

CL 200



$\lambda$  25°-30°



STANDARD



CL 230

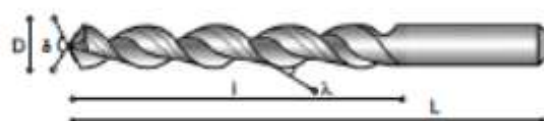
FOR PROFONDI  
DEEP HOLE



$\lambda$  35°-40°



DIN 1412 C



CL200



CL230



Dal  $\varnothing$  0,5 al  $\varnothing$  6 = 10 pz  
Dal  $\varnothing$  5,1 al  $\varnothing$  13 = 9 pz

D h8	L	l	CODE	HSS 5200..... €	HSS+5%Co 5230..... €	HSS+5%Co 6230..... € QUARTZ	HSS+5%Co 7230..... € TITANITE
0,5	32	12	...00050				
0,6	35	15	...00060				
0,7	42	21	...00070				
0,8	46	25	...00080				
0,9	51	29	...00090				
1	56	33	...00100				
1,1	60	37	...00110				
1,2	65	41	...00120				
1,25	65	41	...00125				
1,3	65	41	...00130				
1,4	70	45	...00140				
1,5	70	45	...00150				
1,6	76	50	...00160				
1,7	76	50	...00170				
1,75	80	53	...00175				
1,8	80	53	...00180				
1,9	80	53	...00190				
2	85	56	...00200				
2,1	85	56	...00210				
2,2	90	59	...00220				
2,25	90	59	...00225				
2,3	90	59	...00230				
2,4	95	62	...00240				
2,5	95	62	...00250				
2,6	95	62	...00260				
2,7	100	66	...00270				
2,75	100	66	...00275				
2,8	100	66	...00280				
2,9	100	66	...00290				
3	100	66	...00300				
3,1	106	69	...00310				
3,2	106	69	...00320				
3,25	106	69	...00325				
3,3	106	69	...00330				
3,4	112	73	...00340				
3,5	112	73	...00350				
3,6	112	73	...00360				
3,7	112	73	...00370				
3,75	112	73	...00375				
3,8	119	78	...00380				

CL 200



N

$\lambda$  25°-30°

$\delta$  118°

STANDARD



CL 230

FORN PROFONDI  
DEEP HOLE

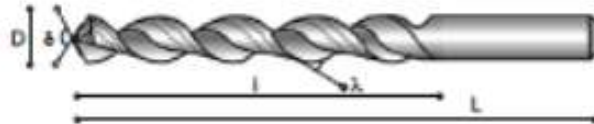


S

$\lambda$  35°-40°

$\delta$  135°

DIN 1412 C



CL200



CL230



Dal  $\varnothing$  0,5 al  $\varnothing$  6 = 10 pz  
Dal  $\varnothing$  6,1 al  $\varnothing$  13 = 5 pz

D h8	L	l	CODE	HSS	HSS+5%Co	HSS+5%Co	HSS+5%Co
				5200... €	5230... €	6230... € QUARTZ	7230... € TITANITE
3,9	119	78	...00390				
4	119	78	...00400				
4,1	119	78	...00410				
4,2	119	78	...00420				
4,25	119	78	...00425				
4,3	126	82	...00430				
4,4	126	82	...00440				
4,5	126	82	...00450				
4,6	126	82	...00460				
4,7	126	82	...00470				
4,75	126	82	...00475				
4,8	132	87	...00480				
4,9	132	87	...00490				
5	132	87	...00500				
5,1	132	87	...00510				
5,2	132	87	...00520				
5,25	132	87	...00525				
5,3	132	87	...00530				
5,4	139	91	...00540				
5,5	139	91	...00550				
5,6	139	91	...00560				
5,7	139	91	...00570				
5,75	139	91	...00575				
5,8	139	91	...00580				
5,9	139	91	...00590				
6	139	91	...00600				
6,1	148	97	...00610				
6,2	148	97	...00620				
6,25	148	97	...00625				
6,3	148	97	...00630				
6,4	148	97	...00640				
6,5	148	97	...00650				
6,6	148	97	...00660				
6,7	148	97	...00670				
6,75	156	102	...00675				
6,8	156	102	...00680				
6,9	156	102	...00690				
7	156	102	...00700				
7,1	156	102	...00710				
7,2	156	102	...00720				

CL 200



$\lambda$  25°-30°



STANDARD



CL 230

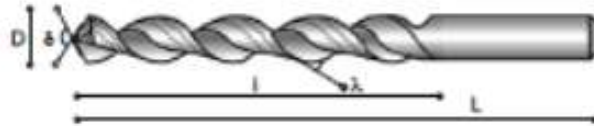
FOR DEEP HOLES  
DEEP HOLE



$\lambda$  35°-40°



DIN 1412 C



Real D.P.E. at D.C. = 48 mm

CL200



CL230



D h8	L	l	CODE	HSS	HSS+5%Co	HSS+5%Co	HSS+5%Co
				5205 €	5230 €	5230 € QUARTZ	7230 € TITANITE
7,25	156	102	...00725				
7,3	156	102	...00730				
7,4	156	102	...00740				
7,5	156	102	...00750				
7,6	165	109	...00760				
7,7	165	109	...00770				
7,75	165	109	...00775				
7,8	165	109	...00780				
7,9	165	109	...00790				
8	165	109	...00800				
8,1	165	109	...00810				
8,2	165	109	...00820				
8,25	165	109	...00825				
8,3	165	109	...00830				
8,4	165	109	...00840				
8,5	165	109	...00850				
8,6	175	115	...00860				
8,7	175	115	...00870				
8,75	175	115	...00875				
8,8	175	115	...00880				
8,9	175	115	...00890				
9	175	115	...00900				
9,1	175	115	...00910				
9,2	175	115	...00920				
9,25	175	115	...00925				
9,3	175	115	...00930				
9,4	175	115	...00940				
9,5	175	115	...00950				
9,6	184	121	...00960				
9,7	184	121	...00970				
9,75	184	121	...00975				
9,8	184	121	...00980				
9,9	184	121	...00990				
10	184	121	...01000				
10,1	184	121	...01010				
10,2	184	121	...01020				
10,25	184	121	...01025				
10,3	184	121	...01030				
10,4	184	121	...01040				
10,5	184	121	...01050				
10,6	184	121	...01060				
10,7	195	128	...01070				
10,75	195	128	...01075				
10,8	195	128	...01080				
10,9	195	128	...01090				
11	195	128	...01100				
11,1	195	128	...01110				
11,2	195	128	...01120				
11,25	195	128	...01125				
11,3	195	128	...01130				
11,4	195	128	...01140				
11,5	195	128	...01150				
11,6	195	128	...01160				
11,7	195	128	...01170				
11,75	195	128	...01175				
11,8	195	128	...01180				
11,9	205	134	...01190				
12	205	134	...01200				
12,1	205	134	...01210				
12,2	205	134	...01220				

CL 200



$\lambda$  25°-30°



STANDARD



CL 230

FOR PROS  
DEEP HOLE



$\lambda$  35°-40°



DIN 1412 C



CL200



CL230



Dal  $\varnothing$  0,5 al  $\varnothing$  6 = 10 pz  
Dal  $\varnothing$  6,1 al  $\varnothing$  13 = 5 pz

D h8	L	l	CODE	HSS	HSS+5%Co	HSS+5%Co	HSS+5%Co
				5200..... €	5230..... €	6230..... € QUARTZ	7230..... € TITANITE
12,25	205	134	...01225				
12,3	205	134	...01230				
12,4	205	134	...01240				
12,5	205	134	...01250				
12,6	205	134	...01260				
12,7	205	134	...01270				
12,75	205	134	...01275				
12,8	205	134	...01280				
12,9	205	134	...01290				
13	205	134	...01300				
13,25	214	140	...01325				
13,5	214	140	...01350				
13,75	214	140	...01375				
14	214	140	...01400				
14,25	220	144	...01425				
14,5	220	144	...01450				
14,75	220	144	...01475				
15	220	144	...01500				
15,25	227	149	...01525				
15,5	227	149	...01550				
15,75	227	149	...01575				
16	227	149	...01600				
16,25	235	154	...01625				
16,5	235	154	...01650				
16,75	235	154	...01675				
17	235	154	...01700				
17,25	241	158	...01725				
17,5	241	158	...01750				
17,75	241	158	...01775				
18	241	158	...01800				
18,25	247	162	...01825				
18,5	247	162	...01850				
18,75	247	162	...01875				
19	247	162	...01900				
19,25	254	166	...01925				
19,5	254	166	...01950				
19,75	254	166	...01975				
20	254	166	...02000				



rpm  
 $= (\text{mt/min} \times 1000) / (D \times 3,14)$



mm/min  
 $= \text{mm/rev} \times \text{rpm}$



= mt/min



= mm/rev  
 (vedi tabella - see table page pag. 23)

PUNTE EXTRA CORTE TWIST DRILLS, STUB LENGHT										PUNTE CORTE TWIST DRILLS, JOBBER LENGHT		
CL100	CL101			CL118			CL104	CL104R				
HSS		HSS+8%Co			HSS+5%Co			HSS				

Pag. 378	TIPO DI ACCIAIO TYPE OF STEEL	N/mm <sup>2</sup>	HV	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev
ACCIAI COMUNI COMMON STEEL	Acciai teneri Soft steel	1	500	157	30 b	42 d	55 c	60 c	38 c	50 c	57 c	30 b	37 c
	Acciai da costruzione Structural steel	2	700	219	22 c	35 c	45 b	55 b	30 c	40 b	50 b	22 c	30 b
	Acciai da tempra Hardening steel	3	900	280	13 c		35 b	40 b		30 b	38 b	13 c	20 b
	Acciaio automatico Automatic steel	4	1200	373									
ACCIAI INOX STAINLESS STEEL	Acciaio automatico Automatic steel	3	850	265	17 b	26 c	32 b	36 b	22 b	28 b	34 b	17 b	22 b
	Austenitico Austenitic	3	850	265	8 c	18 d	18 c	22 c	12 c	15 c	20 c	8 c	12 c
	Ferritico+austenitico Ferritic austenitic	4	1000	311	10 b		22 c	26 c	15 b	18 c	24 c	10 b	15 b
GHISA CAST IRON	Ghisa fino a 180 hb Cast iron up to 180hb	2	500	157	30 d	38 d	45 c	48 d	36 d	42 c	45 d	30 d	37 d
	Ghisa oltre 180 hb Cast iron over 180hb	3	700	219	20 b	28 c	32 c	35 d	26 b	30 c	32 d	20 b	25 b
TITANIO TITANIUM	Titanio non legato Unalloyed titanium	5	500	157	22 b	33 d	36 d	40 d	28 c	31 c	38 d	22 b	26 b
	Leghe di titanio Titanium alloys	5	900	280	10 a	24 d	27 d	30 d	18 c	21 c	28 d	10 a	14 a
RAME COPPER	Rame Copper	9	350	110	30 c	42 d			40 c			30 c	40 c
	Ottone Brass	9	700	219	33 c	45 d	55 c		43 b	50 c		33 c	43 b
	Bronzo Bronze	9	700	219	15 c	24 d	50 c		22 b	45 c		15 c	23 b
NICHEL NICKEL	Nichel non legato Unalloyed nichel	6	700	219	10 b	18 c	22 c	26 d	16 c	20 c	24 d	10 b	16 c
	Leghe di nichel Nichel alloys	6	900	280	5 a	15 c	12 c	16 d	12 b	10 c	14 d	5 a	11 b
ALLUMINIO ALUMINIUM	Alluminio non legato Unalloyed aluminium	7	350	110	35 d	40 d	70 d		38 d	60 d		35 d	39 d
	Alluminio con leghe Alloyed aluminium	7	400	125	30 d	35 d	60 d		33 d	55 d		30 d	34 d
	Alluminio con leghe Alloyed aluminium	7	500	157	25 c	30 c	45 c		28 c	40 c		25 c	29 c

## PUNTE CORTE TWIST DRILLS, JOBBER LENGTH



CL107 CL108 CL104CR CL106 CL105 CL109 CL119



HSS HSS+5%Co HSS+8%Co HSS+5%Co



mt/min mm/rev		mt/min mm/rev		mt/min mm/rev		mt/min mm/rev		mt/min mm/rev		mt/min mm/rev		mt/min mm/rev		mt/min mm/rev	
		30 b	35 c	50 c	57 c	42 d	55 c	60 c	38 c	50 c	57 c	38 c	50 c	57 c	
		22 c	28 b	40 b	50 b	35 c	45 b	55 b	30 c	40 b	50 b	30 c	40 b	50 b	
		13 c	18 b	30 b	38 b		35 b	40 b		30 b	38 b		30 b	38 b	
		17 b	20 b	28 b	34 b	26 c	32 b	36 b	22 b	28 b	34 b	22 b	28 b	34 b	
		8 c	10 c	15 c	20 c	18 d	18 c	22 c	12 c	15 c	20 c	12 c	15 c	20 c	
		10 b	13 b	18 c	24 c		22 c	26 c	15 b	18 c	24 c	15 b	18 c	24 c	
		30 d	35 d	42 c	45 d	38 d	45 c	48 d	36 d	42 c	45 d	36 d	42 c	45 d	
		20 b	23 b	30 c	32 d	28 c	32 c	35 d	26 b	30 c	32 d	26 b	30 c	32 d	
		22 b	24 b	31 c	38 d	33 d	36 d	40 d	28 c	31 c	38 d	28 c	31 c	38 d	
		10 a	12 a	21 c	28 d	24 d	27 d	30 d	18 c	21 c	28 d	18 c	21 c	28 d	
	30 c	30 c	38 c			42 d			40 c			40 c			
33 c		33 c	41 b	50 c		45 d	55 c		43 b	50 c		43 b	50 c		
15 c		15 c	20 b	45 c		24 d	50 c		22 b	45 c		22 b	45 c		
		10 b	14 c	20 c	24 d	18 c	22 c	26 d	16 c	20 c	24 d	16 c	20 c	24 d	
		5 a	9 b	10 c	14 d	15 c	12 c	16 d	12 b	10 c	14 d	12 b	10 c	14 d	
	35 d	35 d	37 d	60 d		40 d	70 d		38 d	60 d		38 d	60 d		
	30 d	30 d	32 d	55 d		35 d	60 d		33 d	55 d		33 d	55 d		
	25 c	25 c	27 c	40 c		30 c	45 c		28 c	40 c		28 c	40 c		



$$\text{rpm} = (\text{mt/min} \times 1000) / (D \times 3,14)$$



$$\text{mm/min} = \text{mm/rev} \times \text{rpm}$$



$$= \text{mt/min}$$



$$= \text{mm/rev}$$

(vedi tabella - see table page pag. 23)

PUNTE LUNGHE TWIST DRILLS, LONG SERIES				PUNTE EXTRA LUNGHE TWIST DRILLS, EXTRA LONG SERIES					
CL200	CL230			CL111/1	CL110/1			CL111/2	
DIN 340				DIN 1869/1					DIN 1869/2
HSS		HSS+5%Co			HSS		HSS+5%Co		HSS

Pag. 378	TIPO DI ACCIAIO TYPE OF STEEL	N/mm <sup>2</sup>	HV	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev
ACCIAI COMUNI COMMON STEEL	Acciai teneri Soft steel	1	500	157	30 b	38 c	50 c	57 c	30 b	38 c	50 c	57 c	30 b
	Acciai da costruzione Structural steel	2	700	219	22 c	30 c	40 b	50 b	22 c	30 c	40 b	50 b	22 c
	Acciai da tempra Hardening steel	3	900	280	13 c		30 b	38 b	13 c		30 b	38 b	13 c
	Acciaio automatico Automatic steel	4	1200	373									
ACCIAI INOX STAINLESS STEEL	Acciaio automatico Automatic steel	3	850	265	17 b	22 b	28 b	34 b	17 b	22 b	28 b	34 b	17 b
	Austenitico Austenitic	3	850	265	8 c	12 c	15 c	20 c	8 c	12 c	15 c	20 c	8 c
	Ferritico+austenitico Ferritic austenitic	4	1000	311	10 b	15 b	18 c	24 c	10 b	15 b	18 c	24 c	10 b
GHISA CAST IRON	Ghisa fino a 180 hb Cast iron up to 180hb	2	500	157	30 d	36 d	42 c	45 d	30 d	36 d	42 c	45 d	30 d
	Ghisa oltre 180 hb Cast iron over 180hb	3	700	219	20 b	26 b	30 c	32 d	20 b	26 b	30 c	32 d	20 b
TITANIO TITANIUM	Titanio non legato Unalloyed titanium	5	500	157	22 b	28 c	31 c	38 d	22 b	28 c	31 c	38 d	22 b
	Leghe di titanio Titanium alloys	5	900	280	10 a	18 c	21 c	28 d	10 a	18 c	21 c	28 d	10 a
RAME COPPER	Rame Copper	9	350	110	30 c	40 c			30 c	40 c			30 c
	Ottone Brass	9	700	219	33 c	43 b	50 c		33 c	43 b	50 c		33 c
	Bronzo Bronze	9	700	219	15 c	22 b	45 c		15 c	22 b	45 c		15 c
NICHEL NICKEL	Nichel non legato Unalloyed nichel	6	700	219	10 b	16 c	20 c	24 d	10 b	16 c	20 c	24 d	10 b
	Leghe di nichel Nichel alloys	6	900	280	5 a	12 b	10 c	14 d	5 a	12 b	10 c	14 d	5 a
ALLUMINIO ALUMINIUM	Alluminio non legato Unalloyed aluminium	7	350	110	35 d	38 d	60 d		35 d	38 d	60 d		35 d
	Alluminio con leghe Alloyed aluminium	7	400	125	30 d	33 d	55 d		30 d	33 d	55 d		30 d
	Alluminio con leghe Alloyed aluminium	7	500	157	25 c	28 c	40 c		25 c	28 c	40 c		25 c

PUNTE EXTRA LUNGHE TWIST DRILLS, EXTRA LONG SERIES							PUNTE DOPPIE DOUBLE TWIST DRILLS	PUNTE PER CENTRI NC NC-SPOTTING DRILLS									
QUARTZ			TITANITE			QUARTZ			TITANITE			QUARTZ			TITANITE		
CL110/2			CL111/3			CL110/3			CL150			CL102			CL103		
DIN 1869/2			DIN 1869/3			CARMON NORM.			CARMON NORM.								
HSS+5%Co			HSS			HSS+5%Co			HSS			HSS+8% Co					
[Symbol]			[Symbol]			[Symbol]			[Symbol]			[Symbol]					
mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	
38 c	50 c	57 c	30 b	38 c	50 c	57 c		35 c	50 c	57 c	35 c	50 c	57 c				
30 c	40 b	50 b	22 c	30 c	40 b	50 b		28 b	40 b	50 b	28 b	40 b	50 b				
	30 b	38 b	13 c		30 b	38 b		18 b	30 b	38 b	18 b	30 b	38 b				
22 b	28 b	34 b	17 b	22 b	28 b	34 b		20 b	28 b	34 b	20 b	28 b	34 b				
12 c	15 c	20 c	8 c	12 c	15 c	20 c		10 c	15 c	20 c	10 c	15 c	20 c				
15 b	18 c	24 c	10 b	15 b	18 c	24 c		13 b	18 c	24 c	13 b	18 c	24 c				
36 d	42 c	45 d	30 d	36 d	42 c	45 d		35 d	42 c	45 d	35 d	42 c	45 d				
26 b	30 c	32 d	20 b	26 b	30 c	32 d		23 b	30 c	32 d	23 b	30 c	32 d				
28 c	31 c	38 d	22 b	28 c	31 c	38 d		24 b	31 c	38 d	24 b	31 c	38 d				
18 c	21 c	28 d	10 a	18 c	21 c	28 d		12 a	21 c	28 d	12 a	21 c	28 d				
40 c			30 c	40 c				38 c			38 c						
43 b	50 c		33 c	43 b	50 c			41 b	50 c		41 b	50 c					
22 b	45 c		15 c	22 b	45 c			20 b	45 c		20 b	45 c					
16 c	20 c	24 d	10 b	16 c	20 c	24 d		14 c	20 c	24 d	14 c	20 c	24 d				
12 b	10 c	14 d	5 a	12 b	10 c	14 d		9 b	10 c	14 d	9 b	10 c	14 d				
38 d	60 d		35 d	38 d	60 d			37 d	60 d		37 d	60 d					
33 d	55 d		30 d	33 d	55 d			32 d	55 d		32 d	55 d					
28 c	40 c		25 c	28 c	40 c			27 c	40 c		27 c	40 c					





rpm  
 $= (\text{mm/min} \times 1000) / (D \times 3,14)$



mm/min  
 $= \text{mm/rev} \times \text{rpm}$




























= mt/min



= mm/rev  
 (vedi tabella - see table page pag. 23)

PUNTE DA CENTRO CENTER DRILLS									PUNTE A GRADINO CON ELICHE INDIPENDENTI SUBLAND DRILLS WITH INDEPENDENT SPIRAL					
CL910			CL920			CL930			CL270	CL271	CL272			
DIN 333/A			DIN 333/R			DIN 333/B			DIN 8376	DIN 8374	DIN 8378			
HSS									HSS					

Pag. 378	TIPO DI ACCIAIO TYPE OF STEEL	N/mm <sup>2</sup>	HV	mt/min		mm/rev		mt/min		mm/rev		mt/min		mm/rev		mt/min		mm/rev			
				b	c	b	c	b	c	b	c	b	c	b	c	b	c				
ACCIAI COMUNI COMMON STEEL	Acciai teneri Soft steel	1	500	157	30	37	30	37	30	37	30	37	30	37	30	37	30	37	30	37	
	Acciai da costruzione Structural steel	2	700	219	22	30	22	30	22	30	22	30	22	30	22	30	22	30	22	30	22
	Acciai da tempra Hardening steel	3	900	280	13	20	13	20	13	20	13	20	13	20	13	20	13	20	13	20	13
	Acciaio automatico Automatic steel	4	1200	373																	
ACCIAI INOX STAINLESS STEEL	Acciaio automatico Automatic steel	3	850	265	17	22	17	22	17	22	17	22	17	22	17	22	17	22	17	22	
	Austenitico Austenitic	3	850	265	8	12	8	12	8	12	8	12	8	12	8	12	8	12	8	12	8
	Ferritico+austenitico Ferritic austenitic	4	1000	311	10	15	10	15	10	15	10	15	10	15	10	15	10	15	10	15	10
GHISA CAST IRON	Ghisa fino a 180 hb Cast iron up to 180hb	2	500	157	30	37	30	37	30	37	30	37	30	37	30	37	30	37	30	37	
	Ghisa oltre 180 hb Cast iron over 180hb	3	700	219	20	25	20	25	20	25	20	25	20	25	20	25	20	25	20	25	20
TITANIO TITANIUM	Titanio non legato Unalloyed titanium	5	500	157	22	26	22	26	22	26	22	26	22	26	22	26	22	26	22	26	22
	Leghe di titanio Titanium alloys	5	900	280	10	14	10	14	10	14	10	14	10	14	10	14	10	14	10	14	10
RAME COPPER	Rame Copper	9	350	110	30	40	30	40	30	40	30	40	30	40	30	40	30	40	30	40	30
	Ottone Brass	9	700	219	33	43	33	43	33	43	33	43	33	43	33	43	33	43	33	43	33
	Bronzo Bronze	9	700	219	15	23	15	23	15	23	15	23	15	23	15	23	15	23	15	23	15
NICHEL NICKEL	Nichel non legato Unalloyed nichel	6	700	219	10	16	10	16	10	16	10	16	10	16	10	16	10	16	10	16	10
	Leghe di nichel Nichel alloys	6	900	280	5	11	5	11	5	11	5	11	5	11	5	11	5	11	5	11	5
ALLUMINIO ALUMINIUM	Alluminio non legato Unalloyed aluminium	7	350	110	35	39	35	39	35	39	35	39	35	39	35	39	35	39	35	39	35
	Alluminio con leghe Alloyed aluminium	7	400	125	30	34	30	34	30	34	30	34	30	34	30	34	30	34	30	34	30
	Alluminio con leghe Alloyed aluminium	7	500	157	25	29	25	29	25	29	25	29	25	29	25	29	25	29	25	29	25

PUNTE CODOLO CONICO TAPER SHANK TWIST DRILLS				PUNTE LUNGHE CODOLO CONICO TAPER SHANK DRILLS, LONG SERIES				PUNTE EXTRA LUNGHE CODOLO CONICO TWIST DRILLS TAPER SHANK EXTRALONG						
														
CM300	CM303			CM301	CM302			CM304	CM306			CM305	CM307	
														
HSS	HSS+5% Co			HSS	HSS+5% Co			HSS	HSS+5% Co			HSS	HSS+5% Co	
														
mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	
30 c	35 c	50 c	57 c	30 c	38 c	50 c	57 c	30 c	38 c	50 c	57 c	30 c	38 c	
22 b	28 b	40 b	50 b	22 b	30 c	40 b	50 b	22 b	30 c	40 b	50 b	22 b	30 c	
13 b	18 b	30 b	38 b	13 b		30 b	38 b	13 b		30 b	38 b	13 b		
17 b	20 b	28 b	34 b	17 b	22 b	28 b	34 b	17 b	22 b	28 b	34 b	17 b	22 b	
8 c	10 c	15 c	20 c	8 c	12 c	15 c	20 c	8 c	12 c	15 c	20 c	8 c	12 c	
10 b	13 b	18 c	24 c	10 b	15 b	18 c	24 c	10 b	15 b	18 c	24 c	10 b	15 b	
30 d	35 d	42 c	45 d	30 d	36 d	42 c	45 d	30 d	36 d	42 c	45 d	30 d	36 d	
20 b	23 b	30 c	32 d	20 b	26 b	30 c	32 d	20 b	26 b	30 c	32 d	20 b	26 b	
22 b	24 b	31 c	38 d	22 b	28 c	31 c	38 d	22 b	28 c	31 c	38 d	22 b	28 c	
10 a	12 a	21 c	28 d	10 a	18 c	21 c	28 d	10 a	18 c	21 c	28 d	10 a	18 c	
18 c	30 c	40 c		18 c	38 c	40 c		18 c	38 c	40 c		18 c	38 c	
20 c	33 c	43 b	50 c	20 c	41 b	43 b	50 c	20 c	41 b	43 b	50 c	20 c	41 b	
12 c	15 c	22 b	45 c	12 c	20 b	22 b	45 c	12 c	20 b	22 b	45 c	12 c	20 b	
10 b	14 c	20 c	24 d	10 b	16 c	20 c	24 d	10 b	16 c	20 c	24 d	10 b	16 c	
5 a	9 b	10 c	14 d	5 a	12 b	10 c	14 d	5 a	12 b	10 c	14 d	5 a	12 b	
35 d	37 d	60 d		35 d	38 d	60 d		35 d	38 d	60 d		35 d	38 d	
30 d	32 d	55 d		30 d	33 d	55 d		30 d	33 d	55 d		30 d	33 d	
25 c	27 c	40 c		25 c	28 c	40 c		25 c	28 c	40 c		25 c	28 c	



rpm  
 $= (\text{mt/min} \times 1000) / (D \times 3,14)$



mm/min  
 $= \text{mm/rev} \times \text{rpm}$



= mt/min



= mm/rev  
 (vedi tabella - see table page pag. 23)

## PUNTE A DUE DIAMETRI SUBLAND TWIST DRILLS



Pag. 378	TIPO DI ACCIAIO TYPE OF STEEL	N/mm <sup>2</sup>	HV	mt/min mm/rev	mt/min mm/rev	mt/min mm/rev	
ACCIAI COMUNI COMMON STEEL	Acciai teneri Soft steel	1	500	157	30 c	30 c	30 c
	Acciai da costruzione Structural steel	2	700	219	22 b	22 b	22 b
	Acciai da tempra Hardening steel	3	900	280	13 b	13 b	13 b
	Acciaio automatico Automatic steel	4	1200	373			
ACCIAI INOX STAINLESS STEEL	Acciaio automatico Automatic steel	3	850	265	17 b	17 b	17 b
	Austenitico Austenitic	3	850	265	8 c	8 c	8 c
	Ferritico+austenitico Ferritic austenitic	4	1000	311	10 b	10 b	10 b
GHISA CAST IRON	Ghisa fino a 180 hb Cast iron up to 180hb	2	500	157	30 d	30 d	30 d
	Ghisa oltre 180 hb Cast iron over 180hb	3	700	219	20 b	20 b	20 b
TITANIO TITANIUM	Titanio non legato Unalloyed titanium	5	500	157	22 b	22 b	22 b
	Leghe di titanio Titanium alloys	5	900	280	10 a	10 a	10 a
RAME COPPER	Rame Copper	9	350	110	18 c	18 c	18 c
	Ottone Brass	9	700	219	20 c	20 c	20 c
	Bronzo Bronze	9	700	219	12 c	12 c	12 c
NICHEL NICKEL	Nichel non legato Unalloyed nichel	6	700	219	10 b	10 b	10 b
	Leghe di nichel Nichel alloys	6	900	280	5 a	5 a	5 a
ALLUMINIO ALUMINIUM	Alluminio non legato Unalloyed aluminium	7	350	110	35 d	35 d	35 d
	Alluminio con leghe Alloyed aluminium	7	400	125	30 d	30 d	30 d
	Alluminio con leghe Alloyed aluminium	7	500	157	25 c	25 c	25 c

FORATURA DRILLING	TABELLA PARAMETRI DI AVANZAMENTO mm/giro RECOMMENDED FEED DATA mm/rev.																
	DIAMETRO DELLA PUNTA DRILL DIAMETER																
LETTERA DI RIFERIMENTO REFERENCE LETTER	D. 1	D. 2	D. 3	D. 4	D. 5	D. 6	D. 8	D. 10	D. 12	D. 14	D. 16	D. 20	D. 25	D. 30	D. 35	D. 40	D. 50
<b>a</b>	0,015	0,030	0,038	0,047	0,053	0,060	0,075	0,090	0,100	0,120	0,127	0,160	0,200	0,230	0,250	0,300	0,350
<b>b</b>	0,020	0,050	0,070	0,085	0,100	0,120	0,150	0,180	0,200	0,230	0,250	0,270	0,290	0,330	0,350	0,380	0,400
<b>c</b>	0,023	0,080	0,100	0,130	0,150	0,180	0,250	0,270	0,280	0,300	0,330	0,370	0,420	0,450	0,470	0,500	0,550
<b>d</b>	0,030	0,100	0,160	0,180	0,220	0,240	0,300	0,370	0,400	0,450	0,480	0,500	0,530	0,550	0,580	0,600	0,630
<b>e</b>	0,035	0,120	0,200	0,250	0,270	0,300	0,350	0,450	0,470	0,500	0,530	0,550	0,600	0,640	0,680	0,700	0,730
<b>f</b>	0,050	0,150	0,220	0,250	0,320	0,400	0,490	0,620	0,650	0,720	0,850	0,900	1,100	1,130	1,170	1,200	1,250
<b>g</b>	0,070	0,160	0,250	0,270	0,360	0,470	0,620	0,830	0,900	0,950	1,100	1,200	1,280	1,330	1,400	1,470	1,520
<b>h</b>	0,090	0,200	0,270	0,300	0,400	0,520	0,750	1,000	1,100	1,200	1,300	1,350	1,430	1,500	1,650	1,700	1,800

## CLASSIFICAZIONE DEI MATERIALI GROUPS OF MATERIALS

## ESEMPI DI MATERIALI - MATERIAL EXAMPLE

		W. - Nr.	DIN	EN	B.S.	AISI/SAE	SS
- Acciai sino a 500 N/mm2	- Steels up to 500 N/mm2	1.0037	ST 37-2	EN 10025	FE 360 B	M 1010	1311
- Acciai da costruzione	- Construction steels	1.0044	ST 44-2	EN 10025	FE 430 B FN	M 1015	1412
- Acciai alta velocità	- Steels for automatic lathes	1.0711	9 S 20	1651	220 M 07		
		1.0715	9 SMn 28	1651	230 M 07	1213	1912
		1.0718	9 MnPb 28	1651		12 L 13	1914

### 1

- Acciai sopra 500 - 800 N/mm2	- Steels more than 500 - 800 N/mm2	1.0060	St 60-2	EN 10025	4360-55E; 55C	A572 GR.65	1650
- Acciai da costruzione	- Construction steels	1.0503	C 45	EN 10083-2	080 M 46	1045	1672
- Acciai alta velocità	- Steels for automatic lathes	1.0570	St 52-3	EN 10025	4360-50 D		2134
- Acciai da cementazione	- Case hardening steels	1.0727	45 S 20	1651		1146	
- Acciai da bonifica	- Tempering steels	1.1141	Ck 15	1652T.3	080 M15	1015	1370
- Acciai da utensili nonlegati	- Non-alloyed tools steels	1.1191	Ck 45		080 M 46	1045	1672
- Titanio non legato	- Non-alloyed titanium						
- Ghisa grigia < 180 HB	- Cast iron < 180 HB						

### 2

- Acciai sopra 800 - 1000 N/mm2	- Steels more than 800 - 1000 N/mm2	0.6020	GG 20		GRADE 220	A48-30B	0120-00
		0.7040	GGG 40		420/12	60-40-18	0717-02
- Acciai da cementazione	- Case hardening steels	0.8035	GTW-35				
- Acciai da bonifica	- Tempering steels	0.8135	GTS-35		B 340/12	32510	
- Acciai da nitrurazione	- Nitriding steels	1.1167	36 Mn 5	17204	150 M 36	1335	2120
- Acciai da costruzione resistenti al calore	- Heat resistant construction steels	1.1221	Ck 60	EN 10083-1	060 A 62	1060	1665
- Ghisa grigia > 180 HB	- Cast iron > 180 HB	1.2312	40 CrMnMoS 8 6	17350			
		1.5732	14 NiCr 10				3415
		1.5775	31 NiCr 14		653 M 31		
		1.7131	16 MnCr 5		572 M 17	5115	2173
		1.7225	42 CrMo 4	EN 10083-1	708 M 40	4140	2244
		1.8504	34 CrAl 6				
		1.8507	34 CrAlMo 5	17211		A355 Cl.D	
		1.8509	41 CrAlMo 7		905 M 39	A355 Cl.A	2940
		1.8515	31 CrMo 12	17211	722 M 24		2240

### 3

- Acciai sopra 1000 - 1300 N/mm2	- Steels more than 1000 - 1300 N/mm2	0.6030	GG 30		GRADE 300	A48-45B	0130-00
		0.7050	GGG 50		500/7	65-45-12	0727-02
- Acciai da cementazione	- Case hardening steels	0.7060	GGG 60		600/3	80-55-06	0732-03
- Acciai da bonifica	- Tempering steels	0.8065	GTW-65				
- Acciai da nitrurazione	- Nitriding steels	0.8170	GTS-70		P 690		
- Acciai da utensili per lavorazioni a caldo	- Hot working steels	1.2067	102 Cr 6	17350	BL 3	L 3	
- Acciai inossidabili ferritici	- Ferritic Stainless steel	1.2311	40 CrMnMo 7				
- Acciai inossidabili ferritici	- Titanium alloys	1.2312	40 CrMnMoS 8 6	17350			
- Leghe di titanio		1.2343	X 38 CrMoV 5-1	17350	BH 11	H 11	
		1.2344	X40CrMoV 5-1	17350	BH13	H13	HARDOX600
		1.2510	100 MnCrW 4		BO 1	O 1	HARDOX400 500
		1.2710	45 NiCr 6				
		1.2711	54 NiCrMo V 6				
		1.2714	56 NiCrMoV 7	17350			
		1.2833	100 V 1		BW 2	W 210	
		1.2842	90 MnCrV 8	17350	BO 2	O 2	
		1.3565	48 CrMo 4	17230	817 M40		
		1.4002	X 6 CrAl 13	E EN 10088	405 S 17	405	2302
		1.4006	X 10 Cr 13	E EN 10088	410 S21	410	
		1.4028	X 30 Cr 13	E EN 10088	420 S 45	420F	2304
		1.6587	17 CrNiMo 6	1672 T.3	820 A 16		
		1.8519	31 CrMoV 9	17211			
		1.8550	34 CrAlNi 7	17211			
		1.8550	34 CrAlNi 7	172111.4301	X 5 CrNi 18 10	E EN 10088	304 S 15

### 4

## CLASSIFICAZIONE DEI MATERIALI GROUPS OF MATERIALS

## ESEMPI DI MATERIALI - MATERIAL EXAMPLE

		W. - Nr.	DIN	EN	B.S.	AISI/SAE	SS
- Acciai da utensili per lavorazioni a freddo 12% Cr	- Tool steels for cold machining 12% Cr	1.2080	X 210 Cr 12	17350	BD 3	D 3	
- Acciai resistenti al calore = 17% Ni e 17% Cr	- High temperature steels = 17% Ni and 17% Cr	1.2379	X 155 CrVMo 12-1	17350	BD 2	D 2	2310
- Acciai inossidabili austenitici	- Austenitic stainless steel	1.2436	X 210 CrW 12	17350			2312
- Leghe di titanio indurite	- Titanium alloys hardened	1.2601	X 165 CrMoV 12	17350			
- Leghe a base di nichel non indurenti	- Nickel-based alloys	1.4301	X 5 CrNi 18 10	E EN 10088	304 S 15	304	2332
		1.4305	X 12 CrNi S 18 9	E EN 10088	303 S 22	303	2346
		1.4571	X 6CrNiMoTi 17-12-2	E EN 10088	320 S 18	316 Ti	2350
		1.4876	Incoloy 800	SEW 470	NA 15	B 163	
		1.4923	X 22 CrMoV 12-1	17240			
		1.4945	X 6 CrNiWNb 16 16				
		1.4962	X 12 CrNiWTi 16-13				
		1.5920	18 CrNi 8				
		1.6582	34 CrNiMo 6	EN 10083-1			
		2.4632	Nimonic 90	LW			
		2.4654	Waspalloy	LW			
		2.4665	Hastelloy X	LW			
		2.4670	Inconel 713	LW			
		2.4816	Inconel 600	17742			
		2.4856	Inconel 625	17744			
<b>5</b>							
- Leghe resistenti al calore	- Higt temperature alloys	2.4636	Udimet 700				
- Leghe a base di nichel indurenti	- Nickel-based alloys	2.4668	Inconel 718				
		2.4973	René 41				
			Astroloy				
			René 95				
			Stellite 6				
<b>6</b>							
- Alluminio puro	- Pure aluminium	3.0255	Al 99,5				
- Leghe d'alluminio non bonificato	- Non-hardened aluminium	3.2315	AlMgSi 1				
- Materiali malleabili	- Forging materials	3.3211	AlMg 1 SiCu				
		3.3535	AlMg 3				
		3.4365	AlZnMgCu 1,5				
<b>7</b>							
- Leghe d'alluminio bonificato	- Hardened aluminium	3.2151	G-Al Si6 Cu 4				
- Materiali malleabili	- Forging materials	3.2341	G-AlSi 5 Mg				
- Getti in lega leggera Si ≤ 10%	- Aluminium cast material Si ≤ 10%	3.2373	G-AlSi 9 Mg				
<b>8</b>							
- Getti in lega leggera Si > 10%	- Aluminium cast material Si > 10%	3.2381	G-AlSi 10 Mg				
- Leghe rame - zinco (ottone)	- Copper - zinc alloys (brass)	3.2581	G-AlSi 12				
- Leghe rame - stagno (bronzo)	- Copper - zinc alloys (bronze)		AlSi 17 Cu 4				
- Duroplastica laminata	- Duroplast laminated		Al Si 21 CuNiMg				
			AlSi 25 CuNiMg				
<b>9</b>							