,62	10,70	10,188	10,424
M 11	x 1,00	**10,55**	10,52	10,62	9,917	10,217
M 12	x 1,00	**11,55**	11,52	11,62	10,917	11,217
M 12	x 1,25	**11,40**	11,36	11,47	10,647	10,982
M 12	x 1,50	**11,30**	11,26	11,38	10,376	10,751
M 14	x 1,00	**13,55**	13,52	13,62	12,917	13,217
M 14	x 1,25	**13,40**	13,36	13,47	12,647	12,982
M 14	x 1,50	**13,30**	13,26	13,38	12,376	12,751
M 15	x 1,00	**14,55**	14,52	14,62	13,917	14,217
M 15	x 1,50	**14,30**	14,26	14,38	13,376	13,751
M 16	x 1,00	**15,55**	15,52	15,62	14,917	15,217
M 16	x 1,50	**15,30**	15,26	15,38	14,376	14,751
M 17	x 1,00	**16,55**	16,52	16,62	15,917	16,217
M 17	x 1,50	**16,30**	16,26	16,38	15,376	15,751
M 18	x 1,00	**17,55**	17,52	17,62	16,917	17,217
M 18	x 1,50	**17,30**	17,26	17,38	16,376	16,751
M 18	x 2,00	**17,10**	17,05	17,20	15,835	16,310
M 20	x 1,00	**19,55**	19,52	19,62	18,917	19,217

* M 2.5 x 0.35 up to M 4 x 0.35 tapping size hole of int. thread 6H

Ø nom.	x passo	Ø foro	Ø foro		Ø preforo madrevite 7H*	
mm		mm	min. mm	max. mm	min. mm	max. mm
M 20	x 1,50	**19,30**	19,26	19,38	18,376	19,751
M 24	x 1,00	**23,55**	23,52	23,62	22,917	23,217
M 24	x 1,50	**23,30**	23,26	23,38	22,376	22,751
M 24	x 2,00	**23,10**	23,05	23,20	21,835	22,310
M 27	x 1,50	**26,30**	26,26	26,38	25,376	25,751
M 30	x 1,50	**29,30**	29,26	29,38	28,376	28,751
M 33	x 1,50	**32,30**	32,26	32,38	31,376	31,751
M 36	x 1,50	**35,30**	35,26	35,38	34,376	34,751
M 39	x 1,50	**38,30**	38,26	38,38	37,376	37,751
M 42	x 1,50	**41,30**	41,26	41,38	42,376	42,751

Tolleranza dei diametri di fori di filettatura nei maschi a rullare (a DIN 13, parte 50)

Per ragioni di resistenza, non è necessario mantenere la tolleranza 6H per i fori di filettatura; la tolleranza 7H è sufficiente a garantire che non sia superato il ricoprimento del diametro medio di 0,32 x P tra madrevite e bullone. Inoltre, la filettatura a rullare, per la corsa della fase non interrotta e la deformazione a freddo, conferisce di regola una resistenza superiore a quella della filettatura normale.

HARTNER

Diametri dei fori consigliati per maschiatura a rullare

Filettatura UNC ASME B1.1

Ø nom.	filetti per pollici	Ø foro mm	Ø foro min. mm	Ø foro max. mm	Ø preforo madrevite 2B min. mm	Ø preforo madrevite 2B max. mm
Nr. 1	64	**1,68**	1,67	1,70	1,425	1,580
Nr. 2	56	**1,98**	1,97	2,01	1,694	1,872
Nr. 3	48	**2,28**	2,27	2,32	1,941	2,146
Nr. 4	40	**2,55**	2,54	2,59	2,157	2,385
Nr. 5	40	**2,90**	2,89	2,94	2,487	2,698
Nr. 6	32	**3,15**	3,14	3,19	2,642	2,896
Nr. 8	32	**3,80**	3,78	3,82	3,302	3,531
Nr. 10	24	**4,35**	4,33	4,39	3,683	3,937
Nr. 12	24	**5,00**	4,97	5,03	4,343	4,597
1/4	20	**5,75**	5,72	5,80	4,978	5,258
5/16	18	**7,30**	7,26	7,37	6,401	6,731
3/8	16	**8,80**	8,77	8,88	7,798	8,153
7/16	14	**10,30**	10,27	10,37	9,144	9,550
1/2	13	**11,80**	11,77	11,88	10,592	11,024
9/16	12	**13,30**	13,28	13,39	11,989	12,446
5/8	11	**14,80**	14,78	14,90	13,386	13,868
3/4	10	**17,90**	17,85	17,97	16,307	16,840
7/8	9	**21,00**	20,95	21,10	19,177	19,761
1	8	**24,00**	23,95	24,12	21,971	22,606

Filettatura UNF ASME B1.1

Ø nom.	filetti per pollici	Ø foro mm	Ø foro min. mm	Ø foro max. mm	Ø preforo madrevite 2B min. mm	Ø preforo madrevite 2B max. mm
Nr. 1	72	**1,70**	1,69	1,72	1,473	1,610
Nr. 2	64	**2,00**	1,99	2,03	1,755	1,910
Nr. 3	56	**2,30**	2,29	2,34	2,024	2,197
Nr. 4	48	**2,60**	2,59	2,63	2,271	2,459
Nr. 5	44	**2,90**	2,89	2,93	2,550	2,741
Nr. 6	40	**3,20**	3,19	3,24	2,819	3,023
Nr. 8	36	**3,85**	3,83	3,88	3,404	3,607
Nr. 10	32	**4,45**	3,43	4,49	3,962	4,166
Nr. 12	28	**5,10**	5,07	5,13	4,496	4,724
1/4	28	**5,95**	5,92	5,99	5,359	5,588
5/16	24	**7,45**	7,42	7,50	6,782	7,036
3/8	24	**9,05**	9,02	9,10	8,838	8,636
7/16	20	**10,55**	10,48	10,58	9,728	10,033
1/2	20	**12,10**	12,08	12,18	11,328	11,608
9/16	18	**13,65**	13,61	13,72	12,751	13,081
5/8	18	**15,25**	15,21	15,32	14,351	14,681
3/4	16	**18,35**	15,30	18,41	17,323	17,678
7/8	14	**21,40**	21,35	21,49	20,269	20,650
1	12	**24,45**	24,40	24,54	23,114	23,571

Filettatura (Whitworth-) DIN EN ISO 228-1

Ø nom. pollici	filetti per pollici	Ø foro mm	Ø foro min. mm	Ø foro max. mm	Ø preforo madrevite min. mm	Ø preforo madrevite max. mm
G 1/16	28	**7,30**	7,28	7,35	6,561	6,843
G 1/8	28	**9,30**	9,28	9,35	8,566	8,848
G 1/4	19	**12,50**	12,48	12,55	11,445	11,890
G 3/8	19	**16,00**	15,98	16,05	14,950	15,395
G 1/2	14	**20,00**	19,98	20,12	18,631	19,172
G 5/8	14	**22,00**	21,98	22,12	20,587	21,128
G 3/4	14	**25,50**	25,48	25,62	24,117	24,658
G 7/8	14	**29,25**	29,23	29,37	27,877	28,418
G 1	11	**32,00**	31,98	32,15	30,291	30,931
G 1 1/4	11	**40,75**	40,70	40,85	38,952	39,592

HARTNER

Le nuove abbreviazioni per materiali (scelta)

Nr. materiale	Abbreviazione vecchia	Abbreviazione nuova
0.6010	GG10	EN-GJL-100
0.6020	GG20	EN-GJL-200
0.6025	GG25	EN-GJL-250
0.6035	GG35	EN-GJL-350
0.7050	GGG50	EN-GJS-500-7
0.7070	GGG70	EN-GJS-700-2
0.8035	GTW35	EN-GJMW-350-4
0.8155	GTS55	EN-GJMB-550-4
0.8170	GTS70	EN-GJMB-700-2
1.0022	St 01Z	–
1.0035	St 33	S185
1.0039	St 37 -2	S235JRH
1.0044	St 44 -2	S275JR
1.0050	St 50 -2	E295
1.0060	St 60 -2	E335
1.0070	St 70 –2	E360
1.0114	St 37 –3U	S235J0
1.0226	St 02Z	DX51D
1.0242	StE 250 -2Z	S250GD
1.0244	StE 280 -2Z	S280GD
1.0250	StE 320 -3Z	S320GD
1.0301	C 10	–
1.0302	C 10 Pb	–
1.0306	St 06 Z	DX54D
1.0312	St 15	DC05 [Fe P05]
1.0319	RRStE 210.7	L210GA
1.0322	–	DX56D
1.0330	St 12 [St 2]	DC01 [Fe P01]
1.0333	USt 13	–
1.0338	St 14 [St 4]	DC04 [Fe P04]
1.0345	H I	P235GH
1.0347	RRSt 13 [RRSt 3]	DC03 [Fe P03]
1.0348	UH I	P195GH
1.0350	St 03Z	DX52D
1.0355	St 05Z	DX53D
1.0356	TTSt 35 N	P215NL
1.0358	St 05 Z	–
1.0401	C 15	–
1.0402	C 22	C22
1.0403	C 15 Pb	–
1.0406	C 25	C25
1.0419	St 52.0	L355
1.0424	St 45.8 (ersetzt)	P265
1.0424	St 42.8 (ersetzt)	P265
1.0425	H2	P265GH
1.0429	StE 290.7 TM	L290MB
1.0457	StE 240.7	L245NB
1.0459	RRStE 240.7	L245GA
1.0461	StE 255	S255N
1.0473	19 Mn 6	P355GH
1.0481	17 Mn 4	P295GH
1.0484	StE 290.7	L290NB
1.0486	StE 285	P275N
1.0501	C 35	C35
1.0503	C 45	C45
1.0505	StE 315	P315N
1.0511	C 40	C40
1.0528	C 30	C30
1.0529	StE 350 -3Z	S350GD
1.0535	C 55	C55
1.0539	StE 355N	S355NH
1.0540	C 50	C50
1.0547	St 52 –3U	S355J0H
1.0582	StE 360.7	L360NB
1.0601	C 60	C60
1.0710	15 S 10	–
1.0715	9 SMn 28	11SMn30
1.0718	9 SMnPb 28	11SMnPb30
1.0721	10 S 20	10S20
1.0722	10 S Pb 20	10SPb20
1.0726	35 S 20	35S20
1.0727	45 S 20	46S20

Nr. materiale	Abbreviazione vecchia	Abbreviazione nuova
1.0728	60 S 20	–
1.0736	9 SMn 36	11SMn37
1.0737	9 SMnPb 36	11SMnPb37
1.0756	35 SPb 20	35SPb20
1.0757	45 SPb 20	46SPb20
1.0760	–	38SMn26
1.0761	–	38SMnPb26
1.0762	–	44SMn28
1.0763	–	44SMnPb28
1.0873	–	DC06 [Fe P06]
1.1103	EStE 255	S255NL1
1.1105	EStE 315	S315NL1
1.1121	Ck 10	C10E
1.1141	Ck15	C15E
1.1151	Ck 22	C22E
1.1158	Ck 25	C25E
1.1170	28 Mn 6	28Mn6
1.1178	Ck 30	C30E
1.1181	Ck 35	C35E
1.1186	Ck 40	C40E
1.1191	Ck 45	C45E
1.1203	Ck 55	C55E
1.1206	Ck 50	C50E
1.1221	Ck 60	C60E
1.1241	Cm 50	C50R
1.1750	C 75 W	C75W
1.2067	102 Cr 6	102Cr6
1.2080	–	X210Cr12
1.2083	–	X42Cr13
1.2419	–	105WCr6
1.2767	–	X45NiCrMo4
1.3243	S6-5-2-5	S 6-5-2-5
1.3343	S6-5-2	S 6-5-2
1.3344	S6-5-3	S 6-5-3
1.4000	X6Cr 13	X6Cr13
1.4002	X6CrAl 13	X6CrAl13
1.4003	X2Cr 11	X2CrNi12
1.4005	–	X12CrS13
1.4006	X10Cr 13	X12Cr13
1.4016	X6Cr 17	X6Cr17
1.4021	X20Cr 13	X20Cr13
1.4028	X30Cr 13	X30Cr13
1.4031	X38Cr 13	X38Cr13
1.4034	X46Cr 13	X46Cr13
1.4037	X65Cr13	X65Cr13
1.4057	X20CrNi 17 2	X17CrNi16-2
1.4104	X12CrMoS 17	X14CrMoS17
1.4105	X4CrMoS 18	X6CrMoS17
1.4109	X65CrMo 14	X70CrMo15
1.4110	X55CrMo 14	X55CrMo14
1.4112	X90CrMoV 18	X90CrMoV18
1.4113	X6CrMo 17 1	X6CrMo17-1
1.4116	X45CrMoV 15	X50CrMoV15
1.4120	X20CrMo 13	X20CrMo13
1.4122	X35CrMo 17	X39CrMo17-1
1.4125	X105CrMo 17	X105CrMo17
1.4301	X5CrNi 18 10	X5CrNi18-10
1.4303	X5CrNi 18 12	X4CrNi18-12
1.4305	X10CrNiS 18 9	X8CrNiS18-9
1.4306	X2CrNi 19 11	X2CrNi19-11
1.4310	X12CrNi 17 7	X10CrNi18-8
1.4311	X2CrNiN 18 10	X2CrNiN18-10
1.4313	X4CrNi 13 4	X3CrNiMo13-4
1.4318	X2CrNiN 18 7	X2CrNiN18-7
1.4335	X1CrNi 25 21	X1CrNi25-21
1.4361	X1CrNiSi 18 15	X1CrNiSi18-15-4
1.4362	X2CrNiN 23 4	X2CrNiN23-4
1.4401	X5CrNiMo 17 12 2	X5CrNiMo17-12-2
1.4404	X2CrNiMo 17 13 2	X2CrNiMo17-12-2
1.4410	X10CrNiMo 18 9	X2CrNiMoN25-7-4
1.4418	X4CrNiMo 16 5	X4CrNiMo16-5-1
1.4435	X2CrNiMo 18 14 3	X2CrNiMo18-14-3

Nr. materiale	Abbreviazione vecchia	Abbreviazione nuova
1.4436	X5CrNiMo 17 13 3	X3CrNiMo17-13-3
1.4438	X2CrNiMo 18 16 4	X2CrNiMo18-15-4
1.4460	X4CrNiMo 27 5 2	X3CrNiMoN27-5-2
1.4462	X2CrNiMoN 22 5 3	X2CrNiMoN22-5-3
1.4509	X6CrTiNb 18	X2CrTiNb18
1.4510	X6CrTi 17	X3CrTi17
1.4511	X6CrNb 17	X3CrNb17
1.4512	X6CrTi 12	X2CrTi12
1.4520	X1CrTi 15	X2CrTi17
1.4521	X2CrMoTi 18 2	X2CrMoTi18-2
1.4522	X2CrMoNb 18 2	X2CrMoNb18-2
1.4532	X7CrNiMoAl 15 7	X8CrNiMoAl15-7-2
1.4541	X6CrNiTi18 10	X6CrNiTi18-10
1.4542	X5CrNiCuNb 17 4	X5CrNiCuNb16-4
1.4550	X6CrNiNb 18 10	X6CrNiNb18-10
1.4558	X2NiCrAlTi 32 20	X2NiCrAlTi32-20
1.4567	X3CrNiCu 18 9 X	X3CrNiCu18-9-4
1.4568	X7CrNiAl 17 7	X7CrNiAl17-7
1.4571	–	X6CrNiMoTi17-12-2
1.4577	X3CrNiMoTi 25 25	X3CrNiMoTi25-25
1.4592	X1CrMoTi 29 4	X2CrMoTi29-4
1.4713	X10CrAl 7	X10CrAlSi7
1.4724	X10CrAl 13	X10CrAlSi13
1.4742	X10CrAl 18	X10CrAlSi18
1.4762	X10CrAl 24	X10CrAlSi25
1.4821	X20CrNiSi 25 4	X20CrNiSi25-4
1.4828	X15CrNiSi 20 12	X15CrNiSi20-12
1.4833	X7CrNi 23 14	X7CrNi23-12
1.4841	X15CrNiSi 25 20	X15CrNiSi25-21
1.4845	X12CrNi 25 21	X12CrNi25-21
1.4864	X12NiCrSi 36 16	X12NiCrSi35-16
1.4878	X12CrNiTi18 9	X10CrNiTi18-10
1.4903	–	X10CrMoVNb9-1
1.5026	55 Si 7	55Si7
1.5131	50 MnSi 4	50MnSi4
1.5415	15 Mo 3	16Mo3
1.5530	21 MnB 5	20MnB5
1.5531	30 MnB 5	30MnB5
1.5532	38 MnB 5	38MnB5
1.5637	10 Ni 14	12Ni14
1.5662	–	X11CrMo5+I
1.5680	–	X12Ni5
1.5710	36 NiCr 6	36NiCr6
1.5715	–	16NiCrS4
1.5752	14 NiCr 14	15NiCr13
1.6210	15 MnNi 6 3	15MnNi6-3
1.6211	16 MnNi 6 3	16MnNi6-3
1.6310	20 MnMoNi 5 5	20MnMoNi5-5
1.6311	20 MnMoNi 4 5	20MnMoNi4-5
1.6341	11 NiMoV 5 3	11NiMoV5-3
1.6368	15 NiCuMoNb 5	15NiCuMoNb5
1.6511	36 CrNiMo 4	36CrNiMo4
1.6523	21 NiCrMo 2	21NiCrMo2-2
1.6526	21 NiCrMoS 2	21NiCrMoS2-2
1.6580	30 CrNiMo 8	30CrNiMo8
1.6582	34 CrNiMo 6	34CrNiMo6
1.6587	17 CrNiMo 6	18CrNiMo7-6
1.7003	38 Cr 2	38Cr2
1.7006	46 Cr 2	46Cr2
1.7016	17 Cr 3	17Cr3
1.7023	38 CrS 2	38CrS2
1.7025	46 CrS 2	46CrS2
1.7030	28 Cr 4	28Cr4
1.7033	34 Cr 4	34Cr4
1.7034	37 Cr 4	37Cr4
1.7035	41 Cr 4	41Cr4
1.7036	28 CrS 4	28CrS4
1.7037	34 CrS 4	34CrS4
1.7038	37 CrS 4	37CrS4
1.7039	41 CrS 4	41CrS4
1.7131	16 MnCr 5	16MnCr5
1.7139	16 MnCrS 5	16MnCrS5

Nr. materiale	Abbreviazione vecchia	Abbreviazione nuova
1.7043	–	38Cr4
1.7147	20 MnCr 5	20MnCr5
1.7149	20 MnCrS 5	20MnCrS5
1.7176	55 Cr 3	55Cr3
1.7182	27 MnCrB 5 2	27MnCrB5-2
1.7185	33 MnCrB 5 2	33MnCrB5-2
1.7189	39 MnCrB 6 2	39MnCrB6-2
1.7213	25 CrMoS 4	25CrMoS4
1.7218	25 CrMo 4	25CrMo4
1.7219	–	26CrMo4-2
1.7220	34 CrMo 4	34CrMo4
1.7225	42 CrMo 4	42CrMo4
1.7226	34 CrMoS 4	34CrMoS4
1.7227	42 CrMoS 4	42CrMoS4
1.7228	50 CrMo 4	50CrMo4
1.7264	20 CrMo 5	20CrMo5
1.7321	20 MoCr 4	20MoCr4
1.7323	20 MoCrS 4	20MoCrS4
1.7333	22 CrMoS 3 5	22CrMoS3-5
1.7335	13 CrMo 4 4	13CrMo4-5
1.7362	12 CrMo 19 5	12CrMo19-5
1.7380	10 CrMo 9 10	10CrMo9-10
1.7383	–	11CrMo9-10
1.7779	–	20CrMoV13-5-5
1.8159	50 CrV 4	51CrV4
1.8504	34 CrAl 6	34CrAl6
1.8519	31 CrMoV 9	31CrMoV9
1.8550	34 CrAlNi 7	34CrAlNi7
1.8807	13 MnNiMoV 5 4	13MnNiMoV5-4
1.8812	18 MnMoV 5 2	18MnMoV5-2
1.8815	18 MnMoV 6 3	18MnMoV6-3
1.8821	StE 355 TM	P355M
1.8824	StE 420 TM	P420M
1.8826	StE 460 TM	P460M
1.8828	EStE 420 TM	P420ML2
1.8831	EStE 460 TM	P460ML2
1.8832	TStE 355 TM	P355ML1
1.8835	TStE 420 TM	P420ML1
1.8837	TStE 460 TM	P460ML1
1.8879	StE ...	P690Q
1.8880	WStE ...	P690QH
1.8881	TStE ...	P690QL1
1.8882	10 MnTi 3	10MnTi3
1.8888	EStE ...	P690QL2
1.8900	StE 380	S380N
1.8901	StE 460	S460N
1.8902	StE 420	S420N
1.8903	TStE 460	S460NL
1.8905	StE 460	P460N
1.8907	StE 500	S500N
1.8910	TStE 380	S380NL
1.8911	EStE 380	S380NL1
1.8912	TStE 420	S420NL
1.8913	EStE 420	S420NL1
1.8915	TStE 460	P460NL1
1.8917	WStE 500	S500NL
1.8918	EStE 460	P460NL2
1.8919	EStE 500	S500NL1
1.8930	WStE 380	P380NH
1.8932	WStE 420	P420NH
1.8935	WStE 460	P460NH
1.8937	TStE 500	P500NH
1.8972	StE 415.7	L415NB
1.8973	StE 415.7 TM	L415MB
1.8975	StE 445.7 TM	L450MB
1.8977	StE 480.7 TM	L485MB
1.8978	StE 550.7 TM	L555MB

Tolleranze dei diametri

Scostamenti ISO

Nelle punte elicoidali secondo DIN 1414 la normale precisione di fabbricazione corrisponde al campo di tolleranza h8 delle norme ISO. Per le tolleranze più restrittive contemplate dai campi di tolleranza h7, h6 e h5.

Campi di diametro mm		Scostamenti mm (misurati sulle fasi, agli spigoli)				
		h8	h7	h6	h5	m7
da	1,0	0	0	0		
fino	3,0	–0,014	–0,010	–0,006	–0,004	
oltre	3,0	0	0	0	0	+0,016
fino	6,0	–0,018	–0,012	–0,008	–0,005	+0,004
oltre	6,0	0	0	0	0	+0,021
fino	10,0	–0,022	–0,015	–0,009	–0,006	+0,006
oltre	10,0	0	0	0	0	+0,025
fino	18,0	–0,027	–0,018	–0,011	–0,008	+0,007
oltre	18,0	0	0	0	0	+0,029
fino	30,0	–0,033	–0,021	–0,013	–0,009	+0,008
oltre	30,0	0	0	0	0	
fino	50,0	–0,039	–0,025	–0,016	–0,011	
oltre	50,0	0	0	0	0	
fino	80,0	–0,046	–0,030	–0,019	–0,013	
oltre	80,0	0	0	0	0	
fino	100,0	–0,054	–0,035	–0,022	–0,015	

Tolleranze delle micropunte secondo DIN 1899

Nelle micropunte fino al Ø 1,5 mm la precisione di fabbricazione corrisponde alle tolleranze previste da DIN 1899.

Tolleranza nel diametro al vertice	= 0/– 0,004 mm
Tolleranza nel diametro al codolo h8	= 0/– 0,014 mm

Tolleranze delle misure non previste dalle norme secondo DIN-ISO 2768

Valori numerici per misure di lunghezza (mm)

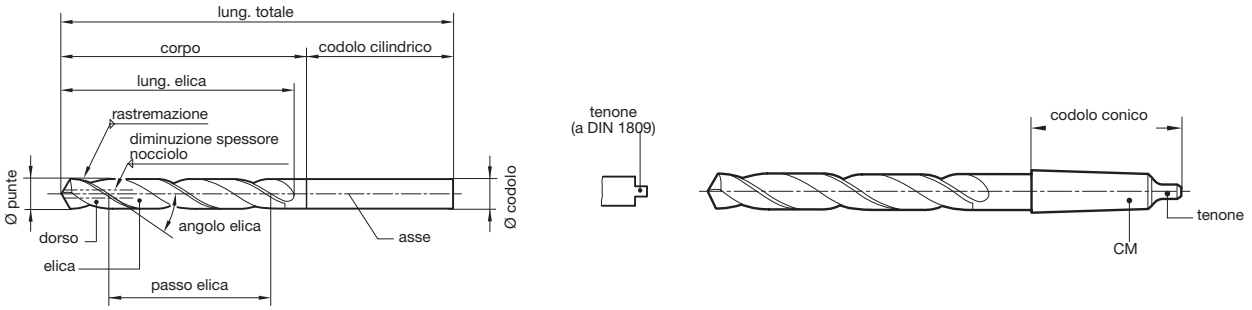
Grado di precisione	Campo misure nominali							
	0,5 fino 3	oltre 3 fino 6	oltre 6 fino 30	oltre 30 fino 120	oltre 120 fino 400	oltre 400 fino 1000	oltre 1000 fino 2000	oltre 2000 fino 4000
fine	± 0,05	± 0,05	± 0,1	± 0,15	± 0,2	± 0,3	± 0,5	-
medio	± 0,1	± 0,1	± 0,2	± 0,3	± 0,5	± 0,8	± 1,2	± 2
grosso	± 0,15	± 0,2	± 0,5	± 0,8	± 1,2	± 2	± 3	± 4
molto grosso	–	± 0,5	± 1	± 1,5	± 2,5	± 4	± 6	± 8

Valori numerici per angoli (espressi in gradi e minuti)

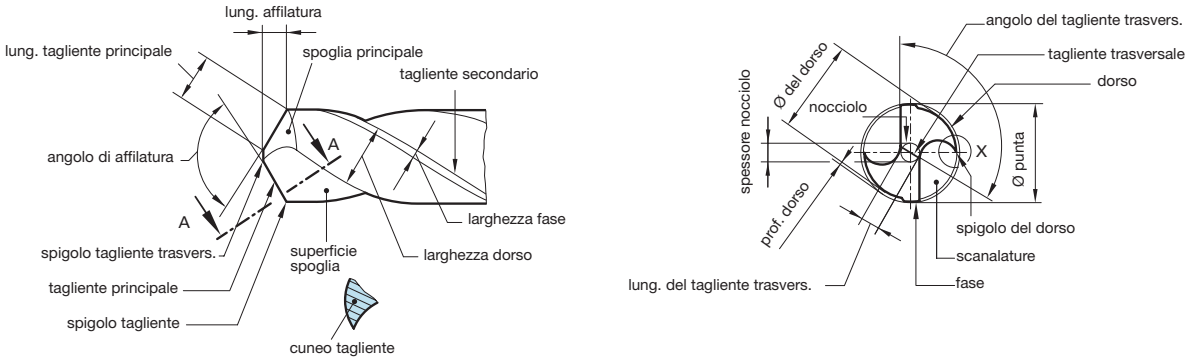
Grado di precisione	Campo misure nominali							
	fino 10	oltre 10 fino 50	oltre 50 fino 120	oltre 120 fino 400	oltre 400			
fine, medio	± 1°	± 0° 30'	± 0° 20'	± 0° 10'	± 0° 5'			
grosso	± 1°30'	± 1°	± 0° 30'	± 0° 15'	± 0° 10'			
molto grosso	± 3°	± 2°	± 1°	± 0° 30'	± 0° 20'			

Definizione di punte elicoidali secondo DIN ISO 5419 (Estratto: edizione 06/1998)

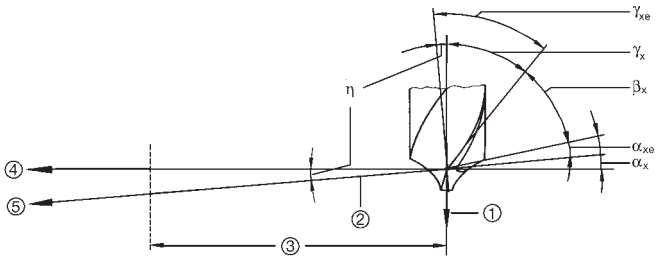
Punte elicoidali con codolo cilindrico/conico Morse



Parte tagliente



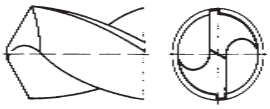
Angoli sui taglienti



α_x	angolo spoglia inferiore (Alpha)	γ_x	angolo spoglia superiore (Gamma)
α_{xe}	angolo spoglia inferiore effettivo	γ_{xe}	angolo spoglia superiore effettivo
β_x	angolo taglio inferiore (Beta)	η	angolo direzione forza taglio (Eta)

Designazione:
1 = direzione avanzamento
2 = avanzamento f
3 = percorso taglio al giro (d · π)
4 = direzione di taglio
5 = direzione forza di taglio
Angolo di spoglia inferiore a, angolo di taglio b ed angolo di spoglia superiore g sono misurati sul piano delimitato dall'angolo. Per i particolari vedere DIN 6581, tecniche di asportazione truciolo: geometria sull'angolo tagliente dell'utensile.

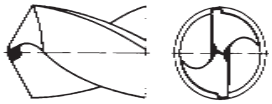
secondo norma di fabbrica



Affilatura normale a mantello

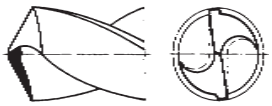
Impiego: per tutte le comuni operazioni di foratura su acciaio, materiali non ferrosi e materiali plastici. Gli angoli di vertice tengono conto del differente grado di truciolabilità dei materiali.
Vantaggi: Robustezza dei taglienti principali, praticamente insensibili all'urto ed alle forze laterali. Affilatura semplice, facilmente eseguibile anche a mano.
Svantaggi: il tagliente trasversale, essendo piuttosto largo, richiede una notevole forza di avanzamento.

secondo DIN 1412 (Estratto, Edizione 03/01)



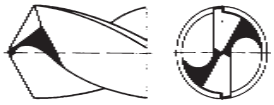
Tagliente trasversale ridotto secondo DIN 1412 A

Impiego: per tutte le comuni operazioni di foratura mediante punte con nocciolo robusto e, nei diametri grossi, per le foratura nel pieno.
Vantaggi: preciso centraggio in sede di foratura grazie all'accorciamento della lunghezza del tagliente trasversale fino ad un decimo del Ø della punta e sforzo ridotto per l'avanzamento.
Svantaggi: affilatura supplementare.



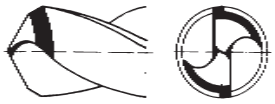
Tagliente trasversale ridotto con correzione tagliente principale secondo DIN 1412 B

Impiego: per la foratura di acciai ad alta resistenza, di acciai a forte contenuto di manganese (oltre il 10% di Mn) e di acciai per molle nonché per allargature.
Vantaggi: insensibile agli urti, ai carichi unidirezionali ed agli effetti delle forze lat.. Nessun rischio di agganciamento nei mat. sottili.
Svantaggi: richiede notevole forza di avanzamento e tende a corsa scentrata, riaffilatura più dispendiosa.



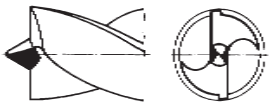
Affilatura a croce secondo DIN 1412 C

Impiego: nelle punte con nocciolo molto robusto per materiali particolarmente tenaci e duri nonchè nelle punte per fori profondi.
Vantaggi: ottimo centraggio, facile avanzamento. Il rompitruciolo assicura asportazione molto efficiente.
Svantaggi: una perfetta riaffilatura è ottenibile solo su macchina.



Affilatura per ghisa grigia secondo DIN 1412 D

Impiego: per la foratura di ghisa, ghisa malleabile e di pezzi fucinati.
Vantaggi: i taglienti principali essendo prolungati prevengono l'usura degli spigoli; insensibilità agli urti e buona dissipazione del calore a tutto vantaggio della durata utile dell'utensile.
Svantaggi: riaffilatura più dispendiosa.



Affilatura con centrino secondo DIN 1412 E

Impiego: per la foratura delle lamiere e dei materiali teneri in genere, per fori ciechi a fondo piano.
Vantaggi: ottimo centraggio, formazione di bava insignificante, forature precise nelle lamiere e nei tubi a parete sottile, senza rischio di agganciamento.
Svantaggi: sensibile agli urti ed ai carichi unidirezionali. Una perfetta riaffilatura è ottenibile solo a macchina.

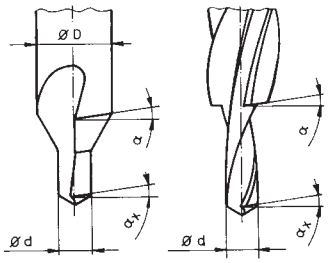
Angolo di spoglia/Indice di frequenza

Angolo di spoglia nelle punte elicoidali in HSS e HSS-E

Diametro	Tipo N, tipo H e punte da centro		Tipo W, tipo FN, tipo FW, tipo S, tipo IS		Tipo V	
Ø punte in mm oltre fino	Angolo di spoglia α_x	Angolo al vertice	Angolo di spoglia α_x	Angolo al vertice	Angolo di spoglia α_x	Angolo al vertice
0,14 – 0,24	28°	118°	28°	130°	28°	130°
0,24 – 0,48	25°	118°	25°	130°	25°	130°
0,48 – 0,95	23°	118°	23°	130°	23°	130°
0,95 – 2,36	20°	118°	20°	130°	20°	130°
2,36 – 6,00	15°	118°	15°	130°	15°	130°
6,00 – 15,00	13°	118°	13°	130°	13°	130°
15,00 – 37,50	10°	118°	10°	130°	10°	130°
37,50 – 100,00	8°	118°	8°	130°	8°	130°

Angolo di spoglia nelle punte a gradino ad eliche indipendenti, punte a gradino e punte a centrare

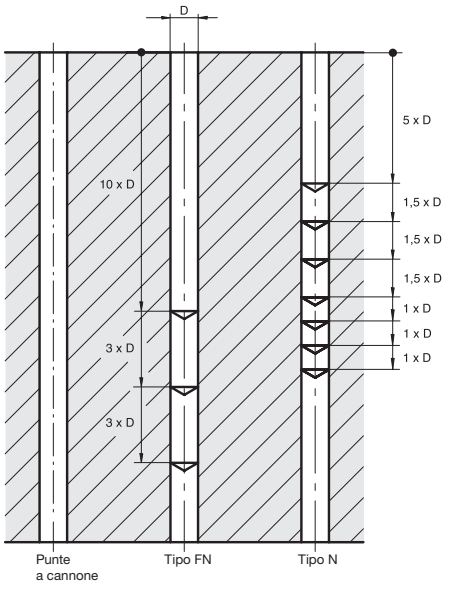
Diametro	Tipo N, tipo S angolo di svasatura 20 - 160°	161 - 180°	Tipo W, tipo H, angolo di svasatura 20 - 160°	161 - 180°	Punte a centrare	
Ø punte D oltre fino	Angolo al vertice α_x	Angolo al vertice α	Angolo al vertice α_x	Angolo al vertice α	Angolo misurato al corpo Ø D	
0,48 – 0,95	-	-	-	-	7°	
0,95 – 2,36	14,0°	8°	16°	9°	7°	
2,36 – 3,75	13,0°	7°	15°	8°	6°	
3,75 – 6,00	12,5°	6,5°	14°	7°	5°	
6,00 – 9,50	11,0°	6°	13°	7°	4°	
9,50 – 15,00	10,0°	5°	12°	6°	4°	
15,00 – 23,60	9,5°	5°	11°	6°	–	
23,60 – 37,50	9,0°	4,5°	11°	5°	–	
37,50 – 60,00	8,0°	4°	10°	5°	–	



Indice di frequenza di scarico trucioli

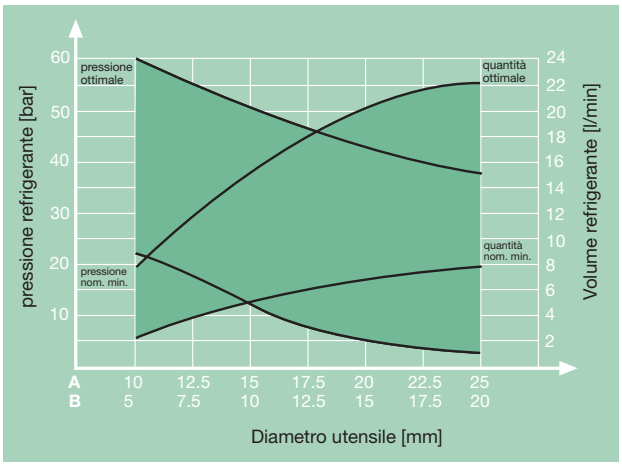
I dati sopra esposti rappresentano valori medi orientativi. Nelle perforazione in profondità si ponga la massima attenzione ad una abbondante e costante presenza di refrigerante ai taglienti della punta. Con lo scarico dei trucioli, da eseguirsi almeno una volta, o meglio ripetute volte, nel corso della lavorazione, la punta si raffredda già in maniera sufficiente. La frequenza delle operazioni di scarico dei trucioli dipende essenzialmente dal tipo di materiale, dalla profondità della foratura nonché dal tipo della punta impiegata.
L'impiego di punte del tipo FN, cioé avente profilo a scanalature piatte riduce sensibilmente la frequenza di scarico. Si tenga presente, comunque che in determinati materiali è possibile influire sul modo di formazione dei trucioli con l'adeguato variare dell'angolo del vertice; se la loro forma è abbastanza favorevole l'asportazione spontanea ne risulterà facilitata e l'afflusso del lubrorefrigerante diventa piu efficace. Per perforazioni di estrema profondità come per le perforazioni
orizzontali si consiglia il ricorso alle punte auto-refrigeranti ad alimentazione interna.

Tutti i dati sono orientativi e rappresentano valori medi.



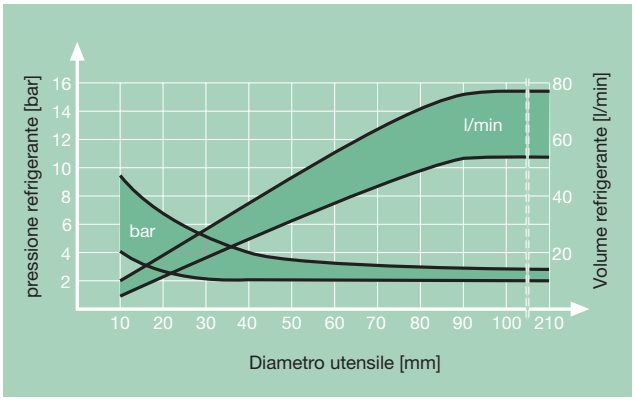
Diagrammi del refrigerante
Pressione e volume del refrigerante

Per punte elicoidali in metallo duro con fori di refrigerazione



A = Diametri per utensili con condotto refrigerante centrale
B = Diametri per utensili con condotto refrigerante elicoidale

Per punte con placchette intercambiabili, sistema Multiplex con fori di refrigerazione



Nella foratura con placchette intercambiabili in HSS-E e MD l'emulsione serve come lubrorefrigerante. Il rapporto di miscelazione è quello usuale di 1:20.

Di decisiva importanza è un efficiente gruppo refrigerante. Una pressione e quantità del refrigerante non sufficienti possono provocare un risultato di foratura insoddisfacente e persino la rottura dell'utensile.

La quantità delle particelle della sostanza solida possibilmente non deve superare i 50 µm.

Consigli per l'impiego di punte elicoidali

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento 1	2	3	4	5	6	7	8	9
	f (mm/giro)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Refrigerante:
○ Aria
● Olio
● Emulsione

Direzione di taglio:
® destre
↺ sinistre

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigerante
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		○ ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		○ ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

≤3xD

81110 81115	81120	81130	81140 81145	84400	84501	81171	82971	81173	82972	84803	84503
1897	1897	1897	1897	1897	1897	1897	N.d.F.	1897	N.d.F.	1897	1897
HSS				HSS	HSS	HSS-E				HSS-E	HSS-E
>Ø 2,36			>Ø 2,36	T	F	>Ø 2,36				T	F
N	H	W	FN	N	N	V	V	IS	IS	V	V
69/71	75	76	77/78	73	73	81	166	80	165	83	83

v_c m/min	Num. col. avanzam.				v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.				v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.
27	**6**			6	30	**6**	32	**7**	35	5	5	5	5	38	5	42	6
22	**5**			5	24	**5**	26	**6**	30	5	5	5	5	33	4	36	5
30	**6**			**6**	33	**6**	36	**7**	40	5	5	5	5	44	5	48	6
30	5			5	33	5	36	6	40	**5**	**5**	5	5	38	5	42	6
25	**5**			**5**	28	**5**	31	**6**	40	5	5	5	5	44	5	48	6
25	**5**			**5**	28	**5**	31	**6**	40	5	5			44	5	48	6
					25	4	28	5	35	**4**	**4**			38	**4**	42	**5**
					22	4	24	5	20	**4**	**4**			27	**4**	30	**5**
									16	**3**	**3**			22	**3**	24	**4**
30	**6**			6	33	**6**	36	**7**	36	6	6	6	6	44	4	48	5
					20	4	22	5	20	**4**	**4**			22	**4**	24	**5**
									15	**3**	**3**			18	**3**	20	**4**
					14	4	16	5	16	4	**4**			22	**4**	24	**5**
									12	3	**3**			18	**3**	20	**4**
16	4			4	18	4	20	5	15	**4**	**4**			19	**4**	21	**5**
									12	**3**	**3**			14	**3**	16	**4**
									15	3	**3**			14	**3**	17	**4**
									8	**2**	**2**			9	**2**	11	**3**
									45	**4**	**4**			4	1	5	2
									18	4	4	**4**	**4**	20	4	22	5
									14	3	3	**3**	**3**	15	**3**	17	**4**
									16	3	**3**	3	3	18	**3**	20	**4**
30	**6**			6	33	**6**	36	7	35	**6**	6			40	6	45	7
30	6			6	33	6	36	**7**	30	**6**	**6**			35	**6**	40	**7**
25	**6**			6	28	**6**	31	7	30	6	6			33	6	36	7
20	6			6	22	6	24	**7**	25	**6**	**6**			27	6	29	7
									10	3	3			12	3	14	4
									8	1	1			6	2	7	2
									10	2	2	2	2	11	2	12	3
									6	2	2	2	2	7	2	8	3
70			**7**	7			85	8	90			7	7				
70			**7**	7			85	8	90			7	7				
50	7		7	**7**			60	**8**	80			7	7				
50	6			**6**			60	**7**	70			6	6				
70	6	**6**		6	80	6	90	6	70			6	6				
60	5		5	**5**	65	**5**	70	**6**	40			5	5				
70		6			75	5	80	6	60			5	5				
40	5		5	**5**	45	**5**	50	**6**	40			5	5				
30	4	4		**4**	33	**4**	36	**5**	35	4	4	4	4	45	5	50	6
25	4			4	27	4	30	5	30	**4**	**4**	4	4	40	**4**	45	**5**
15	4			4	16	**4**	18	**5**	20	4	4	**4**	**4**	23	4	26	5
					15	4	18	5	15	4	4	**4**	**4**	17	4	20	**5**
18	4	4		**4**	22	**4**	29	**5**	20	4	4						
28	5	**5**	5	5	36	**5**	47	6	30			4	4				

Consigli per l'impiego di punte elicoidali

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento								
	1	2	3	4	5	6	7	8	9
	f (mm/giro)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Refrigerante:
○ Aria
● Olio
● Emulsione

Direzione di taglio:
® destre
↺ sinistre

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigerante
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		○ ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		○ ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

≤3xD

84805	84808	84806	84511	89235	89246	89301	89302	89303
N.d.F.	1897	1897	1897	6539	N.d.F.	8037	8041	8038
HSS-E	HSS-E	HSS-E	HSS-E-PM	int. in MD				
T	○	T	F	○	○	○	○	○
FU 500	FU 500 DZ	FU 500 DZ	FN 500	N	N	N	N	N
92	85	85	87	89	91	150	183	149

v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.				
45	**6**	35	**6**	*45*	**6**	*42*	6	*80*	4				
35	**5**	30	**5**	*35*	**5**	*37*	5	*70*	4				
50	**6**	40	**6**	*50*	**6**	*47*	**7**	*80*	**5**		4	4	
40	**6**	30	**6**	*40*	**6**	*44*	6	*70*	**4**		3	3	
44	**6**	32	**6**	*44*	**6**	*47*	6	*80*	4				
44	**6**	28	**6**	*44*	**6**	*47*	6	*70*	4				
40	**5**	20	**5**	*40*	**5**	*44*	**5**	*60*	4				
27	4	15	4	*27*	4	*30*	4	*60*	4				
22	3	13	3	*22*	3	*25*	**3**						
44	**6**	30	**6**	*44*	**6**	*47*	4	*80*	5				
22	4	16	4	*22*	4	*25*	**5**	*60*	4				
18	3	12	3	*18*	3	*20*	**4**						
22	4	15	4	*22*	4	*25*	**5**	*50*	4				
16	3	10	3	*16*	3	*18*	**4**						
20	4	15	4	*20*	4	*22*	**5**	*50*	3				
15	3	10	3	*15*	3	*17*	**4**						
13	3	10	3	*13*	3	*17*	**4**						
9	2			*9*	2	*12*	**2**	*25*	2		**2**	**2**	
								20	3		3	3	
								10			2	2	
20	**4**	14	**4**	*20*	**4**	*22*	**4**	*25*	**2**				
16	**3**	10	**4**	*16*	**4**	*18*	3	*15*	1				
18	**4**	12	**4**	*18*	**4**	*20*	3	*25*	2				
45	**6**	36	**6**	*45*	**6**	*50*	**7**	*90*	**4**		4	4	
40	**6**	30	**6**	*40*	**6**	*44*	**7**	*80*	**4**		4	4	
40	**6**	30	**6**	*40*	**6**	*45*	**7**	*80*	**4**		4	4	
30	**6**	22	**6**	*30*	**6**	*33*	**7**	*70*	**4**		4	4	
						16	4	*10*			**1**	**1**	
						6	2	*15*	2				
								15	1				
								15	1				
70	7	50	**7**	*70*	7			*200*	**7**				
70	7	50	**7**	*70*	7			*200*	**7**				
85	7	65	**7**	*85*	7			*150*	**6**				
70	6	60	**6**	*70*	6			*120*	**6**				
80	6	60	6	*80*	6			*180*	**6**				
80	**5**	70	**5**	*80*	**5**	*80*	5	*80*	**5**				
77	**5**	45	**5**	*77*	**5**			*180*	**5**		5	5	
44	**5**	30	**5**	*44*	**5**	*60*	5	*180*	**5**		5	5	
50	**4**	36	**4**	*50*	**4**	*50*	5	*120*	**5**				
40	**4**	30	**4**	*40*	**4**	*44*	5	*120*	**5**				
32	**4**	30	**4**	*32*	**4**	*33*	5	*70*	4				
28	**4**	25	**4**	*28*	**4**	*28*	5	*50*	3				
25	**4**	20	**4**	*25*	**4**	*25*	**4**	*50*	4	**4**			
27	**4**	15	**4**	*27*	**4**			*40*	3	**3**			3
								80	3	**3**			2

Consigli per l'impiego di punte elicoidali

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento 1	2	3	4	5	6	7	8	9
	f (mm/giro)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Refrigerante:
○ Aria
● Olio
● Emulsione

Direzione di taglio:
® destre
↺ sinistre

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigerante
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		○ ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		○ ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

≤5xD

81010 81015	81017	82010	81020 81025	81030 81035	82030	81040 81045	84406	84405	84460	84415	84502
338	338	345	338	338	345	338	338	338	345	338	338
HSS							HSS	HSS			HSS
>Ø 2,36						>Ø 2,36	T	T	T	T	F
N	N	N	H	W	W	FN	N	N	N	FN	FN
23/27	29	158	32/34	36/38	157	39/41	43	30	160	45	45

v_c m/min	Num. col. avanzam.							v_c m/min	Num. col. avanzam.
27	**6**	**6**	**6**				6		
22	**5**	**5**	**5**				5		
30	**6**	**6**	**6**				**6**		
30	5	5	5				5		
25	**5**	**5**	**5**				5		
25	**5**	**5**	**5**				5		
30	6	6	6				6		
16	4	4	4				4		
30	**6**	**6**	**6**				6		
30	6	6	6				6		
25	6	6	6				6		
25	6	6	6				6		
80					**7**	**7**			
80					**7**	**7**			
70	7	7	7		7	7	**7**		
70	6	6	6				**6**		
50	6	6	6	6			6		
50	5	5	5		**5**	**5**	**5**		
70				**6**					
40	5	5	5				**5**		
30	4	4	4	4					
25	4	4	4						
15	4	4	4				4		
18	4	4	4	4			**4**		
28	5	5	5	**5**	5	5			

v_c m/min	Num. col. avanzam.			v_c m/min	Num. col. avanzam.			v_c m/min	Num. col. avanzam.		
30	**6**	**6**	6					32	7		
24	**5**	**5**	5					26	6		
33	**6**	**6**	**6**					36	**7**		
33	5	5	5					36	6		
28	**5**	**5**	5					31	6		
28	**5**	**5**	5					31	6		
25	4	4	4					28	5		
22	4	4	4					24	5		
33	**6**	**6**	6					36	7		
20	4	4	4					22	5		
14	4	4	4					16	5		
18	4	4	4					20	5		
33	6	6	6					36	7		
33	6	6	6					36	7		
28	**6**	**6**	6					31	7		
22	6	6	6					24	7		
								85	8		
								85	8		
								60	8		
								60	7		
80	6	6						90	7		
65	5	5	**5**					70	6		
75	5	5	5					80	6		
45	5	5	**5**					50	**6**		
33	**4**	**4**									
27	**4**	**4**									
16	**4**	**4**	4					18	5		
15	**4**	**4**	4					18	5		
22	4	4	**4**					29	5		
36	5	5									

Consigli per l'impiego di punte elicoidali

Articolo nr. ®
Articolo nr. ↺
Norma/DIN
Materiale tagliente
Tratt. superficiale
Tipo
Prezzi/misure pag.

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento								
	1	2	3	4	5	6	7	8	9
	f (mm/giro)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Refrigerante:
○ Aria
● Olio
● Emulsione

Direzione di taglio:
® destre
↺ sinistre

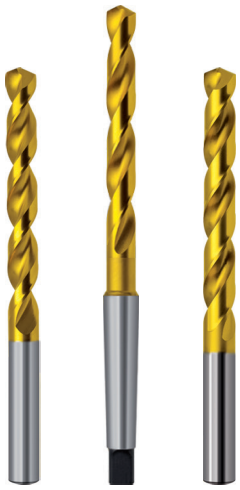
Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigerante
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		○ ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		○ ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

≤5xD

81011	82011	81041	81061	81013	82012	81012
338	345	338	338	338	345	338
HSS-E						M42
>Ø 2,36		>Ø 2,36				
N	N	FN	S	IS	IS	N
47	161	49	57	55	162	65

84800	84859	84807
338		338
HSS-E		
T	T	T
FN	N	S
51	164	61

84504	84505
338	338
HSS-E	
F	F
FN	S
51	61



v_c m/min	Num. col. avanzam.						
35	5	5	5		5	5	5
30	5	5	5		5	5	5
40	5	5	5		5	5	5
40	5	5	**5**		5	5	5
40	5	5	5		5	5	5
40	5	5	5				5
35	**4**	**4**	4				5
20	**4**	**4**	**4**				4
16	3	3	**3**	3			3
36	6	6	6	6	6	6	6
20	**4**	**4**	4				3
15	3	3	**3**	3			3
16	**4**	**4**	4				3
12	3	3	**3**	3			3
15	**4**	**4**	4				3
12	**3**	3	**3**	3			3
15	3	3	**3**	3			3
8	**2**	2		**2**			**2**
4							**1**
18	4	4	**4**	4	**4**	**4**	3
14	3	3	2	**3**	3	3	
16	3	3	3	**3**	3	3	3
35	6	6	6				5
30	**6**	**6**	6				5
30	6	6	6				5
28	**6**	**6**	6				5
10	3	3	3	3			**3**
8				1			**1**
10				**2**	2	2	2
6				**2**	2	2	2
90					**7**	**7**	7
90					**7**	**7**	7
80			7		7	7	7
70			6		6	6	6
70					6	6	6
40	**5**	5	5		5	5	5
60					5	5	5
40	5	5	4		5	5	5
35	**4**	4			4	4	4
33	**4**	4			4	4	4
20	4	4	4		**4**	**4**	4
15	4	4	**4**		**1**	**1**	4
20	4	4	4				

v_c m/min	Num. col. avanzam.		
38	6	6	
33	5	5	
44	5	5	
38	**5**	5	
44	5	5	
38	4	**4**	
27	4	**4**	
22	**3**	3	3
44	4	4	
22	4	**4**	
18	**3**	3	
22	4	**4**	
18	**3**	3	
19	**4**	**4**	
14	**3**	3	
14	**3**	3	3
9		2	**2**
20	**4**	4	4
15		3	**3**
18	3		**3**
40	6	6	
35	6	**6**	
33	6	6	
27	6	**6**	
12			**3**
6			2
11			**2**
7			**2**
88	5	5	
40		**4**	
22	4	**4**	
17	**4**	4	4
22	4	4	

v_c m/min	Num. col. avanzam.	
42	6	
36	5	
48	6	
42	**6**	
48	6	
42	5	
30	**5**	
34	**4**	4
48	6	
24	5	
20	**4**	
24	5	
20	**4**	
21	5	
16	**4**	
17	**4**	4
11	3	**2**
6	1	
22	**5**	5
17	4	**3**
20	4	**4**
45	7	
40	7	
36	7	
29	7	
14	4	**3**
7		2
12		**2**
8		**2**
85	8	
72	7	
96	6	
25	5	
20	**5**	4
24	5	

HARTNER

Consigli per l'impiego di punte elicoidali

Articolo nr. ®
Articolo nr. ↺
Norma/DIN
Materiale tagliente
Tratt. superficiale
Tipo
Prezzi/misure pag.

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento								
	1	2	3	4	5	6	7	8	9
	f (mm/giro)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Refrigerante:
○ Aria
● Olio
● Emulsione

Direzione di taglio:
® destre
↺ sinistre

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigerante
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		● ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		● ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

≤5xD

84804	84802	84801	84660	81062
338	338	N.d.F.	345	338
HSS-E	HSS-E	HSS-E	HSS-E	HSS-E
○	T	T	A	●
FU 500 DZ	FU 500 DZ	FU 500	FN	P2000
53	53	94	163	59

v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.
35	6	45	6	45	6			35	6
30	5	35	5	35	5			30	5
40	6	50	6	50	6			40	6
30	6	40	6	40	5	42	5	40	5
32	6	44	6	44	6			40	5
28	6	44	6	44	6			40	5
20	5	40	5	40	5			35	4
15	4	27	4	27	4			25	4
13	3	22	3	22	3			20	3
30	6	44	6	44	6			40	6
16	4	22	4	22	4			20	4
12	3	18	3	18	3			15	3
15	4	22	4	22	4			20	4
10	3	16	3	16	3			15	3
15	4	20	4	20	4			18	4
10	3	15	3	15	3			12	3
10	3	13	3	13	3			12	3
		9	2	9	2			8	2
14	4	20	4	20	4			14	4
10	4	16	4	16	4			10	3
12	4	18	4	18	4			12	3
36	6	45	6	45	6	45	7	38	6
30	6	40	6	40	6	40	7	30	6
30	6	40	6	40	6	36	7	30	6
22	6	30	6	30	6	29	7	25	6
								10	3
								5	2
50	7	70	7	70	7			90	7
50	7	70	7	70	7			90	7
65	7	85	7	85	7			80	7
60	6	70	6	70	6			70	6
60	6	80	6	80	6	85		85	6
70	5	80	5	88	5	96		80	5
45	5	77	5	77	5			70	5
30	5	44	5	44	5			40	5
36	4	50	4	50	4			40	4
30	4	40	4	40	4	25	5	30	4
30	4	32	4	32	4	20	5	25	4
25	4	28	4	28	4			15	4
20	4	25	4	25	4	24	5	20	4
15	4	27	4	27	4			25	5

HARTNER

Consigli per l'impiego di punte elicoidali

Articolo nr. ®
Norma/DIN
Materiale tagliente
Tratt. di superficie
Tipo
Raffreddamento
Prezzi/misure pag.

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento 1	2	3	4	5	6	7	8	9
	f (mm/giro)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Refrigerante:
○ Aria
● Olio
● Emulsione

Direzione di taglio:
® destre
Ⓛ sinistre

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigerante
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		○ ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		○ ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

HARTNER

≤5xD

84811	84507	82761	84461	89244
338	N.d.F.	N.d.F.	N.d.F.	N.d.F.
HSS-E-PM	HSS-E-PM	HSS-E	HSS-E	int. in MD
T	F	○	T	○
FN 500 DZ	FN 500	FN	FN	N
		assiale	assiale	
64	96	108	108	67

v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.
40	6	42	6	48	7	60	7	80	4
32	5	37	5	38	6	48	6	70	4
45	6	47	6	48	7	60	7	80	**5**
40	5	44	6	38	6	48	6	70	**4**
42	6	47	6	48	6	60	6	80	4
40	5	47	6	48	6	60	6	70	4
28	**4**	44	**5**	45	**5**	50	**5**	60	4
25	4	30	4	30	**5**	33	**5**	60	4
20	**3**	25	**3**	28	**4**	31	**4**		
40	4	47	3	50	7	55	7	80	5
22	**4**	25	**4**	25	**5**	31	**5**	60	4
18	**3**	20	**3**	25	**4**	31	**4**		
20	**4**	25	**4**	25	**5**	30	**5**	50	4
15	**3**	18	**4**	20	**4**	24	**4**		
25	**4**	22	**5**	24	5	30	5	50	3
15	**3**	17	**4**	17	**4**	20	**4**		
15	**3**	14	**4**	14	**4**	18	**4**		
10	**2**	12	**2**	12	**3**	15	**3**	25	2
				4	**3**	5	**3**	20	2
15	4	22	4	20	**5**	25	**5**	25	**2**
10	3	18	3	14	**4**	18	**4**	15	1
12	3	20	3	16	**4**	20	**4**	25	2
50	**6**	50	**7**	48	7	60	7	90	**4**
40	**6**	40	**7**	38	**7**	48	**7**	80	**4**
45	**6**	44	**7**	42	7	52	7	70	**4**
32	**6**	33	**7**	35	**7**	40	**7**	80	**4**
8	3	16	4	12	**4**	15	**4**		
5	2	6	2	10	**2**	12	**2**	15	2
				14	3	18	3	15	**1**
				10	**3**	12	**3**	15	**1**
								200	**7**
								200	**7**
				95	7	120	7	150	**6**
				75	8	95	8	120	**6**
								180	**5**
50	5	50	5	90	6	100	6	80	**5**
								180	5
60	5	60	5	50	6	55	6	180	5
50	5	50	5					120	5
45	4	44	5	48	5	60	5	120	5
40	4	33	5	45	5	55	5	70	4
32	4	28	5	38	**5**	45	**5**	50	3
25	**4**	25	**4**					50	4
				38	6	48	6	40	3
								80	3

Consigli per l'impiego di punte elicoidali

Articolo nr. ®
Articolo nr. ↺
Norma/DIN
Materiale tagliente
Tratt. superficiale
Tipo
Prezzi/misure pag.

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento								
	1	2	3	4	5	6	7	8	9
	f (mm/giro)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Refrigerante:
○ Aria
● Olio
● Emulsione

Direzione di taglio:
® destre
↺ sinistre

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigerante
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		● ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		● ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

≤10xD

81210	81317	81310	82210	81320	81330	81350	81340	84814	84812	84418	84423	84506
339	340	340	341	340	340	340	340	340	340	340	340	340
HSS								HSS-E	HSS-E	HSS		HSS
>Ø 2,36		>Ø 2,36					>Ø 2,36		T	T	T	F
N	N	N	N	H	W	FW	FN	FU500DZ	FU500DZ	N	FN	FN
109	114	111	168	117	118	124	120	131	131	115	122	122

v_c m/min	Num. col. avanzam.								v_c m/min	Num. avanz.	v_c m/min	Num. avanz.	v_c m/min	Num. col. avanzam.		v_c m/min	Num. avanz.
24	6	6	6	6				**6**	*29*	5	32	5	*28*	6	**6**	*30*	**7**
20	5	5	5	5				**5**	*22*	4	25	4	*22*	5	**5**	*24*	**6**
27	6	6	6	6				**6**	*32*	5	35	5	*30*	6	**6**	*33*	**7**
27	5	5	5	5				5	*25*	5	28	5	*30*	5	5	*33*	6
22	5	5	5	5				**5**	*25*	5	28	5	*25*	5	**5**	*28*	**6**
22	5	5	5	5				**5**	*22*	5	25	5	*25*	5	**5**	*28*	**6**
									13	4	15	4	*22*	4	4	*24*	5
									12	3	13	3	*18*	4	4	*23*	5
									11	2	12	2					
27	6	6	6	6				**6**	*25*	5	28	5	*30*	6	**6**	*33*	**7**
									12	3	14	3	*14*	4	4	*18*	5
									11	2	12	2					
									12	3	13	3	*12*	4	4	*15*	5
									7	2	8	2					
14	4	4	4	4				4	*12*	3	13	9	*16*	4	4	*19*	5
									9	2	10	2	*10*	3	3	*13*	4
									9	2	10	2					
									12	3	13	3					
									7	3	8	3					
									11	3	12	3					
27	6	6	6	6				**6**	*29*	6	32	6	*30*	6	**6**	*33*	**7**
27	6	6	6	6				6	*23*	6	26	6	*30*	6	6	*33*	7
22	6	6	6	6				**6**	*25*	6	28	6	*24*	6	**6**	*26*	**7**
18	6	6	6	6				6	*18*	6	20	6	*20*	6	6	*22*	7
65						**7**	**7**		*45*	7	50	7					
65						**7**	**7**		*45*	7	50	7					
45	7	7	7	7		7		**7**	*54*	7	60	7	*50*	7	**7**	*55*	**8**
45	6	6	6	6				**6**	*45*	6	50	6	*50*	6	**6**	*55*	**7**
63	6	6	6	6	6		**6**		*45*	6	50	6	*70*	6			
54	5	5	5	5		5		**5**	*60*	5	70	5	*60*	5	**5**	*65*	**6**
63					**6**				*40*	5	50	5					
36	5	5	5	5				**5**	*25*	5	28	5	*40*	5	**5**	*44*	**6**
28	4	4	4	4	**4**				*31*	4	35	4	*30*	**4**			
22	4	4	4	4					*22*	4	25	4	*25*	**4**			
22	4	4	4	4				**4**	*22*	4	24	4	*14*	4	**4**	*16*	**5**
									18	4	20	4	*12*	4	4	*14*	5
14	4	4	4	4	4			**4**	*16*	4	18	4	*18*	4	**4**	*23*	**5**
22	5	5	5	5	**5**	5	5		*11*	4	12	4	*32*	5			

Consigli per l'impiego di punte elicoidali

Articolo nr. ®
Norma/DIN
Materiale tagliente
Tratt. di superficie
Tipo
Refrigerazione
Prezzi/misure pag.

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento								
	1	2	3	4	5	6	7	8	9
	f (mm/giro)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Refrigerante:
○ Aria
● Olio
● Emulsione

Direzione di taglio:
® destre
Ⓛ sinistre

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigerante
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		● ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		● ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

HARTNER

≤10xD

81311	82211	81341	81361	81362	89286	82710	82521	82535	82525	82515
340	341	340	340	340	N.d.F.	N.d.F.	N.d.F.	N.d.F.	N.d.F.	N.d.F.
HSS-E				HSS-E	MD	HSS			HSS-E	HSS-E
>Ø 2,36		>Ø 2,36		T						
N	N	FN	S	S	N	FN	N	FN	FN	FN
						assiale	assiale	assiale	assiale	assiale
126	169	127	129	129	133	107	180	179	181	182

vc m/min	Num. col. avanzam.				vc m/min	Num. col. avanzam.	vc m/min	Num. col. avanzam.	vc m/min	Num. col. avanzam.			vc m/min	Num. col. avanzam.	vc m/min	Num. col. avanzam.
33	5	O5	5						26	6	6	6	35	6	30	**5**
27	5	5	5						22	5	5	5	30	5	25	**4**
36	5	5	5						30	6	6	6	30	6	30	**5**
32	5	5	**5**						30	**5**	**5**	**5**	30	5	25	**4**
36	5	5	5						24	**5**	**5**	**5**	35	5	30	**4**
36	5	5	5						24	**5**	**5**	**5**	29	5	25	**4**
22	4	4	**4**						22	4	4	4	22	**4**	18	**3**
18	4	4	**4**						20	4	4	4	18	**4**	16	**3**
14	3	3	**3**	3	15	3			14	3	3	3	14	**3**	12	**2**
32	5	5	5						30	**6**	**6**	**6**	35	6	30	**5**
18	4	4	**4**						17	4	4	4	18	**4**	16	**3**
13	3	3	**3**		13	3			12	3	3	3	14	**3**	12	**2**
14	4	4	**4**						14	4	4	4	14	**4**	12	**3**
10	3	3	**3**		10	3			10	3	3	3	12	**3**	10	**2**
13	4	4	**4**						15	**4**	**4**	**4**	15	4	13	**3**
10	3	3	**3**		10	3			10	3	3	3	11	**3**	9	**2**
12	3	3	**3**		10	3			10	3	3	3	11	**3**	9	**2**
6	2	2	2		8	**2**			7	2	2	2	8	**2**	6	**2**
4			1										4	2	4	**1**
12	4	4	**4**	4	15	4							14	**4**	12	**3**
8	3	3	2	**3**	10	**3**							10	3	8	**2**
10	3	3	**3**	**3**	13	**3**							12	**3**	12	**2**
32	6	6	6						30	**6**	**6**	**6**	30	6	28	**5**
27	6	6	**6**						30	6	6	6	24	**6**	22	**5**
26	6	6	6						24	**6**	**6**	**6**	24	6	22	**5**
24	6	6	**6**						20	6	6	6	20	**6**	18	**5**
6	3	3	3	3	6	**3**			7	3	3	3	8	3	6	**2**
5	1	1		1	6	1							8	**1**	6	**1**
8				**2**	10	**2**							10	**2**	8	**2**
5				**2**	6	**2**							8	**2**	6	**2**
									80	**6**						
70			7						50	**7**	**7**	**7**	60	7	55	**6**
60			6						50	**6**	**6**	**6**	50	6	44	**5**
60				5												
36	5	5	5						60	**5**	**5**	**5**	38	5	35	**4**
54			5										55	5	50	4
36	5	5	5						40	**5**	**5**	**5**	36	5	33	**4**
30	4	4	5													
24	4	4	5						24	**4**	**4**	**4**	24	4	22	**4**
18	4	4	4						24	**4**	**4**	**4**	20	**4**	18	**4**
13	4	4	**4**	4	25	4			22	4	4	4	14	**4**	12	**4**
16	4	4	4				50	**4**								
26				4			40	**3**	24	**5**	**5**	**5**	25	5	25	**4**
							80	**3**								

Consigli per l'impiego di punte elicoidali

Articolo nr. ®

Norma/DIN

Materiale tagliente

Tratt. di superficie

Tipo

Prezzi/misure pag.

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
	f (mm/giro)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Refrigerante:
○ Aria
● Olio
● Emulsione

Direzione di taglio:
® destre
Ⓛ sinistre

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigerante
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		● ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		● ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

81410	82310	81450	81440	81740	82340	82466
81510	82410		81540	81750	82440	82467
81610			81640	81760		82468
						82469
1869	1870	1869	1869	N.d.F.	1870	N.d.F.
HSS						
>Ø 2,36			>Ø 2,36		>Ø 16,0	>Ø 16,0
N	N	FW	FN	FN	FN	FN
134/139/ 143	170/173	137	135/140/ 144	145-147	171/174	175-178
①	⑤	③	②	④	④	④

84425	81441	82341
84426	81541	
1869	1869	1870
HSS	HSS-E	HSS-E
T		
GT 100	FN	FN
136/141	138/142	172
⑥	②	④

v_c m/min	Num. col. avanzam.						
22	5	5	**5**	**5**	**5**	**5**
18	4	4	**4**	**4**	**4**	**4**
20 22	5	5	**5**	**5**	**5**	**5**
20 18	4	4	4	4	4	4
25 22	4	4	**4**	**4**	**4**	**4**
25 18	4	4	**4**	**4**	**4**	**4**
12	3	3				
22	5	5	**5**	**5**	**5**	**5**
10	3	3				
8	3	3				
12	3	3	3	3	3	3
6	2	2	2	2	2	2
6	2	2				
22	5	5	**5**	**5**	**5**	**5**
18	5	5	5	5	5	5
20	5	5	**5**	**5**	**5**	**5**
14	5	5	5	5	5	5
55			**6**			
55			**6**			
45	6	6	**6**	**6**	**6**	**6**
36	5	5	**5**	**5**	**5**	**5**
55	5	5	5	**5**	**5**	**5**	**5**
22	4	4	**4**	**4**	**4**	**4**
45	4	4				
28	4	4	**4**	**4**	**4**	**4**
22	3	3	3	3	3	3
20	3	3	**3**	**3**	**3**	**3**
18	3	3	**3**	**3**	**3**	**3**
12	3	3	**3**	**3**	**3**	**3**
18	4	4	4	4	4	4	4

v_c m/min	Num. col. avanzam.
28	**5**
22	**4**
28	**5**
22	**4**
28	**4**
22	**4**
16	**3**
28	**5**
12	**3**
8	**2**
6	1
70	6
70	6
55	**6**
45	**5**
70	**5**
28	**4**
36	**4**
28	3
25	**3**
22	**3**
18	**3**
15	**3**
22	4

v_c m/min	Num. col. avanzam.
30	4
25	4
33	4
30	**4**
33	4
33	4
20	**3**
14	**3**
10	**2**
29	4
14	**3**
10	**2**
10	**3**
8	**2**
11	**3**
8	**2**
8	**2**
5	**1**
3	1
10	**3**
8	**2**
10	**2**
20	**5**
16	**5**
5	2
5	**1**
6	**1**
5	**1**
50	6
40	5
30	4
45	4
30	4
25	4
20	4
16	3
10	**3**
14	3
20	3

v_c m/min	Num. col. avanzam.
30	4
25	4
33	4
30	**4**
33	4
33	4
20	**3**
14	**3**
10	**2**
29	4
14	**3**
10	**2**
10	**3**
8	**2**
11	**3**
8	**2**
8	**2**
5	**1**
3	1
10	**3**
8	**2**
10	**2**
20	5
16	5
5	2
5	**1**
6	**1**
5	**1**
50	6
70	5
30	4
45	4
30	4
25	4
20	4
16	3
10	**3**
14	3
20	3

Consigli per l'impiego di micropunte elicoidali

Articolo nr. ®
Articolo nr. ℓ
Norma/DIN
Materiale tagliente
Tipo di metallo duro
Tratt. di superficie
Tipo
Refrigerazione
Prezzi/misure pag.

Ø utensile mm	Num. colonna avanzamento								
	101	**102**	**103**	**104**	**105**	**106**	**107**	**108**	**109**
	f (mm/riv.)								
0,10	0,002	0,003	0,003	0,004	0,006	0,007	0,010	0,013	0,016
0,16	0,002	0,003	0,004	0,005	0,007	0,009	0,012	0,016	0,022
0,25	0,003	0,004	0,005	0,007	0,009	0,011	0,014	0,019	0,024
0,30	0,004	0,005	0,007	0,009	0,011	0,015	0,019	0,025	0,033
0,50	0,005	0,007	0,008	0,011	0,014	0,019	0,024	0,031	0,041
0,63	0,007	0,009	0,012	0,015	0,020	0,026	0,034	0,044	0,057
0,80	0,010	0,013	0,016	0,020	0,024	0,031	0,038	0,048	0,060
1,00	0,020	0,024	0,029	0,035	0,041	0,050	0,060	0,072	0,086
1,50	0,030	0,035	0,040	0,046	0,052	0,060	0,069	0,080	0,092
2,00	0,040	0,046	0,053	0,061	0,070	0,080	0,093	0,106	0,122

Ø utensile mm	Num. colonna avanzamento articolo no. 6400/6401/6408/6412												
	56	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**
	f (mm/riv.)												
0,80	0,008	0,016	0,024	0,032	0,04	0,05	0,06	0,07	0,08	0,08	0,08	0,09	0,09
1,00	0,012	0,022	0,032	0,042	0,06	0,07	0,08	0,09	0,10	0,10	0,11	0,11	0,12
1,50	0,021	0,036	0,051	0,066	0,09	0,10	0,12	0,13	0,15	0,15	0,16	0,17	0,18
2,00	0,032	0,052	0,072	0,092	0,12	0,14	0,16	0,18	0,20	0,21	0,22	0,23	0,24
2,50	0,045	0,070	0,095	0,120	0,15	0,17	0,20	0,22	0,25	0,26	0,27	0,28	0,30
3,00	0,060	0,090	0,120	0,150	0,18	0,21	0,24	0,27	0,30	0,31	0,33	0,34	0,36

Refrigerante:
○ Aria
● Olio
◉ Emulsione

Direzione di taglio:
® destre
ℓ sinistre

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigerante
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		◉
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		◉
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		◉
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		◉
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		◉
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		◉
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		◉
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		◉
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		◉
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		◉
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		◉
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		◉
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	◉ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	◉ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	◉
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	◉
Ghisa in conchiglia	–		≤350 HB	◉
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	◉ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	◉ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		◉ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		◉ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		◉
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		◉
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		◉
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		◉
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		◉
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		◉
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		◉
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		◉ ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		◉ ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

≤4xD ≤7xD

≤5xD ≤8xD ≤15xD

87011 87016	84810	89281	86402	86400	86401	86405	86408	86412
1899	1899	N. di fab.	N. di fab.	N. di fab.	N. di fab.	N. di fab.	N. di fab.	N. di fab.
HSS-E-PM	HSS-E-PM	int. in MD	int. in MD	int. in MD	int. in MD	int. in MD	int. in MD	int. in MD
		K10/K20	K/P	K/P	K/P	K/P	K/P	K/P
○	T	○	A	A	A	A	A	A
N	N	N	N	N	N	N	N	N
						assiale	assiale	assiale
289/291	292	293	294	295	296	297	298	299

vc m/min	Num. col. avanzam.	vc m/min	Num. col. avanzam.	vc m/min	Num. col. avanzam.	vc m/min	Num. col. avanzam.	vc m/min	Num. col. avanzam.		vc m/min	Num. col. avanzam.		
21	106	27	106	50	105	100	**62**	100	**64**	**62**	105	**62**	**58**	**58**
18	105	23	105	35	104	100	**62**	100	**64**	**62**	100	**62**	**58**	**58**
18	106	23	106	50	**105**	100	**62**	100	**64**	**62**	105	**62**	**59**	**59**
16	105	21	105	45	**104**	90	**61**	90	**63**	**61**	90	**61**	**59**	**59**
20	105	26	105	45	104	90	**62**	90	**64**	**62**	95	**62**	**58**	**58**
18	105	23	105	35	104	90	**62**	90	**64**	**62**	95	**62**	**58**	**58**
14	**104**	18	**104**	30	103	90	**61**	90	**63**	**61**	90	**61**	**58**	**58**
14	**104**	18	**104**	30	103	90	**61**	90	**63**	**61**	90	**61**	**58**	**58**
12	103	16	103			70	**60**	70	**62**	**60**	70	**60**	**58**	**58**
18	106	23	106	50	103	100	**61**	100	**63**	**61**	100	**61**	**57**	**57**
14	**104**	18	**104**	40	103	85	**61**	85	**63**	**61**	85	**61**	**58**	**58**
12	103	16	103			70	**60**	70	**62**	**60**	70	**60**	**58**	**58**
14	**104**	18	**104**	25	103	70	**60**	70	**62**	**60**	70	**60**	**57**	**57**
12	103	16	103			60	**60**	60	**62**	**60**	60	**60**	**57**	**57**
16	**104**	20	**104**	25	103	50	**60**	50	**62**	**60**	50	**60**	**58**	**58**
14	103	18	103			60	**60**	60	**62**	**60**	50	**60**	**58**	**58**
14	103	18	103					60	**57**	**57**	50	**57**	**57**	**57**
8	102	10	102	20	102			60	**57**	**57**	50	57	57	57
				15	104									
18	104	20	104	25	**103**			30	57	57	70	**57**	**57**	**57**
14	103	16	103	25	**102**			15	56	56	60	**56**	**56**	**56**
16	103	18	103	25	**102**			30	57	57	70	**57**	**57**	**57**
26	106	33	106	80	**105**	130	**66**	130	**68**	**66**	150	**60**	**60**	**60**
22	**106**	28	**106**	60	**105**	130	**66**	130	**68**	**66**	140	**60**	**60**	**60**
18	106	23	106	60	105	130	**66**	130	**68**	**66**	140	**60**	**60**	**60**
22	**106**	28	**106**	50	**105**	120	**65**	120	**67**	**65**	130	**60**	**60**	**60**
				15	**103**			10	56	56	25	56	56	56
				45	**104**			15	56	56	35	56	56	56
				25	**104**			15	56	56	35	56	56	56
				160	**107**			70	68	68	70	68	68	68
				150	**106**			70	68	68	70	68	68	68
26	107			100	**106**			135	59	59	135	59	59	59
18	106			60	**106**			135	59	59	135	59	59	59
75	106	80	106	150	**105**									
42	105	53	105	50	**105**									
				67	106									
22	105	28	105	44	104									
22	104	28	104	68	103									
18	104	23	104	49	103									
13	104	16	104	53	103									
		14	104	36	103									
16	104	20	104	50	103									
18	104	23	104	36	103									
				60	104									

Consigli per l'impiego di TS-Drills

Articolo nr. ®
Norma/DIN
Materiale tagliente
Tipo di metallo duro
Tratt. di superficie
Tipo
Forma dell'attacco
Refrigerazione
Prezzi/misure pag.

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento 1	2	3	4	5	6	7	8	9
	f (mm/giro)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Refrigerante:
○ Aria
● Olio
● Emulsione

Direzione di taglio:
® destre
Ⓛ sinistre

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigeracion
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		● ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		● ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

≤3xD

89306	89264	89237	89422	89413	89402	89401	89450	89550	89266
6538K	6537K	6539	6537K	6537K	6537K	6539	6537K	6537K	6537K
MD	int. MD		int. MD	int. MD			int. MD	int. MD	int. MD
	K/P	K/P		K/P	K/P	K/P	K/P	K/P	K/P
T	T	T	Y	F	F	F	a	a	T
80U	100U	100U	100H	100U	100U	100U	100INOX	100INOX	100U
HE	HE	DZ	HA	HA	HE	DZ	HA	HE	HE
							assiale	assiale	assiale
208	196	200	198	194	194	200	209	209	207

v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.			v_c m/min	Num. col. avanzam.		v_c m/min	Num. col. avanzam.
95	6	100	6	130	7	130	7	7	7				110	6
80	5	85	5	110	6	110	6	6	6				90	5
95	7	110	7	145	8	145	8	8	8				130	7
75	6	85	6	110	7	110	7	7	7				110	7
80	6	90	6	120	7	120	7	7	7				100	7
75	6	85	6	110	7	110	7	7	7				95	6
70	6	80	6	105	7	105	7	7	7				90	6
75	6	80	6	105	7	105	7	7	7				90	6
60	5	75	5	100	6	100	6	6	6				80	6
90	7	100	7	130	8	130	8	8	8				110	7
75	6	90	6	120	7	120	7	7	7				90	6
60	5	65	4	85	5	85	5	5	5				65	4
75	6	75	5	100	6	100	6	6	6				85	6
60	5	70	4	90	5	90	5	5	5				80	5
45	5	50	5	65	6	65	6	6	6				60	5
35	5	40	4	55	5	55	5	5	5				50	4
40	4			55	4								45	3
		35	2	45	3	45	3	3	3				45	2
		35	1	40	1	40	1	1	1				40	2
		20	1	20	1	20	1	1	1				20	1
40	2	40	2	40	2	40	2	2	2	80	5	5	45	4
35	2	15	1	15	1	15	1	1	1	60	2-3	2-3	40	2
35	2	35	2	35	2	35	2	2	2	80	5	5	35	4
150	7	160	7			210	8	8	8				160	8
110	7	120	7			155	8	8	8				120	8
110	7	120	6			155	7	7	7				100	8
90	6	95	6			125	7	7	7				95	7
		25	2			35	3	3	3				30	2
		20	3	25	4	25	4	4	4	30	4	4	25	3
		15	1	15	1	15	1	1	1	45	4	4	35	3
		15	1	15	1	15	1	1	1	40	3	3	30	2
200	8	200	8			260	9	9	9				240	8
200	8	200	8			260	9	9	9				240	8
170	8	170	8			220	8	8	8				200	8
140	7	140	7			180	8	8	8				170	8
		200	7			260	8	8	8				230	7
		80	6			105	7	7	7				95	6
		210	7			270	8	8	8				250	7
		140	6			180	7	7	7				170	6
		80	5			105	6	6	6				95	6
		65	5			85	6	6	6				80	5
		60	4			80	5	5	5				70	5
		45	4			60	5	5	5				60	5

Consigli per l'impiego di TS-Drills

Articolo nr. ®
Norma/DIN
Materiale tagliente
Tipo di metallo duro
Tratt. di superficie
Tipo
Forma dell'attacco
Refrigerazione
Prezzi/misure pag.

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento 1	2	3	4	5	6	7	8	9
	f (mm/giro)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Refrigerante:
○ Aria
● Olio
● Emulsione

Direzione di taglio:
® destre
Ⓛ sinistre

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigeracion
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		● ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		○ ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

HARTNER

≤3xD

89410	89415
6537K	6537K
int. MD	
K/P	K/P
F	F
100U	100U
HA	HE
assiale	assiale
205	205

89423	89424
6537K	6537K
int. MD	int. MD
Y	Y
100H	100H
HA	HE
assiale	assiale
211	211

≤4xD

89292
WN
int. MD
K
○
150GG
HA
assiale
213

≤5xD

89307
6538M
MD
P
T
80U
HE
assiale
217

89420
6537L
int. MD
K/P
F
100R
HA
assiale
222

89451	89551
6537L	6537L
int. MD	int. MD
K/P	K/P
a	a
100INOX	100INOX
HA	HE
assiale	assiale
218	218

v_c m/min	Num. col. avanzam.		v_c m/min	Num. col. avanzam.		v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	
145	7	7	145	**7**	**7**			95	5					
120	6	6	120	**6**	**6**			80	4					
170	8	8	170	**8**	**8**			95	6					
145	8	8	145	**8**	**8**			75	5					
130	8	8	130	**8**	**8**			80	5					
125	7	7	125	**7**	**7**			75	5					
120	7	7	120	**7**	**7**			75	5					
120	7	7	120	**7**	**7**			75	5					
105	7	7	105	**7**	**7**			55	4					
145	8	8	145	**8**	**8**			90	6					
120	7	7	120	**7**	**7**			75	5					
85	5	5	85	**5**	**5**			55	4					
110	**7**	**7**	110	**7**	**7**			70	5					
105	**5**	**5**	105	**5**	**5**			55	4					
80	**6**	**6**	80	**6**	**6**			40	4					
65	**5**	**5**	65	**5**	**5**			35	4					
60	**4**	**4**	60	**4**	**4**			40	3					
60	**3**	**3**	60	**3**	**3**									
55	**3**	**3**	55	**3**	**3**									
35	**2**	**2**	35	2	2									
60	**5**	**5**						40	2			80	**5**	**5**
55	**2**	**2**						35	2			60	**2-3**	**2-3**
45	**5**	**5**						35	2			80	**5**	**5**
210	9	9				120	7	150	6	210	**9**			
160	9	9				100	7	110	6	160	**9**			
140	9	9				90	7	110	6	160	**9**			
130	8	8				80	7	90	5	130	**8**			
40	3	3				40	2							
										130	**8**			
										100	**8**			
										80	**8**			
										60	**8**			
35	**4**	**4**	35	**4**	**4**							30	4	4
45	**4**	**4**	45	4	4							45	4	4
40	**3**	**3**	40	3	3							40	3	3
310	9	9				410	**9**	200	7					
310	9	9				410	**9**	200	7					
260	9	9				380	**9**	170	7					
220	9	9				330	**9**	140	6					
280	8	8												
125	**7**	**7**												
325	**8**	**8**				280	9							
220	7	7												
125	7	7				110	6							
105	6	6				80	5							
90	6	6												
80	6	6												

HARTNER

Consigli per l'impiego di TS-Drills

Articolo nr. ®
Norma/DIN
Materiale tagliente
Tipo di metallo duro
Tratt. di superficie
Tipo
Forma dell'attacco
Refrigerazione
Prezzi/misure pag.

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento 1	2	3	4	5	6	7	8	9
	f (mm/giro)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Refrigerante:
○ Aria
● Olio
● Emulsione

Direzione di taglio:
® destre
Ⓛ sinistre

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigeracion
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		● ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		● ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

≤5xD

89275	89414	89417	89272	89411	89408	89425	89426
WN	6537L	6537L	6537L	6537L	6537L	6537L	6537L
int. MD	int. MD	int. MD	int. MD	int. MD	int. MD	int. MD	int. MD
K/P	K/P	K/P	K/P	K/P	K/P		
T	F	F	T	F	F	Y	Y
100U	100U	100U	100U	100U	100U	100H	100H
DZ	HA	HE	HE	HA	HE	HA	HE
			assiale	assiale	assiale	assiale	assiale
204	202	202	214	215	215	220	220

v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.		v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.		v_c m/min	Num. col. avanzam.	
100	**6**	130	**7**	**7**	110	6	145	**7**	7	145	7	**7**
85	**5**	110	**6**	**6**	90	5	120	**6**	6	120	**6**	**6**
110	**7**	145	**8**	**8**	130	7	170	**8**	8	170	8	**8**
85	**6**	110	**7**	**7**	110	7	145	**8**	8	145	**8**	**8**
90	**6**	120	**7**	**7**	100	7	130	**8**	8	130	8	**8**
85	**6**	110	**7**	**7**	95	6	125	**7**	7	125	7	**7**
80	**6**	105	**7**	**7**	90	6	120	**7**	7	120	**7**	**7**
80	**6**	105	**7**	**7**	90	6	120	**7**	7	120	**7**	**7**
75	**5**	100	**6**	**6**	80	6	105	**7**	7	105	**7**	**7**
100	**7**	130	**8**	**8**	110	7	145	**8**	8	145	8	**8**
90	**6**	120	**7**	**7**	90	6	120	**7**	7	120	**7**	**7**
65	**4**	85	**5**	**5**	65	4	85	**5**	5	85	**5**	**5**
75	5	100	6	6	85	**6**	105	7	**7**	110	**7**	**7**
70	4	90	5	5	80	**5**	100	5	**5**	105	**5**	**5**
50	5	65	6	6	60	**5**	70	6	**6**	80	**6**	**6**
40	4	55	5	5	50	**4**	55	5	**5**	65	**5**	**5**
					45	**4**	60	5	**5**	60	**4**	**4**
35	2	45	3	3	45	**2**	60	3	**3**	60	**3**	**3**
35	1	35	1	1	40	**2**	55	2	**2**	55	**3**	**3**
20	1	20	1	1	25	**1**	35	2	**2**	35	2	2
40	2	40	2	2	45	**4**	60	5	**5**			
15	1	15	1	1	40	**2**	55	5	**5**			
35	2	35	2	2	35	**4**	45	5	**5**			
160	**7**	210	**8**	**8**	160	8	195	**9**	9			
120	**7**	155	**8**	**8**	120	8	160	**9**	9			
120	**6**	145	**7**	**7**	100	8	140	**9**	9			
95	**6**	125	**7**	**7**	95	7	130	**8**	8			
25	**2**	35	**3**	**3**	30	2	40	3	3			
20	3	25	4	4	25	**3**	35	4	**4**	35	**4**	**4**
15	1	15	1	1	35	**3**	45	4	**4**	45	4	4
15	1	15	1	1	30	**2**	40	3	**3**	40	3	3
200	**8**	260	**9**	**9**	240	8	310	**9**	9			
200	**8**	260	**9**	**9**	240	8	310	**9**	9			
170	**8**	235	**9**	**9**	200	8	260	**9**	9			
140	**7**	170	**8**	**8**	170	8	220	**9**	9			
200	**7**	260	**8**	**8**	230	7	280	**8**	8			
80	6	105	7	7	95	**6**	125	7	**7**			
210	7	270	**8**	**8**	250	**7**	325	8	**8**			
140	**6**	180	**7**	**7**	170	6	220	**7**	7			
80	**5**	105	**6**	**6**	95	6	125	**7**	7			
65	**5**	85	**6**	**6**	80	5	105	**6**	6			
60	**4**	80	**5**	**5**	70	5	90	**6**	6			
45	**4**	60	**5**	**5**	60	5	80	**6**	6			

Consigli per l'impiego di TS-Drills

Articolo nr. ®
Norma/DIN
Materiale tagliente
Tipo di metallo duro
Tratt. di superficie
Tipo
Forma dell'attacco
Refrigerazione
Prezzi/misure pag.

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento 1	2	3	4	5	6	7	8	9
	f (mm/giro)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Refrigerante:
○ Aria
● Olio
● Emulsione

Direzione di taglio:
® destre
Ⓛ sinistre

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigeracion
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		● ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		● ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

≤5xD

89239	89247
6539	6537L
int. MD	
K	K
○	○
TS 3 G	TS 3 G
DZ	HA
241	240

vc m/min	Num. col. avanzam.	

Consigli per l'impiego di TS-Drills

Articolo nr. ®
Norma/DIN
Materiale tagliente
Tipo di metallo duro
Tipo
Tratt. di superficie
Refrigerante
Prezzi/misure pag.

Procedimento:
- Fresatura di una superficie perpendicolare rispetto all'angolo di entrata della foratura (necessario soltanto per superfici oblique).
- Eseguire un foro pilota cilindrico (tolleranza F9) con profondi tà minimo 1 x D.
- Entrata nel foro pilota con ca. 300 giri/min. e f = 500 mm/min
- Regolazione di pressione del refrigerante e del numero di giri.
- Foratura continua sull'intera lunghezza senza scaricare.
- Con fori passanti e uscita obliqua ridurre l'avanzamento vf del 40% a ca. 1 mm. prima dell'uscita della punta.
- Spegnimento dell'adduzione refrigerante al raggiungimento della profondità di foro voluta, corsa di ritorno rapida.

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento 1	2	3	4	5	6	7	8	9
	f (mm/giro)								
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630

Refrigerante:
○ Aria
● Olio
● Emulsione

Direzione di taglio:
® destre
Ⓛ sinistre

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigeracion
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	○
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	○
Ghisa in conchiglia	–		≤350 HB	○
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		● ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		● ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

≤15xD

86509
n. di fab.
int. in MD
K/P
RT 100 T
A
40 bar MQL
235

v_c m/min	Num. col. av.	v_c m/min	Num. col. av.
110	8		
110	8		
120	8		
120	8		
110	6		
110	8		
100	7		
110	7	80	7
110	6	80	7
110	8		
110	7	80	6-7
110	6	80	6-7
100	5		
80	5		
100	6-7		
80	5		
50	5		
50	5		
50	4		
100	5		
70	2-3		
100	5		
140	8		
100	8		
140	8		
100	8		
100	6		
100	6		
90	8	90	8
30	2		
120	1		
120	8		

≤20xD

86511
n. di fab.
int. in MD
K/P
RT 100 T
A
40 bar MQL
236

v_c m/min	Num. col. av.	v_c m/min	Num. col. av.
110	8		
110	8		
120	8		
120	8		
110	6		
110	8		
100	7		
110	7	80	7
110	6	80	7
110	8		
110	7	80	6-7
110	6	80	6-7
100	5		
80	5		
100	6		
80	5		
50	5		
50	5		
50	4		
100	5		
60	3		
100	5		
140	8		
100	8		
140	8		
100	8		
100	6		
100	6		
90	8	90	8
30	2		
120	1		
120	8		

≤25xD

86512
n. di fab.
int. in MD
K/P
RT 100 T
A
40 bar MQL
237

v_c m/min	Num. col. av.	v_c m/min	Num. col. av.
100	8		
100	8		
120	8		
100	8		
110	6		
100	8		
100	7		
100	7	70	7
100	6	70	7
100	8		
100	7	70	6-7
100	6	70	6-7
80	5		
60	5		
90	6		
70	4		
50	4		
50	4		
50	4		
100	5		
60	3		
100	5		
130	8		
90	8		
130	8		
90	8		
90	6		
90	6		
80	8	80	8
30	2		
120	1		
110	8		

≤30xD

86513
n. di fab.
int. in MD
K/P
RT 100 T
A
40 bar MQL
238

v_c m/min	Num. col. av.	v_c m/min	Num. col. av.
80	7		
80	7		
100	8		
100	8		
110	6		
80	7		
80	7		
80	7	60	7
80	6	60	7
80	7		
80	6	60	6-7
80	6	60	6-7
80	5		
60	5		
80	6		
70	4		
50	4		
50	4		
50	4		
80	5		
60	3		
80	5		
120	8		
80	8		
120	8		
80	8	65	8
80	6		
80	6		
70	8	70	8
30	2		
120	1		
100	8		

≤40xD

86514
n. di fab.
int. in MD
K/P
RT 100 T
A
40 bar
239

v_c m/min	Num. col. avanzam.
80	7
80	7
100	8
100	8
110	6
80	7
80	7
80	6-7
80	6
80	7
80	6
80	6
80	5
60	5
80	6-7
70	4
50	4
50	4
50	4
80	5
70	2-3
80	5
120	8
80	8
120	8
80	8
80	6
80	6
70	8
30	2
120	1
100	8

HARTNER

Consigli per l'impiego di punte a cannone

Come lavorare con punte a cannone

- Produzione del foro pilota (L = 1,5 x D, tolleranza H8)
- Entrata con nr. giri limitato, ca. 200 giri/min, avanzamento ca. 500 mm/min.
- Regolazione di pressione del refrigerante e del numero di giri
- Foratura in continuo sull'intera lunghezza, senza scaricare. Impiegando punte a cannone con un grosso rapporto lunghezza-diametro, consigliamo di lavorare fino ad una profondità di foro di ca. 25 mm con parametri di taglio ridotti (ca. 75% della velocità di taglio ottimale).
- Spegnimento dell'adduzione refrigerante al raggiungimento della profondità di foro voluta
- Corsa di ritorno rapido con mandrino fermo.

Ø punte mm ab	Numero colonna avanzamento							
	11	12	13	14	15	16	17	18
	f (mm/giro)							
1,50	0,002	0,004	0,006	0,008	0,012	0,020	0,032	0,045
2,00	0,003	0,005	0,007	0,010	0,016	0,028	0,046	0,055
2,50	0,004	0,006	0,008	0,012	0,018	0,030	0,054	0,070
4,00	0,005	0,007	0,010	0,016	0,025	0,043	0,065	0,085
6,00	0,007	0,009	0,013	0,024	0,035	0,061	0,085	0,120
8,00	0,010	0,014	0,022	0,032	0,045	0,068	0,100	0,150
10,00	0,012	0,016	0,028	0,040	0,055	0,075	0,120	0,160
14,00	0,020	0,025	0,035	0,050	0,065	0,085	0,130	0,180
18,00	0,025	0,030	0,040	0,055	0,070	0,095	0,145	0,200
20,00	0,026	0,035	0,045	0,060	0,080	0,110	0,180	0,250
24,00	0,027	0,036	0,047	0,065	0,085	0,130	0,185	0,300
28,00	0,028	0,038	0,049	0,068	0,090	0,140	0,195	0,350
30,00	0,030	0,040	0,050	0,070	0,100	0,150	0,200	0,400
35,00	0,035	0,045	0,055	0,075	0,120	0,180	0,250	0,450
40,00	0,040	0,050	0,060	0,080	0,150	0,200	0,300	0,500

* I valori di avanzamento si basano sempre su utensili con la ricopertura consigliata. In alcuni casi la funzionalità degli utensili non può essere garantita senza ricopertura.

Refrigerante specifico per materiali da lavorare:
○ emulsione
● olio
● aria

E100

Punte a cannone ad 1 tagliente

MD

0,9 ... 12,0

Prezzi/misure pag. 253

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resist. N/mm²	Durezza	Refri-geracion	ricopert. consigl.	≤35xD v_c m/min	≤35xD Nr. col. avanzamento	>35xD v_c m/min	>35xD Nr. col. avanzamento
Acciai da costruzione	**1.0035** S185, **1.0486** P275N, **1.0345** P235GH, **1.0425**	≤500		●		*100*	15	*100*	15
	1.0050 E295), **1.0070** E360, **1.8937** P500NH	≤1000		●		*85*	15	*85*	15
Acciai automatici	**1.0718** 11SMnPb30, **1.0736** 11SMn37	≤850		●		*90*	15	*90*	15
	1.0727 46S20, **1.0728** 60S20, **1.0757** 46SPb20	≤1000		●		*80*	15	*80*	15
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E	≤700		●		*80*	14	*80*	14
	1.0503 C45, **1.1191** C45E	≤850		●		*75*	14	*75*	14
	1.0601 C60, **1.1221** C60E	≤1000		●		*75*	14	*75*	14
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●	A	*75*	14	*75*	14
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●		*65*	14	*65*	14
Acciai da cementazione non legati	**1.0301**, **1.1121** C10E	≤850		●	A	*80*	15	*80*	15
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●		*75*	14	*75*	14
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●		*65*	14	*65*	14
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●	A	*75*	14	*75*	14
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●		*65*	14	*65*	14
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●	A	*75*	13	*75*	13
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419**, **1.2767**	≤1400		●		*65*	13	*65*	13
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●	A	*55*	12	*55*	12
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4		≤350 HB	●	A	*65*	13	*65*	13
Acciai temprati	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105**		≤48 HRC	●		*30*	13	*30*	13
	1.4301 X5CrNi18-10, **1.4541** X6CrNiTi18-10, **1.4571**		≤66 HRC	●		*25*	10	*25*	14
Acciai inossidabili, allo zolfo	**1.4057** X20CrNi172, **1.4122** X39CrMo17-1, **1.4521**	≤900		●		*40*	14	*40*	14
austenitici	–	≤1100		●	A	*35*	14	*35*	14
martensitici		≤1500		●		*35*	14	*35*	14
Ghise	Nimonic, Inconel, Monel, Hastelloy		≤240 HB	○		*85*	16	*85*	16
	0.6010 EN-GJL-100, **0.6020** EN-GJL-200		≤350 HB	○		*80*	16	*85*	16
Ghise sferoidali, ghise	**0.6025** EN-GJL-250, **0.6035** EN-GJL-350		≤240 HB	●		*80*	15	*80*	15
temperate	**0.7050** EN-GJS-500-7, **0.8035** EN-GJMW-350-4		≤350 HB	●		*70*	15	*70*	15
Ghisa in conchiglia	**0.7070** EN-GJS-700-2, **0.8170** EN-GJMB-700-2		≤350 HB	●		*55*	14	*55*	14
Nuove ghise GGV	–		≤220 HB	○					
	3.7024 Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2		≤300 HB	○					
Nuove ghise ADI	**3.7154** TiAl6Zr5, **3.7165** TiAl6V4, **3.7184**	≤1000		○					
	3.0255 Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤1400		○					
Leghe speciali	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245**, **3.4365**	≤2000		●	A	*20*	12	*20*	12
Titanio e leghe di titanio	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤850		●		*35*	12	*35*	12
	3.2581 G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤1400		●		*30*	12	*30*	12
Alluminio e leghe di alu	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05**	≤400		●		*150*	17	*150*	17
Leghe di alu per lav. plastiche	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤650		●		*120*	19	*120*	19
Leghe di alu-ghisa ≤ 10 % Si	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410**	≤600		●		*120*	20	*120*	20
> 10 % Si	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●		*130*	18	*130*	18
Leghe di magnesio	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176**	≤400		○		*110*	17	*110*	17
Rame legato in bassa %	**2.0790** CuNi18Zn19Pb	≤500		●	A	*75*	15	*75*	15
Ottone, a truciolo corto	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤600		●		*120*	18	*120*	18
a truciolo lungo	**2.0980** CuAl11Ni, **2.1247** CuBe2	≤600		●		*90*	18	*90*	18
Bronzi a truciolo corto	Resina epossidica, Resopal, Pertinax, Moltopren	≤600		○ ●		*95*	17	*95*	17
	Plexiglas, Hostalen, Novodur, Makralon	≤850		●		*75*	17	*75*	17
Bronzi a truciolo lungo	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)	≤850		●		*70*	17	*70*	17
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6	≤1000		●		*60*	17	*60*	17
Mat. plastiche termoindurenti	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤150		○		*75*	15	*75*	15
Materie termoplastiche	**EN-GJS-1200-2** (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤100		○		*70*	15	*70*	15
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○		*60*	14	*60*	14
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○		*50*	14	*50*	14

HARTNER

Suggerimenti e trucchi
- Con profondità di foro superiore a 40 x D, consigliamo l'impiego di due o più punte a cannone, p. es. Ø 10 x 400 mm e Ø 9,95 x 800 mm.
- Punte a cannone per profondità di foro superiore a 40 x D dovrebbero essere guidate nel foro pilota con rotazione sinistrorsa.
- Nel cambio di utensili da 40 x D, gli stessi possono essere smorzati con l'accensione di refrigerazione interna ad alta pressione per ca. 1 secondo.
- Per la lavorazione di materiali a truciolo lungo, consigliamo di ordinare punte a cannone con scanalature lucidate.
- In generale consigliamo di impiegare emulsione con almeno il 10% di grasso.
- Punte a cannone ad un tagliente per alluminio a truciolo lungo dovrebbero essere ordinate con angolo di affilatura a 180° e spazio per vano olio.
- Nell'entrare in alluminio con meno dell'1% di Si, cioè con velocità di taglio consigliate vc > 160 m/min, consigliamo di raggiungere il numero di giri finale in più passaggi. Inoltre si dovrebbe avere un foro pilota di ca. 3 x D.

STOP

Tutte le punte a cannone devono essere guidate da un foro pilota. Le punte a cannone non devono essere mai mosse libere al massimo dei giri nello spazio macchina.

E80

Punte a cannone ad 1 tagliente

Testa di MD

2,0 ... 40,0

260

ricopert. consigl.	≤35xD v_c m/min	≤35xD Nr. col. avanzamento	>35xD v_c m/min	>35xD Nr. col. avanzamento
T	100	14	95	13
	85	14	80	13
T	90	14	85	13
	80	14	75	13
	90	13	85	12
T	80	13	75	12
	75	13	70	12
T	75	13	70	12
	65	13	60	12
T	80	14	75	13
T	75	13	70	12
	65	13	60	12
C	75	13	70	12
	65	13	60	12
C	75	12	70	11
	65	12	60	11
C	55	11	50	11
C	65	12	60	12
C	30	12	25	11
	25	11	20	11
C	55	13	50	12
	45	13	40	12
	35	13	35	12
	85	15	80	14
	80	15	75	14
	80	14	75	13
	70	14	65	13
	55	13	50	12
C	20	11	20	11
	35	11	30	11
	30	11	25	11
C	150	16	140	15
	120	15	115	14
	150	16	140	15
	130	16	120	15
	110	16	100	15
C	75	14	70	13
	120	17	115	16
	90	17	85	16
	95	16	90	15
	75	16	70	15
	70	16	65	15
	60	16	55	15
	75	14	70	13
	70	14	65	13
	60	13	55	12
	50	13	45	12

Z80

Punte a cannone a 2 taglienti

Testa di MD

6,0 ... 27,0

252

ricopert. consigl.	≤35xD v_c m/min	≤35xD Nr. col. avanzamento	>35xD v_c m/min	>35xD Nr. col. avanzamento
	85	18	80	17
	80	18	75	17
	75	17	70	16
	70	17	65	16
	65	16	60	15
	120	18	115	17
	110	18	105	17
	135	18	130	17
	120	17	115	16
	130	18	125	17
	120	18	115	17
	110	17	105	16
	110	17	105	16
	95	17	90	16
	95	17	90	16

E800

Punte a cannone ad 1 tagliente

con inserti intercambiabili

12,0 ... 40,0

264

ricopert. consigl.	≤35xD v_c m/min	≤35xD Nr. col. avanzamento	>35xD v_c m/min	>35xD Nr. col. avanzamento
T	90	15	85	15
	80	15	75	15
T	85	16	80	16
	75	16	70	16
	85	15	80	15
T	80	15	75	15
	75	15	70	15
T	75	15	70	15
	65	15	60	15
T	80	15	75	15
T	75	15	70	15
	70	15	65	15
T	70	15	65	15
	60	15	55	15
T	65	14	60	14
	60	14	55	14
T	55	14	50	14
T	65	15	60	15
T	30	13	25	13
	25	12	20	12
	50	14	45	14
F	45	14	40	14
	40	14	35	14
	85	16	80	16
	80	16	75	16
T	75	16	70	16
	70	16	65	16
	55	15	50	15
F	25	13	20	13
	35	13	30	13
	30	12	25	12
F	140	16	135	16
	125	16	120	16
	170	17	165	17
	140	17	135	17
	115	16	110	16
F	75	15	70	15
	120	17	115	17
	90	17	85	17
	95	17	90	17
	75	17	70	17
	70	17	65	17
	60	17	55	17
	75	16	70	16
	70	16	65	16
	60	15	55	15
	50	15	45	15

Consigli per l'impiego di Multiplex

Articolo nr.
Ø
Materiale tagliente
Topologia MD
Categoria di MD
Tratt. di superficie
Prezzi/misure pag.

I numeri in grassetto della colonna avanzamento indicano gli utensili da preferire.

Ø utensile mm	Num. colonna avanzamento 1	2	3	4	5	6
	f (mm/giro)					
10,00	0,08	0,09	0,11	0,14	0,19	0,24
12,50	0,09	0,11	0,13	0,17	0,22	0,28
16,00	0,11	0,13	0,16	0,21	0,27	0,34
20,00	0,13	0,15	0,19	0,25	0,32	0,40
25,00	0,16	0,18	0,23	0,29	0,38	0,48
31,50	0,19	0,22	0,27	0,35	0,45	0,57
40,00	0,23	0,26	0,33	0,42	0,54	0,69
50,00	0,27	0,31	0,39	0,50	0,64	0,82
63,00	0,32	0,38	0,47	0,60	0,77	0,98
102,00	0,40	0,48	0,59	0,74	0,85	1,20
150,00	0,59	0,70	0,87	1,09	1,25	1,76
100,00	0,78	0,93	1,16	1,45	1,67	2,35

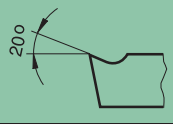
Refrigerante:
○ Aria
● Olio
● Emulsione

Direzione di taglio:
destre
sinistre

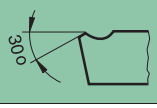
Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigeracion
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		● ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		● ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

86602	86608	86609	86708	86709	86701	86702
10…25	10…25	10…102	10…35	10…35	10…35	10…35
HSS-E-PM	HSS-E-PM	HSS-E-PM	int. in MD	int. in MD	int. in MD	int. in MD
			H22	H22	H22	H22
			K20/K40	K20/K40	K20/K40	K20/K40
T	F	A	T	T	F	F
361	362	363	364	366	367	365

Articolo nr. 86709/86701
senza fase
per materiali fino a
ca. 600 N/mm²
di resistenza a trazione



Articolo nr. 86708/86702
con fase
per materiali da
ca. 600 N/mm²
di resistenza a trazione



v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.	v_c m/min	Num. col. avanzam.
40	4	48	4	48	4	60	5	70	5
35	4	42	4	42	4	55	4	65	4
50	5	60	5	60	5	100	4	115	4
40	5	50	5	50	5	95	4	105	4
40	4	45	4	45	4	80	4	90	4
35	4	40	4	40	4	80	4	90	4
30	4	35	4	35	4	75	3	85	3
25	3	28	3	28	3	70	4	80	4
22	2	25	2	25	2	60	3	70	3
35	3	40	3	40	3	85	4	95	4
25	3	28	3	28	3	70	4	80	4
22	2	25	2	25	2	55	3	65	3
22	3	25	3	25	3	60	3	65	3
15	2	18	2	18	2	50	2	55	2
26	3	28	3	28	3	40	3	45	3
22	2	25	2	25	2	35	2	40	2
12	2	18	2	18	2	40	2	45	2
10	2	13	2	13	2	35	2	40	2
						25	1	30	1
20	2	23	2	23	2	40	2	45	2
15	2	17	2	17	2				
15	2	20	2	20	2	25	2	30	2
35	4	40	4	40	4	100	5	120	5
35	4	40	4	40	4	90	4	105	4
35	4	40	4	40	4	80	4	90	4
28	4	33	4	33	4	65	3	75	3
						25	1	30	1
60	5	65	5	65	5	180	5	200	5
80	5	85	5	85	5	160	5	180	5
85	5	85	5	85	5	140	5	160	5
70	5	70	5	70	5	130	5	150	5
45	4	50	4	50	4	150	5	160	5
45	4	50	4	50	4	70	4	80	4
60	5	65	5	65	5	160	5	180	5
45	4	50	4	50	4	110	4	120	4
32	5	35	5	35	5	80	5	90	5
40	3	45	3	45	3	65	4	75	4
36	3	40	3	40	3	45	4	50	4
28	3	32	3	32	3	35	4	40	4
22	3	27	3	27	3	70	3	85	3
						70	3	85	3
						70	3	85	3
						70	3	85	3

HARTNER

Consigli per l'impiego di Multiplex HPC

Articolo nr.
Norma/DIN
Materiale tagliente
Tipo di metallo duro
Prof. di foro
Tratt. di superficie
Tipo
Prezzi/misure pag.

Ø utensile mm	Num. colonna avanzamento								
	1	2	3	4	5	6	7	8	9
	f (mm/giro)								
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250

Refrigerante:
○ Aria
● Olio
● Emulsione

Tutti i valori sono indicativi. La velocità di taglio e l'avanzamento effettivamente realizzabili dipendono dalle reali condizioni di lavoro. Consigliamo di effettuare prove di foratura.

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigeracion
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.86681** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		● ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		● ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

HARTNER

≤1,5×D

86722	86725	86723	86724
N. d. f.	N. d. f.	N. d. f.	N. d. f.
Int. MD	Int. MD	Int. MD	Int. MD
K/P	K/P	K/P	K/P
1,5xD	1,5xD	1,5xD	1,5xD
F	a	F	○
Acciaio	Acc. inoss.	Ghisa	Alluminio
392	401	395	398

v_c m/min	Nr. col. avanz.	v_c m/min	Nr. col. avanz.	v_c m/min	Nr. col. avanz.	v_c m/min	Nr. col. avanz.
130	6						
110	5						
130	7						
110	6						
130	6						
125	6						
110	5						
110	6						
90	5						
130	7						
110	6						
70	4						
105	5						
70	4						
60	5						
55	4						
55	3						
50	2						
		25	2				
		55	3				
		40	3				
		35	3				
				100	6		
				90	6		
				120	7		
				100	6		
		90	6				
				80	5		
				80	5		
				80	5		
				80	5		
		25	2				
		40	3				
		35	2				
						200	7
						180	7
						150	7
						120	7
						180	7
						70	6
						180	7
						120	6
						70	6
						50	6
						45	6
						35	5

≤3×D

86722	86725	86723	86724
N. d. f.	N. d. f.	N. d. f.	N. d. f.
Int. MD	Int. MD	Int. MD	Int. MD
K/P	K/P	K/P	K/P
3xD	3xD	3xD	3xD
F	a	F	○
Acciaio	Acc. inoss.	Ghisa	Alluminio
392	401	395	398

v_c m/min	Nr. col. avanz.	v_c m/min	Nr. col. avanz.	v_c m/min	Nr. col. avanz.	v_c m/min	Nr. col. avanz.
130	6						
110	5						
130	7						
110	6						
130	6						
125	6						
110	5						
110	6						
90	5						
130	7						
110	6						
70	4						
105	5						
70	4						
60	5						
55	4						
55	3						
50	2						
		25	2				
		55	3				
		40	3				
		35	3				
				100	6		
				90	6		
				120	7		
				100	6		
		90	6				
				80	5		
				80	5		
				80	5		
				80	5		
		25	2				
		40	3				
		35	2				
						200	7
						180	7
						150	7
						120	7
						180	7
						70	6
						180	7
						120	6
						70	6
						50	6
						45	6
						35	5

Consigli per l'impiego di Multiplex HPC

Articolo nr.
Norma/DIN
Materiale tagliente
Tipo di metallo duro
Prof. di foro
Tratt. di superficie
Tipo
Prezzi/misure pag.

Ø utensile mm	Num. colonna avanzamento								
	1	2	3	4	5	6	7	8	9
	f (mm/giro)								
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250

Refrigerante:
○ Aria
● Olio
● Emulsione

Tutti i valori sono indicativi. La velocità di taglio e l'avanzamento effettivamente realizzabili dipendono dalle reali condizioni di lavoro. Consigliamo di effettuare prove di foratura.

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigeracion
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.86681** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		○ ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		○ ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

HARTNER

≤5×D

86722	86725	86723	86724
N. d. f.	N. d. f.	N. d. f.	N. d. f.
Int. MD	Int. MD	Int. MD	Int. MD
K/P	K/P	K/P	K/P
1,5xD	1,5xD	1,5xD	1,5xD
F	a	F	○
Acciaio	Acc. inoss.	Ghisa	Alluminio
392	401	395	398

vc m/min	Nr. col. avanz.	vc m/min	Nr. col. avanz.	vc m/min	Nr. col. avanz.	vc m/min	Nr. col. avanz.
125	6						
105	5						
125	7						
105	6						
125	6						
120	6						
105	5						
105	6						
85	5						
125	7						
105	6						
70	4						
105	5						
70	4						
55	5						
50	4						
55	3						
50	2						
		25	2				
		55	3				
		40	3				
		35	3				
				100	6		
				90	6		
				120	7		
				100	6		
		90	6				
				80	5		
				80	5		
				80	5		
				80	5		
		25	2				
		40	3				
		35	2				
						180	7
						180	7
						140	7
						110	7
						180	7
						70	6
						180	7
						120	6
						70	6
						50	6
						45	6
						35	5

≤7×D

86722	86725	86723	86724
N. d. f.	N. d. f.	N. d. f.	N. d. f.
Int. MD	Int. MD	Int. MD	Int. MD
K/P	K/P	K/P	K/P
3xD	3xD	3xD	3xD
F	a	F	○
Acciaio	Acc. inoss.	Ghisa	Alluminio
392	401	395	398

vc m/min	Nr. col. avanz.	vc m/min	Nr. col. avanz.	vc m/min	Nr. col. avanz.	vc m/min	Nr. col. avanz.
120	5						
105	4						
120	6						
105	5						
120	5						
110	5						
100	4						
100	5						
85	4						
120	6						
100	5						
70	4						
105	4						
70	3						
55	4						
50	3						
55	2						
50	2						
		25	1				
		55	2				
		40	2				
		35	2				
				80	6		
				70	6		
				100	7		
				80	6		
		70	6				
				60	5		
				60	5		
				60	5		
				60	5		
		25	1				
		40	2				
		35	1				
						180	6
						180	6
						140	6
						110	6
						180	6
						70	5
						180	6
						120	5
						70	5
						50	5
						45	5
						35	4

Consigli per l'impiego di Multiplex HPC

Articolo nr.
Norma/DIN
Materiale tagliente
Tipo di metallo duro
Prof. di foro
Tratt. di superficie
Tipo
Prezzi/misure pag.

Ø utensile mm	Num. colonna avanzamento								
	1	2	3	4	5	6	7	8	9
	f (mm/giro)								
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250

Refrigerante:
○ Aria
● Olio
● Emulsione

Tutti i valori sono indicativi. La velocità di taglio e l'avanzamento effettivamente realizzabili dipendono dalle reali condizioni di lavoro. Consigliamo di effettuare prove di foratura.

Materiali	Esempi di materiale Numeri in grassetto = nr. materiale a DIN EN 10 027	Resistenza N/mm²	Durezza	Refrigeracion
Acciai da costruzione	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Acciai automatici	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Acciai da bonifica non legati	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Acciai da bonifica legati	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Acciai da cementazione non legati	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Acciai da cementazione legati	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Acciai nitrurati	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Acciai utensili	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Acciai super rapidi	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Acciai per molle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Acciai temprati	–		≤48 HRC	●
			≤66 HRC	●
Acciai inossidabili, allo zolfo	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.86681** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitici	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitici	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Ghise	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Ghise sferoidali, ghise temperate	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	●
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	●
Ghisa in conchiglia	–		≤350 HB	●
Nuove ghise GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Nuove ghise ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Leghe speciali	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titanio e leghe di titanio	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Alluminio e leghe di alu	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Leghe di alu per lav. plastiche	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Leghe di alu-ghisa ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Leghe di magnesio	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Rame legato in bassa %	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Ottone, a truciolo corto	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
a truciolo lungo	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzi a truciolo corto	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		● ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzi a truciolo lungo	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Mat. plastiche termoindurenti	Resina epossidica, Resopal, Pertinax, Moltopren	≤150		○
Materie termoplastiche	Plexiglas, Hostalen, Novodur, Makralon	≤100		● ○
Mat. plast. a fibre aramidiche	Kevlar	≤1000		○
a fibre di vetro/C rinforzate	GFK/CFK	≤1000		○

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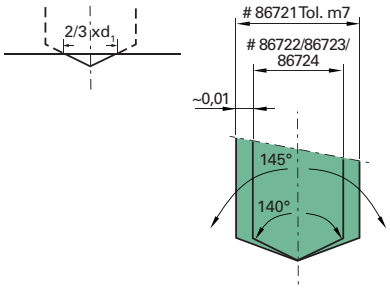
≤10×D

≤1×D foro pilota/svasatura

86722	86725	86723	86724	86721
N. d. f.	N. d. f.	N. d. f.	N. d. f.	N. d. f.
Int. MD	Int. MD	Int. MD	Int. MD	Int. MD
K/P	K/P	K/P	K/P	K/P
1,5xD	1,5xD	1,5xD	1,5xD	1xD
F	a	F	○	a
Acciaio	Acc. inoss.	Ghisa	Alluminio	Pil./svas.
392	401	395	398	389



- Per la realizzazione di fori passanti bisogna controllare che le fasi di guida restino in presa. Inoltre l'avanzamento va ridotto prima di effettuare il foro passante.
- In generale, per profondità di foro da 5xD, consigliamo l'uso dello stelo art. 86681 e relativo inserto art. 86721, per effettuare il foro pilota consentendo il centraggio ottimale.
- Senza foro pilota, consigliamo di ridurre l'avanzamento durante centratura.
- Non utilizzare la punta per fori interrotti (scanalature, fori trasversali) senza prove preliminari. In caso di fori interrotti (max. 0,2 x D) consigliamo, se possibile, di ridurre l'avanzamento.
- Contrariamente alle classiche punte ad inserto, la Multiplex è adatta anche per la foratura di pacchi di lamierini.
- Su torni (utensile fisso) fare attenzione che l'utensile sia esattamente nel centro
- Presupposto per una truciolatura ottimale è una buona refrigerazione con emulsione ad olio.
- L'utensile è adatto per lavorazione a secco o con nebulizzazione solo a ben determinate condizioni. Con nebulizzazione suggeriamo l'impiego di codoli conici per nebulizzazione, nonché di mandrini per nebulizzazione. Chiedete ai nostri tecnici che Vi consiglieranno.

v_c m/min	Nr. col. avanz.	v_c m/min	Nr. col. avanz.	v_c m/min	Nr. col. avanz.	v_c m/min	Nr. col. avanz.	v_c m/min	Nr. col. avanz.
100	5							130	6
95	4							110	5
100	6							130	7
95	5							110	6
100	5							130	6
95	5							125	6
90	4							110	5
90	5							110	6
85	4							90	5
100	6							130	7
90	5							110	6
70	4							70	4
95	4							105	5
70	3							70	4
55	4							60	5
50	3							55	4
55	2							55	3
50	2							50	2
		25	1					25	2
		55	2					55	3
		40	2					40	3
		35	2					35	3
				80	6			100	6
				70	6			90	6
				100	7			120	7
				80	6			100	6
		70	6					90	6
				60	5			80	5
				60	5			80	5
				60	5			80	5
				60	5			80	5
		25	1					25	2
		40	2					40	3
		35	1					35	2
						150	6	200	7
						150	6	180	7
						130	6	150	7
						105	6	120	7
						150	6	180	7
						70	5	70	6
						150	6	180	7
						110	5	120	6
						70	5	70	6
						50	5	50	6
						45	5	45	6
						35	4	35	5

Annotazioni

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Hartner dispone sia internamente che all'estero di una valida e competente rete di vendita. I nostri partner rappresentanti seguono il cliente con un servizio di assistenza tecnico-commerciale.

Gli indirizzi dei nostri rappresentanti sono pubblicati sul nostro sito:

www.hartner.de

Naturalmente potete contattarci anche direttamente:

Hartner GmbH
Jakobstraße 10
72458 Albstadt
Germania
Telefon: +49 74 31 1 25-0
Fax: +49 74 31 1 25-21 547
info@hartner.de

HARTNER

Precision Cutting Tools

Hartner GmbH | Casella postale 100427 | D-72425 Albstadt

Telefono: +49 74 31 125-0 | Fax: +49 74 31 125-21 547 | www.hartner.de

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