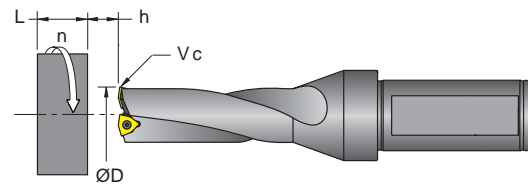
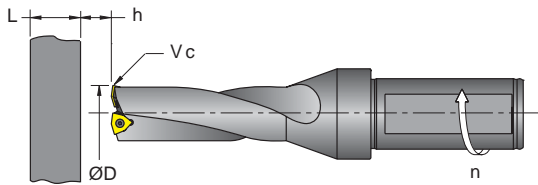

DATI TECNICI FORATURA E BARENATURA

DRILLING AND BORING TECHICAL DATA
TECHNISCHE DATEN ZUM BOHREN UND AUSBOHREN
DONNÉES TECHNIQUES PERCAGE ET ALESAGE
DATOS TECNICOS TALADRADO Y ESCORIADURA



SIGLE E FORMULE GENERALI
GENERAL ACRONYMS AND FORMULAS



- At** (mm²) = AREA DEL FORO
- ØD** (mm) = DIAMETRO DELLA PUNTA
- f** (mm) = AVANZAMENTO AL GIRO
- Ff** (N) = SPINTA ASSIALE
- h** (mm) = DISTANZA DI AVVICINAMENTO
- Kc** (N/mm²) = FORZA DI TAGLIO SPECIFICA
- L** (mm) = PROFONDITÀ DI FORATURA
- Mc** (Nm) = COPPIA , MOMENTO TORCENTE
- n** (giri/min - min⁻¹) = NUMERO DI GIRI AL MINUTO
- Pc** (KW) = POTENZA ASSORBITA
- Q** (cm³/min) = VOLUME DEL TRUCIOLO ASPORTATO
- Tc** (min) = TEMPO DI FORATURA
- Vc** (m/min) = VELOCITÀ DI TAGLIO
- Vf** (mm/min) = VELOCITÀ DI AVANZAMENTO
- η (0,7-0,85) = RENDIMENTO MECCANICO DELLA MACCHINA



- = BORE AREA
- = DRILL DIAMETER
- = FEED / REV.
- = AXIAL THRUST
- = DISTANCE OF APPROACH
- = SPECIFIC CUTTING FORCE
- = DRILLING DEPTH
- = TORQUE
- = NUMBER OF REVOLUTIONS / MIN
- = ABSORBED POWER
- = VOLUME OF CHIP REMOVED
- = DRILLING TIME
- = CUTTING SPEED
- = FEED RATE
- = MECHANICAL EFFICIENCY OF THE MACHINE

$$Vc \text{ (m/min)} = \frac{\text{ØD} \cdot 3,14 \cdot n}{1000}$$

$$n \text{ (giri/min - min}^{-1}\text{)} = \frac{Vc \cdot 1000}{\text{ØD} \cdot 3,14}$$

$$Vf \text{ (mm/min)} = f \cdot n$$

$$Q \text{ (cm}^3\text{/min)} = \frac{Vf \cdot At}{1000}$$

$$At \text{ (mm}^2\text{)} = \frac{3,14 \cdot \text{ØD}^2}{4}$$

$$Tc \text{ (min)} = \frac{L + h}{Vf}$$

$$Pc \text{ (KW)} = \frac{Q}{60 \cdot 1000 \cdot \eta} \cdot Kc \cdot \sin K$$

$$Mc \text{ (Nm)} = \frac{f \cdot Kc}{1000} \cdot \frac{\text{ØD}}{8} \cdot Kc \cdot \sin K$$

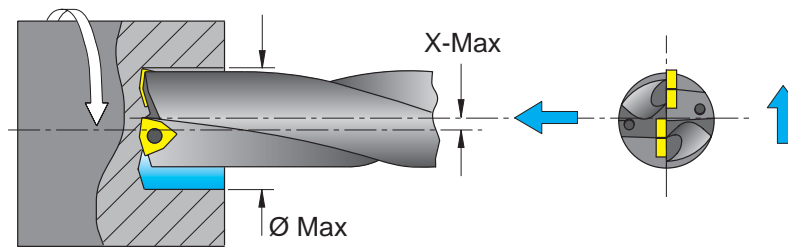
sinK = 1 (k=90°) PUNTE A INSERTI - INSERT DRILLS
sinK = 0,91 (k=70°) PUNTE INTEGRALI - CARBIDE DRILLS

$$Ff \text{ (N)} \approx 0,7 \cdot \frac{\text{ØD}}{2} \cdot f \cdot Kc \cdot \sin K \quad \text{APPROSSIMATA - APPROXIMATE}$$

FORZA SPECIFICA DI TAGLIO Kc PER GRUPPO DI MATERIALE (APPROSSIMATA)
SPECIFIC CUTTING FORCE (Kc) FOR MATERIAL GROUP (APPROXIMATE)

GR.	Kc	GR.	Kc	GR.	Kc	GR.	Kc	GR.	Kc
1	1690	10	2600	15	1440	21	880	31	3250
2	1900	11	3060	16	1630	22	880	32	4130
3	1900	12	2340	17	1530	23	880	33	4020
4	2090	13	2340	18	1690	24	880	34	4130
5	2090	14,1	2690	19	1650	25	880	35	4130
6	1900	14,2	2690	20	1780	26	880		
7	2200					27	880		
8	2500					28	880		
9	2800								

DISASSAMENTO TEORICO PER PUNTE AD INSERTI (CONSIGLIATO SOLO PER LAVORAZIONI SU TORNO)
THEORETICAL OFFSET FOR INSERT DRILLS (RECOMMENDED ONLY FOR LATHE MACHINING)

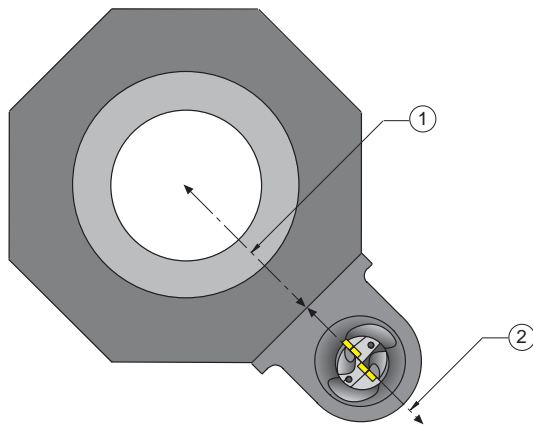


ØD	SDE - X Max	Ø Max	SDBC - X Max	Ø Max	TDC - X Max	Ø Max	TDBC - X Max	Ø Max
14	2,00	18,00	-	-	-	-	-	-
15	1,80	18,60	-	-	-	-	-	-
16	1,50	19,00	-	-	-	-	-	-
17	1,20	19,40	-	-	-	-	-	-
18	2,00	22,00	-	-	1,40	20,80	-	-
19	1,80	22,60	2,50	24,00	1,20	21,40	2,50	24,00
20	1,60	23,20	-	-	1,00	22,00	-	-
21	1,30	23,60	-	-	1,60	24,20	-	-
22	1,00	24,00	-	-	1,50	25,00	-	-
23	0,80	24,60	-	-	1,25	25,50	-	-
24	2,30	28,60	3,00	30,00	1,00	26,00	3,00	30,00
25	2,20	29,40	-	-	0,80	26,60	-	-
26	2,00	30,00	-	-	2,50	31,00	-	-
27	1,80	30,60	-	-	2,20	31,40	-	-
28	1,60	31,20	-	-	2,10	32,20	-	-
29	1,50	32,00	-	-	1,80	32,60	-	-
30	3,20	36,40	4,00	38,00	1,50	33,00	4,00	38,00
31	3,20	37,40	-	-	3,50	38,00	-	-
32	3,20	38,40	-	-	3,20	38,40	-	-
33	3,00	39,00	-	-	3,00	39,00	-	-
34	2,70	39,40	-	-	2,80	39,60	-	-
35	2,50	40,00	-	-	2,50	40,00	-	-
36	2,20	40,40	-	-	2,30	40,60	-	-
37	1,90	40,80	-	-	2,00	41,00	-	-
38	1,60	41,20	-	-	1,80	41,60	5,00	48,00
39	1,40	41,80	3,00	45,00	1,50	42,00	-	-
40	1,20	42,40	-	-	1,20	42,40	-	-
41	1,00	43,00	-	-	1,00	43,00	-	-
42	0,60	43,20	-	-	4,20	50,40	-	-
43	0,30	43,60	-	-	4,00	51,00	-	-
44	0,00	44,00	-	-	3,70	51,40	-	-
45	1,90	48,80	2,50	50,00	3,50	52,00	-	-
46	1,80	49,60	-	-	3,30	52,60	-	-
47	1,50	50,00	-	-	3,00	53,00	-	-
48	1,40	50,80	-	-	2,70	53,40	3,00	54,00
49	1,20	51,40	-	-	2,50	54,00	-	-
50	1,00	52,00	-	-	2,20	54,40	-	-
51	0,70	52,40	-	-	2,00	55,00	-	-
52	0,60	53,20	-	-	1,80	55,60	-	-
53	0,50	54,00	-	-	1,50	56,00	-	-
54	-	-	-	-	1,20	56,40	-	-
55	-	-	-	-	0,80	56,60	-	-
56	-	-	-	-	0,60	57,20	-	-
57	-	-	-	-	0,50	58,00	-	-
58	-	-	-	-	0,40	58,80	-	-
59	-	-	-	-	0,00	-	-	-
60	-	-	-	-	-	-	-	-

QUANDO SI UTILIZZANO LE PUNTE DISASSATE OCCORRE DIMINUIRE L' AVANZAMENTO ANCHE FINO AL 30-50%

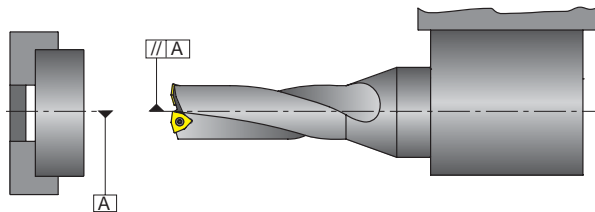
WHEN OFFSET DRILLS ARE USED, IT IS NECESSARY TO REDUCE FEED RATE BY UP TO 30-50%.

INDICAZIONI E CONSIGLI PER LA LAVORAZIONE CON PUNTE AD INSERTI
INSTRUCTIONS AND SUGGESTIONS FOR MACHINING USING INSERT DRILLS



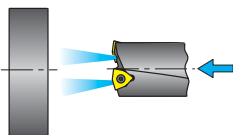
-È indispensabile che il piano 2, sul quale si trovano gli inserti della punta, sia parallelo al piano 1, sul quale si muove la torretta del tornio

-It is absolutely necessary for surface 2, on which the drill inserts are located, to be parallel to surface 1, on which the lathe turret moves



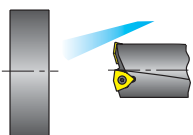
-È indispensabile che sul tornio l'asse della punta e quello del pezzo siano coassiali

-It is absolutely necessary for the drill axis and the workpiece axis to be coaxial on the lathe



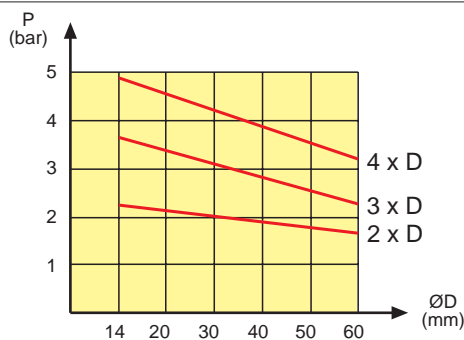
-Per forature con profondità maggiore di $1x \text{ } \varnothing D$ è indispensabile il liquido refrigerante dall'interno della punta

-For bores that are deeper than $1x \text{ diameter } (\varnothing D)$, it is absolutely necessary for the cutting fluid to be fed through the drill



-Con il liquido refrigerante all'esterno della punta è possibile eseguire una lunghezza di foratura max pari a $1x \text{ } \varnothing D$

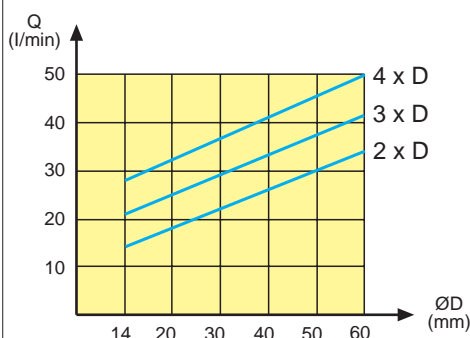
-When the cutting fluid is outside of the drill, it is possible to achieve a maximum bore length of $1x \text{ diameter } (\varnothing D)$



-P = Pressione liquido refrigerante
-P = Coolant Pressure

-Q = Portata liquido refrigerante
-Q = Coolant flow rate

-Nelle tabelle sono riportati valori orientativi per lavorazioni in orizzontale
-Reference values for horizontal machining are indicated in the tables

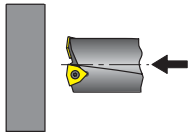


-Per lavorazioni in verticale aumentare i valori del 30-40%
-For vertical machining the values should be increased by 30-40%

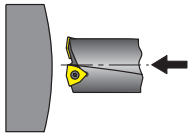
-Se la rottura del truciolo è buona si possono diminuire i valori del 30-40%
-If chip breakage is good it is possible to reduce the values by 30-40%

-Se la rottura del truciolo non è buona si consiglia di aumentare i valori del 30-50%
-If chip breakage is not good it is recommended to increase the values by 30-50%

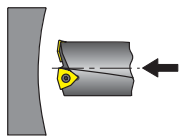
INDICAZIONI E CONSIGLI PER LA LAVORAZIONE CON PUNTE AD INSERTI
INSTRUCTIONS AND SUGGESTIONS FOR MACHINING USING INSERT DRILLS



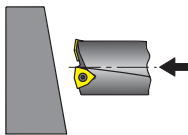
-Piano pari condizione ottimale
-Level surface, optimum condition



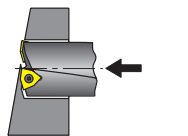
-Piano convesso condizione sufficiente
-Convex surface, adequate condition



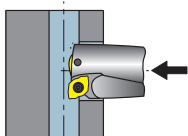
-Piano concavo condizione precaria, diminuire l' avanzamento del 30/50%
-Surface concave, precarious condition; reduce feed rate by 30-50%



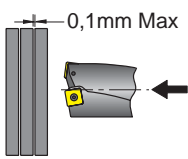
-Piano inclinato in entrata condizione precaria, diminuire l' avanzamento del 30/50%
-Surface tilted at inlet, precarious condition; reduce feed rate by 30-50%



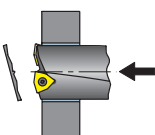
-Piano inclinato in uscita condizione precaria, diminuire l' avanzamento del 30/50%
-Surface tilted at outlet, precarious condition; reduce feed rate by 30-50%



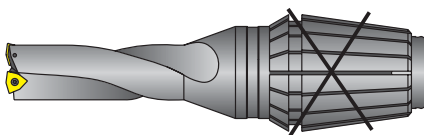
-Attraversamento di un foro trasversale condizione precaria, diminuire l' avanzamento del 30/50% punta consigliata tipo **TDW**
-Penetration by a transverse bore, precarious condition; reduce feed rate by 30-50% recommended drill: **TDW** type



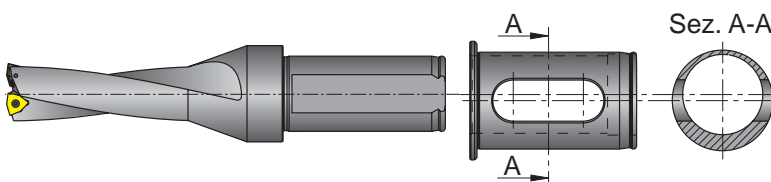
-Nella foratura di elementi sovrapposti assicurarsi che siano rigidamente bloccati in prossimità del foro punta. usare esclusivamente punte tipo **SDP**
-When stacked elements are bored, make sure that they are rigidly held in place near the drill bore. use exclusively **SDP** type drills



-In tornitura, nelle forature passanti, si genera un dischetto che può essere proiettato ad alta velocità, assicurarsi che vi siano adeguate protezioni per l'operatore.
-When making through bores during turning, a small disk is formed which might be ejected at high speeds; make sure that the operator is adequately protected.



-Occorre che il bloccaggio della punta sia sicuro, sono quindi sconsigliate prese con pinze elastiche tipo er.
-It is necessary for the drill to be held securely in place; therefore, er type elastic clamps are not recommended



- Le punte **SDE TDC** si possono usare su macchine con punta rotante e pezzo fermo, con boccole per disassamento : ART. BPUH... PAG. D 124
- Le punte possono essere disassate da -0,1 a +0,3mm
- **SDE, TDC**, drill bits can be used on machine with rotating drill and stationary workpiece, with offset bushings: part no. BPUH, page D 124
- The drill, can be offset by -0.1 to +0.3mm



TOLLERANZE DI COSTRUZIONE STANDARD, MISURATE CON INSERTO CAMPIONE
STANDARD CONSTRUCTION TOLERANCES, MEASURED BY MEANS OF A STANDARD INSERT

ØD +/- 0,08

SDE
TDC

ØD +/- 0,12

SDBC
TDBC
SDP

PROSPETTO PER RICHIESTA DI COSTRUZIONE O DI OFFERTA DI PUNTE AD INSERTI "SPECIALI"
INQUIRY FORM FOR DRILLS WITH "SPECIAL" INSERTS

NOTA :

La tolleranza richiesta si intende misurata con inserto campione, inoltre non é vincolante ai fini della lavorazione. TOLLERANZA MINIMA +/- 0,05 mm.

NOTE :

The requested tolerance is the one measured with sample insert and it is unbinding for machining purposes. MINIMUM TOLERANCE +/- 0,05 mm.

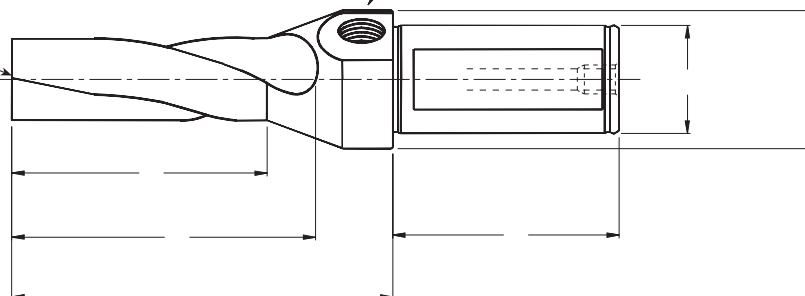
ANMERKUNG :

Die erforderliche Toleranz wird mit Musterwendeschneidplatte gemessen und ist nicht bearbeitungsverbindlich. MINDESTTOLERANZ +/- 0,05 mm.

NOTE :

La tolérance demandée est à considérer mesurée avec plaquette échantillon. De plus elle n'est pas contraignante pour l'usinage. TOLÉRANCE MINIMUM +/- 0,05 mm.

N° pz.	ART.	ØD	+/-	R	L
	SDE				
	SDBC				
	TDC				
	TDBC				
	SDP				
	SDC				



NOTE : _____

NUOVE PUNTE CON DOPPIO PIANO DI BLOCCAGGIO
NEW DRILLS WITH DOUBLE CLAMPING PLANE

FIG.1

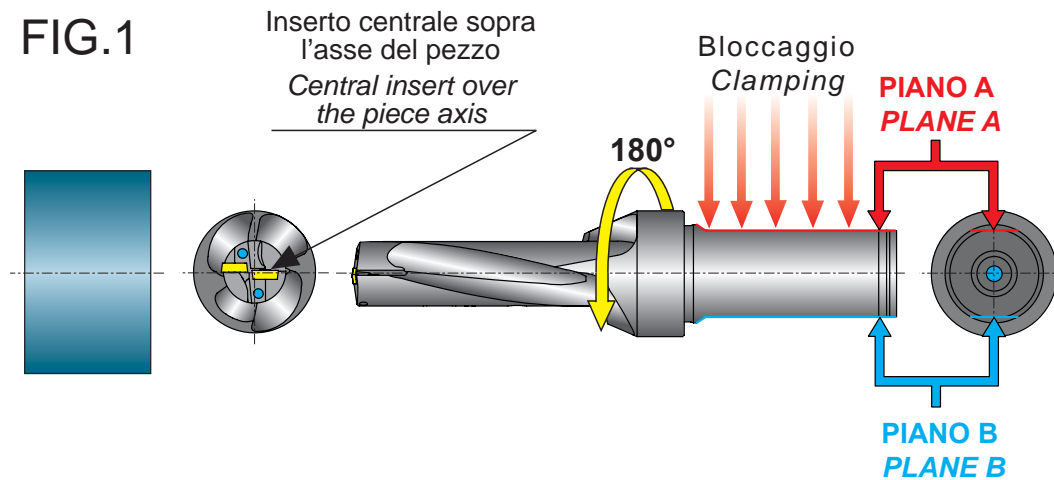
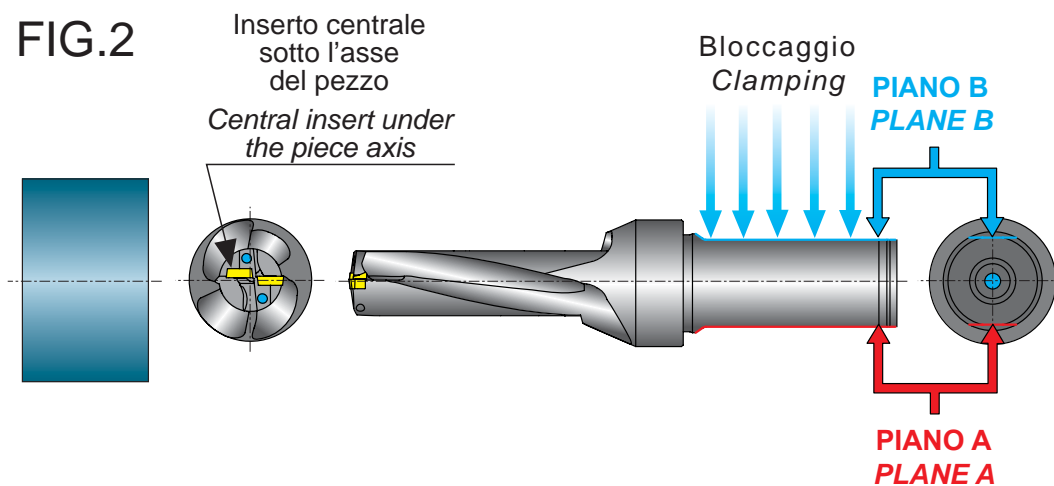


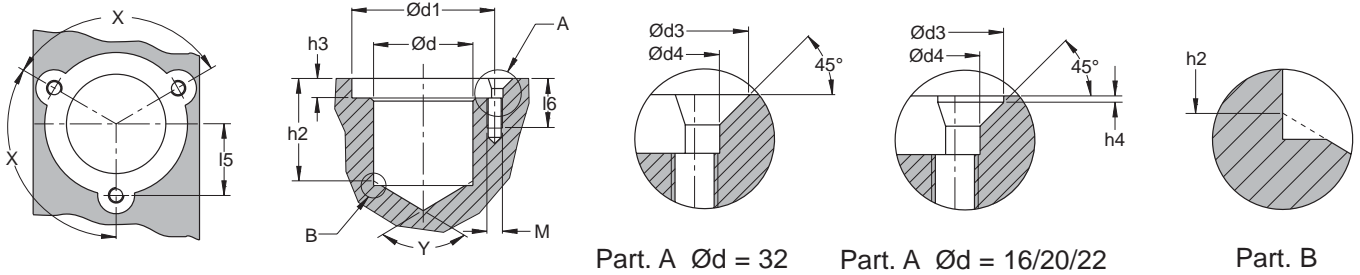
FIG.2



NEL CASO DI FUNZIONAMENTO NON OTTIMALE DELLA PUNTA (ES.FIG1), GIRARLA DI 180°, IN MODO DA CAMBIARE PIANO DI BLOCCAGGIO (ES.FIG2).

IN CASE OF IMPERFECT OPERATION OF THE DRILL (EX.FIG1), TURN IT BY 180° SO AS TO CHANGE THE CLAMPING PLANE (EX.FIG2).

INDICAZIONI PER L' APPLICAZIONE DELLE UNITÀ MICROMETRICHE
 INSTRUCTIONS FOR INSTALLATION OF MICRO-BORING UNITS

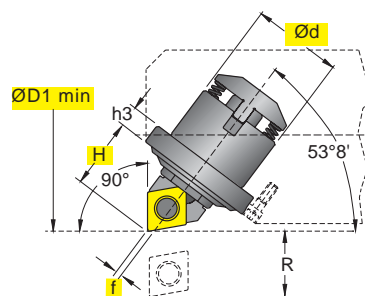


H7	+0,2 0	+0,3 0		+0,2 0	+0,02 -0,02	+0,1 0		+0,02 -0,02		+15' -15'	MAX
Ød	Ød1	Ød3	Ød4	h2	h3	h4	M	I5	I6	X	Y
16	19	4,6	3,2	11,5	2,8	1,6	M3	9,65	9	120°	118°
20	25	4,6	3,2	15,5	4,0	1,6	M3	12,50	9	120°	118°
22	30	6,5	4,3	24,0	5,0	1,8	M4	15,40	13	120°	118°
32	46	11,9	5,4	33,0	6,3	-	M5	23,00	16	120°	118°

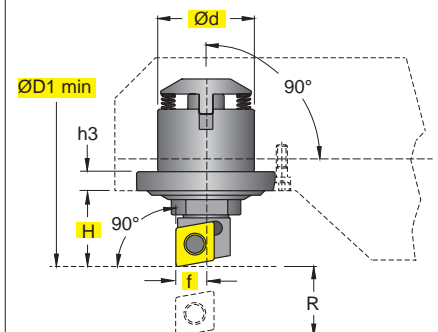
DIAMETRO MINIMO (ØD1min.) DI BARENATURA
 MINIMUM BORE DIAMETER (ØD1MIN.)

Art.	Ød	ØD1min.	f	H
L348C.31.0602	16	25,4	0,36	10,9
L348C.32.0602	20	33,1	1,07	14,6
L348C.33.09T3	22	42,6	1,30	17,1
L348C.34.09T3	32	60,0	1,56	26,2
L348C.32.0902	20	33,1	1,07	14,6
L348C.33.1102	22	42,6	1,30	17,1
L348C.34.16T3	32	60,0	1,56	26,2
L348C.11.0602	16	27,6	5,1	10,2
L348C.12.0602	20	37,1	6,3	13,7
L348C.13.09T3	22	49,1	7,2	16,3
L348C.14.09T3	32	69,0	10,0	25,1
L348C.12.0902	20	37,1	6,3	13,7
L348C.13.1102	22	49,1	7,2	16,3
L348C.14.16T3	32	69,0	10,0	25,1

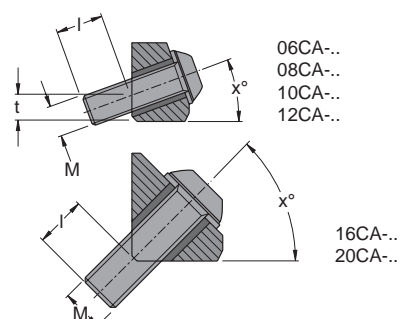
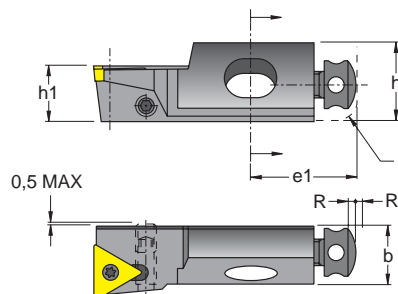
LC348C.3....



LC348C.1....



DIMENSIONI CARTUCCE
 CARTRIDGES DIMENSIONS



ART.	H1	h	b	e1	x°	t	M	I	r	R
06CA-05	5,5	7,5	6,0	13	20°	2,1	M3x0,5	4,0	2	1,0
06CA-06	6,0	8,5	6,0	12	20°	3,5	M3x0,5	4,0	3	1,0
08CA-..	8,0	11,0	7,5	17	20°	4,5	M4x0,7	5,0	3	1,0
10CA-..	10,0	15,0	11,0	20	20°	5,0	M6x1	9,5	4	1,5
12CA-..	12,0	20,0	15,0	20	20°	6,0	M6x1	7,5	5	1,5
16CA-..	16,0	25,0	20,0	25	45°	-	M8x1,25	11,5	6	1,5
20CA-..	20,0	30,0	20,0	30	45°	-	M8x1,25	10,0	6	1,5